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The Relationship between Stakeholder Marketing and Reciprocity in Eastern Europe: A Conceptual Analysis

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This conceptual paper deals with important implications of 'reciprocity' in marketing in emerging and developing business environments, such as Eastern Europe. In mature, developed, high income, business systems, both transaction and relationship based marketing have been well researched. We posit that in less mature business systems, especially transition or emerging economies, there is a third way to look at marketing and exchange, which we call 'reciprocity-stakeholder marketing.' We believe that our framework shows the importance of reciprocity, a fundamental concept in business, for marketing in emerging environments such as Eastern Europe. This paper provides a meaningful starting point for empirical research for developing strategies in Eastern Europe.

Keywords: Eastern Europe; reciprocity; stakeholder; hostages; countertrade; emerging environments

Introduction

This conceptual paper deals with marketing implications of 'reciprocity' in marketing in emerging and developing business environments. International marketing is taking place within a context set by specific, identified stakeholders (Woodbine, 2008; Zakhem, 2008) and in the institutions that support them. Marketing research is increasingly recognizing that in-order to be effective; one needs to consider a broader range of stakeholders. Marketing was seen too restrictive and single dimensional to be effective in the eyes of the Nordic school of thought (Gummesson and Gronroos, 2012). Long term interactive relationships and social networks, rather than transactional exchange, are considered the core of research in marketing. In mature business systems, both transaction and relationship based marketing have been well researched (Arnold and Quelch, 1998; Polonsky, Schuppisser, & Beldona, 2002). We posit that in transition or emerging economies such as Eastern Europe, there is a third way to look at marketing and exchange,

which we call 'reciprocity stakeholder marketing.' We believe that our framework shows the importance of reciprocity (Rosanas, 2008; Stevens, 2008), a fundamental concept for marketing, in emerging environments such as Eastern Europe. The Study of credible commitments that has been relatively neglected in academic literature is explained by the assumption, common to both law and economics, that the legal system enforces promises in a knowledgeable, sophisticated, and low cost way (Berger & Herstein, 2012).

Understanding social capital is relevant for understanding what is going on within and between companies (Luoma-Aho & Vos, 2010). Doing business in many post-Communist countries is very risky because of the prevalence of bribery, extortion and organized crime penetration (Beekun, Westerman, & Barghouti, 2005). In emerging and developing economies, a traditional institutional base has been found striving toward the global economy. In the initial stages of their transformation, such economies have an institutional vacuum, where opportunism (Stevens, 2008; Donaldson, 2008) may be difficult to overcome. If they are to succeed, they need something to support the exchange thus implementing the marketing process in the short term. We believe that such a framework exists. It is an approach that provides temporary scaffolding within which the necessary new institutions of both transactional and relational type can be constructed.

The literature, which has most influenced our thinking on stake-holder marketing, is that on the role of institutions in economic development (Rosanas, 2008; North, 1990; Olson, 1992) or in emerging and transition economies (Kleinrichert, 2008). This paper contributes to this debate in two ways. First by providing a framework for analysing international marketing, which has to be effective across the divide between very different business systems, Secondly, this paper sets out to integrate thinking on the significance of 'ethical' social institutions, especially in the context of emerging globalization, for international marketing (Chiou & Pan, 2008; Choi, Hilton, & Millar, 2004) in Eastern Europe.

We suggest that, in addition to these two institutional aspects of markets and relationship marketing, a third framework is appropriate, one that is based on the concept of mutual hostage giving and taking (Schelling, 1960; Williamson, 1983; Hilton, Choi, Lee, & Millar, 1997) as a means of establishing an irrevocable mutual commitment to a sequence of exchanges out of which may develop a relationship of trust and consequent ongoing exchange. Such reciprocity provides an ethical aspect to marketing exchange that can overcome the opportunism (Stevens, 2008; Zakhem, 2008) that exists in emerging and developing business environments such as many Eastern Europe countries.

Western institutions are generally built on the basis of trust in the government, regulatory agencies, and especially the judicial system, as well

as other formal institutions (Beekun, Stedham, Yamamura, & Barghouti, 2003). In many Eastern European countries, these institutions are not fully developed in the sense of Western economies (McCarthy, Puffer, Dunlap, & Jaeger, 2012). In many cases, their culture is considered to be collective in nature (Hofstede, 2006). These countries have a century's long tradition with collectivism emphasizing the importance of unity and equality (Michailova & Hutchings, 2006). For instance, in Russia, strong collective instincts were encouraged in the countryside in pre-revolutionary times. Collective farming was encouraged by the Tsars because of their fear of anarchy and in an attempt to minimize natural disasters and increase productivity. A strong cultural tendency, based on Communist ideology, is to distrust individuals, groups, and organizations that fall outside personal social networks. This has been attributed to the perception that outsiders do not share the same cultural values as group members and thus cannot be trusted (McCarthy & Puffer, 2008). For example, during the Communist period, the Communist party members placed themselves above the law. As a result, rules and regulations were easily violated and this resulted in a propensity for people not to value the judicial system and contracts. As a result, business of informal social-based networks was such that the use of personal social networks for attaining goods and services in short supply, and for circumventing official procedures can be efficiently conceptualized as the know-how of the Soviet system.

In a market economy, trust comes from formal institutions (such as courts and its legal system) and from informal institutions such as business ethics. For instance, in Communist Russia the markets were lead by central planners. There was no need for strategic or marketing planning, it was sufficient that the products were sent to a predetermined 'customer.' It was necessary to build personal relationships with 'planners' and other related firms as a prerequisite for gaining effective access to the markets. Russia has been ruled by the Communist party for over 50 years. Today, in post communist Eastern Europe, it is still important to build personal relations with government officials in-order to gain access to state property, win state contracts, and avoid direct and indirect taxes (Puffer & McCarthy, 2011).

Credible commitments and credible threats share the following common attribute: both appear mainly in conjunction with irreversible commitments and a weak legal system. The idea of using hostage exchange to create mutual incentives in a business context was originally suggested by Williamson (1983). In Williamson's model, the buyer and seller offer each other hostages to guarantee against cheating. If the buyer cheats, the seller may keep the hostage posted by the buyer; if the seller cheats, the buyer keeps the hostage posted by the seller. This is used when trust and tradi-

tion are weak or non-existent as opposed to cultures with long traditions of 'saving face' such as in China, a system called guanxi (Berger & Herstein, 2012).

Transactional Versus Relationship Marketing

Academic work on marketing since the 1990's has primarily focused on relationship based marketing exchange rather than transactional based exchange (Samiee & Walters, 2003; Kalafatis, 2002; Morgan & Hunt, 1994; Vargo & Lusch, 2004). Transactional cost marketing takes into consideration the costs incurred in the marketing of a product or a service. It takes into account the specificity, frequency, limited rationality, uncertainty, and opportunistic behaviour involved in an exchange. It claims that the best way to meet a firm's objectives is by satisfying its customers better than its competitors. The origins of relationship marketing are in Europe, during the 1980s, as a result of the dissatisfaction with the transactional marketing theory (Chattanon & Trimetsoontorn, 2009). Relationship marketing is seen as the complex and long term relationship between exchange partners and not simply as a series of transactions. These relationships are likely to rely less on formal contracts and more on issues such as trust and reciprocity. A common definition of relationship marketing was developed by Callaghan, McPhail, and Yan (1995, pp. 10):

> Relationship marketing centeres on the creation and maintenance of the relationship between two parties of exchange, the supplier as an individual and the consumer as an individual, through the possession of the desire to be mutually empathic, reciprocal, trusting and to form bonds.

Customer attraction but not customer retention is at the focal point of the transactional based marketing theory, which develops, sells, and markets products and services by means of short-term, discrete economic transactions. The authors build upon the concern in the relationship marketing literature regarding its effect on business interaction (Emerson, Alves, & Raposo, 2011). This work distinguishes between the marketing needed to support short-term, discrete exchange transactions and that required to establish and maintain longer-term repeatable and repeated transactions based on good relationships (Stevens, 2008; Donaldson, 2008) between buyer and seller.

This literature indicates that the traditional approach to international marketing saw exchange far too much in terms of what might be appropriate in an idealised market with full transparency, perfect free information, easy legal enforcement of contracts, and high rates of productive efficiency. However, even in well evolved market-based societies, such as the United

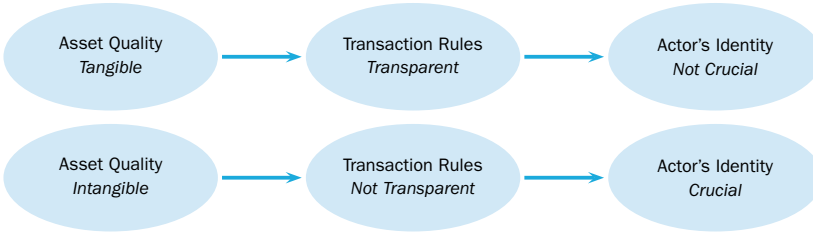

Figure 1 Gift versus Market Exchange – Identity

States, markets do not operate on such a basis, but ultimately always rely on relationships as a sound basis for marketing (Chattananon & Trimetsoontorn, 2009).

Research is increasingly revealing the fact (Samiee & Walters, 2003; Alexander & Colgate, 2000; Morgan & Hunt, 1994; Achrol, 1991; Bucklin & Sengupta, 1993; Vargo & Lusch, 2004) that if one accepts the relationship marketing view, one needs a fundamental paradigm shift. This needs to take into account relational contracting (MacNeil, 1980) within a relational marketing context (Dwyer & LaGace, 1986) that underlines the increased importance of networking (Child & Tse, 2001) to establish effective partnership based on both internal competition and relationships in an increasingly global context. Figure 1 summarizes the concept.

Reciprocity and Stakeholders: Countertrade

Reciprocity is the component in a business relationship that enables giving and receiving favours at a future date, a type of bilateral contingency for a mutual benefit (Berger & Herstein, 2012). Stakeholder theory was developed in-order to better map the firm's environment and assist firms to more efficiently identify and balance different needs (Luoma-aho & Vos, 2010). A stakeholder is an individual or group that is affected or can affect the performance of a firm (Freeman, 1984). Countertrade has been defined as: 'essentially barter trade in which the exporting firm receives payment in terms of products from the importing country' (Rugman & Hodgetts, 1995, p. 168).

We believe that this view portrays matters a little too simply. Hammond's (2000) presents a slightly more complex approach that identifies four types of countertrade: barter, buybacks, offsets and counter purchase, that are all considered as common in international business exchange in Central and Eastern Europe, Asia, Latin America, and Africa (Hilton et al. 1997; Choi, Lee, & Kim, 1999; Marin & Schnitzer, 1995).

Buybacks and barter are the direct exchange of goods between two parties without foreign exchange and were common to trade within Central

Europe (Robicheaux & El Ansary, 1976). Buybacks occur where one party provides input into the production process of another party in return for promising to purchase a proportion of the resulting output. Offsets take place where a seller agrees to offset, partially or in total, the costs of the buyer by subcontracting or co-producing (Thomsen & Pedersen, 1999). Counter purchase is the promise of one party to purchase the goods of the other party at a later date in return for delivering and receiving payment for goods. Barter is seen as the exchange of goods instead of the use on money.

The system operating in the former socialist economies had to adopt all the techniques described above as a pure market exchange. In the past, these exchanges were banned and personal inter-society social relationships were prohibited (Zakhem, 2008; Rosanas, 2008). In such circumstances, the only way they could trade was using countertrade to affect exchange. We posit, however, that these methods can and are used more generally to overcome market and reputational barriers to enterprises wishing to enter the global market and are used in markets where the legal system is weak.

Olson (1992) and Ostrom (1990) note that the former socialist countries had many characteristics common to societies at the beginning of history. There were few if any courts, and if there were any they were often arbitrary in their judgements. Governmental systems and coherent policies (Kleinrichert, 2008; Zakhem, 2008) to facilitate trade did not exist. The leadership of such states was exercised by dictates and arbitrary power ignoring normal social pressures to conforming socially acceptable behaviour typical in most modern and even very ancient societies (Whitley, 1992). As Olson has noted, despite these circumstances international trade with such countries still occurred. The gains from trade are substantial, if not colossal; some trades, and especially those that can be consummated on the spot, are essentially self-enforcing in that the interests of the parties are by themselves sufficient to make the transactions happen (Olson, 1992).

We agree with Olson as to the incentives of exchange in spot transactions within one jurisdiction, but where the exchange is between jurisdictions some other means of building self re-enforcement into a deal is required. An alternative existed, appropriate to the circumstances of these countries and based on the ancient past as alluded to by Olson, namely that of taking and giving hostages to fortune to ensure the good faith of the transacting parties. An even older example of hostage taking (Schelling, 1960) is where marriages are arranged between son and daughter of trust seeking renege avoiding parties.

The mechanism by which such supportive hostages to fortune can be created in the modern world is by use of one of the varieties of counter-

trade listed earlier. Next to transactional and relationship based exchange, this third way to exchange is in contrast to both the explicit legal contract enforcement particularly occurring in formal, legalistic countries such as the United States, and the implicit social enforcement (North, 1990) more frequently observed in relationship and trust based societies. He has developed the idea of the use of such a hostage mechanism for enforcing contracts and business agreements. If each stakeholder and party to a contract faces 'reciprocity' in terms of hostage or hostages to fortune set up with the other, then a credible commitment can be established by each side to underwrite any exchange between them. Hostages to fortune provide an irrevocable and 'ethical' enforcement mechanism that can overcome the purely economic aspects (Rosanas, 2008; Donaldson, 2008) and opportunism (Schelling, 1960, pp. 72):

> The ancients exchanged hostages, drank wine from the same glass to demonstrate the absence of poison, met in public places to inhibit the massacre of one by the other, and even deliberately exchanged spies to facilitate transmittal of authentic information [. . .] in a lawless world that provides no recourse to damage suits for breach of unwritten contracts, hostages may be the only device for partners to strike a bargain.

Such a third framework for international marketing exchange is embedded within the aspects of both, the research on relationship based marketing exchange (Samiee & Walters, 2003; Li & Ng, 2002; Morgan and Hunt, 1994) and the traditional research on discrete, market-based exchange. It is believed to contribute to a firm's legitimacy by managing its long term relationships by contributing to stakeholder satisfaction and consequently shapes the firm's reputation. Stakeholders contribute to a firm's reputation and legitimacy. Hence, countertrade, seen as a manifestation of hostage taking, provides a response to turbulent and uncertain environment that can be seen as quite distinct from the idealistic world of perfect information (Chiou & Pan, 2008; Hunt & Vitell, 1986, 2006; Zakhem, 2008) and efficient markets or that requiring established trust and commitment based relationship-marketing. It is not only the stakeholders who are of substance, but rather the varied networks they become part of.

Emergence, Opportunism, Reciprocity

The issue of restraining opportunism in international marketing has been an important topic in the work on multinational corporations e.g. by Wathne and Heide (2000), Rindfleisch and Heide (1997), Luo and Peng (1999), and Gottschalk and Solli-Soether (2012). Transactions between a multinational corporation, its domestic subsidiaries and other domestic corporations and

Table 1 International Marketing Typology: Traditional, Relationship and Reciprocity Stakeholder Marketing

Marketing Type	Nature of Exchange	Citation
Traditional marketing	Short term, discrete transactions; Anonymity fundamental; Control by law of contract	Gummerson and Gronroos, 2012
Relationship marketing	Long term, repeated transactions; Relationships fundamental; Control by social exclusion	Morgan and Hunt, 1994; Chattanonon and Trimetsoontoson, 2009
Reciprocity staekholder marketing	Short and long term transactions; Personal self interest fundamental; Control by 'reciprocity'	Landa, 1994; Hilton et al., 1997; Emerson et al., 2011

governments add yet another layer of complexity to the dealings that need to be regulated if order, rather than chaos, is to be the norm in everyday business dealings (Casson & Lundan, 1999).

Government administrations and public enterprises can be as susceptible to the temptations of opportunistic behaviour as corporations, especially under totalitarian regimes where they assign themselves to the left, communally orientated, or to the right, libertarian in orientation. The absolute arbitrary discretion of the state in such circumstances results in the lack of 'norms' with no protection from social, legal, or professional sources (Brouthers, 2002). This discourages enterprises from outside of such contexts seeking business within them.

As discussed earlier, such uncertain environment provides neither a basis for frictionless market exchange nor for trust and relationship-based marketing exchange. We posit that countertrade or 'reciprocity' exchange of the type we describe does, however, provide a workable framework for international marketing efforts to penetrate such societies and establish effective trading links. Such reciprocity overcomes the traditional, purely economic (Rosanas, 2008; Kleinrichert, 2008; Stevens, 2008) aspects of opportunism. This paper complements the earlier research (Hewett & Bearden, 2001; Morgan & Hunt, 1994; Samiee & Walters, 2002; Lusch & Brown, 1996) that discusses the importance of relationship marketing and bilateral dependence in non-market governance. Table 1 contrasts the three potential approaches we have outlined in this paper.

Still now, countertrade agreements comprise up to 25 percent of all trade with the former socialist countries (Frances, 2011; Oggioni & Yves, 2012). Hammond's (2000) paper provides an in depth empirical analysis of the continuing prevalence of countertrade agreements throughout certain parts of the world. He shows its prevalence in the actions of governments in many developing countries, e.g. the huge arms for trade and the knowhow deal set up by the South Africans or similar deals brokered by Malaya and

Indonesia. Traditionally, the explanation given for the continued existence of such trade has been the result of a shortage of foreign exchange. We believe this to be a concomitant symptom of the business environment and not the primary source of the benefits, which sustain countertrade. We explain that countertrade survives and has grown because it serves the function of creating an artificial environment conducive to marketing, trade and business in settings where otherwise any exchange at all would be extremely difficult due to the fact that the legal and social systems required to support it and enforce conformity with the rules required to make it work do not exist.

In Central and Eastern Europe the prospect or recent actuality of EU accession may change this for the better, but on the other hand experience indicates that even existing EU countries, e.g. Portugal and Greece are not adverse to stakeholder deals especially in the present economic crisis. In fact, one could argue that much EU international trade and marketing has always been facilitated by such thinking. In the original European Community, the agriculture of France was effectively traded for the industrial productivity of West Germany, which, as a result of the Cold War, lost its bread-basket to the East in what was East Germany. Countertrade also still happens in government-to-government deals, e.g. to balance the trade between two states or to demonstrate that a political return in terms of jobs or income has been gained for a particular politically crucial social group. In such cases, the company/supplier is paid by its own government. All types of countertrade have built in hostage to fortune (Schelling, 1960; Williamson, 1983) and through this a mutual irrevocable commitment by the stakeholders to continue the exchange with each other in addition to what is required to carry out the primary transaction.

Examples of Countertrade: Reciprocity Stakeholder Marketing

Two major types of countertrade, namely offsets and buybacks, illustrate the point on the giving and taking of mutual hostages to fortune (Schelling 1960; Williamson 1983; Hennart and Anderson 1989; Mirus and Yeung 1986).

Offsets

Hall and Markowski (1993) provided a précis on offsets originally provided by Udis and Maskus (1991) who claim that in general, an offset is a contract imposing performance conditions on the seller of a good or service so that the purchasing government can recoup, or offset, some of its investment. In some way, reciprocity beyond that associated with normal market exchange of goods and services is involved. Direct offsets require the participation of industry in the buying country in the manufacturing or assembly of the

item around which the sales contract is written and may include licensed production, coproduction or subcontractor production. Indirect offsets entail goods and services unrelated to the exports included in the sales contract and may include some forms of foreign investment, technology transfer.

A key part of offsets is therefore the fact that their whole discussion refers to agreements to purchase arms. In the case of indirect offsets, the credibility of such deals is almost certainly sustainable as the state is a key contracting party. In both described cases, the existing authority in the state has a clear vested interest in sustaining the deal. In each case, by accepting the deal, a hostage has been created by the purchasing government. In the first instance, this is in terms of political leverage with its own population by giving them access to otherwise unavailable foreign sales. In the second case, this is in terms of technology for which the government believes they will be able to deploy to its future advantage. Cancelling the deal in either case would damage the interest of the purchaser as well as the seller, as was the case in the 'Phalcon' reconnaissance deal between Israel and China. Israel had to cancel the deal as a result of US veto on the exchange. In this case, both China and Israel lost face as well as large amounts of money.

An amusing historical example of this, typical of offset contracts, was the purchase of civilian aircraft by the former Yugoslavia from McDonnell-Douglas. This was offset by the purchase of Yugoslav ham by McDonnell-Douglas. In this example, the well-being of the Yugoslav ham industry was the hostage. Yugoslavia as a state had additional benefit for its corporations and citizens from continuing sales of hams, which it would lose by reneging on the contract. Thus, the offset contract provided incentives to the purchaser to abide by the agreement despite the lack of legal enforceability that one might have found in doing business with a socialist country in those days.

Buybacks

Buybacks are another major type of countertrade. A buyback is a type of joint venture where an enterprise in a developed country supplies the technology and capital required to manufacture a product and agrees to except in payment a percentage of the finished goods that technology can produce. The participant from the emerging economy provides other inputs such as labour and production sites. The output that is bought back by the developed country company is sold in developed markets – thus indirectly providing much wanted access to these developed markets for the enterprise in the emerging country (Choi, et al., 1999)

A typical example of such a buyback was the case of IBM supplying the technology and capital to produce and assemble computers in Hungary

Table 2 Value Creation Conditions: Reciprocity, Redistribution, Market Exchange

Conditions of value creation	Major Characteristics
Reciprocity	Under reciprocity, the identity of the exchange partners are known, with the market valuation, price less important than the social, psychological aspects of value creation
Redistribution	Under gift giving and exchange, inalienable assets are exchanged, often between actors of different status, leading to a certain redistribution of assets and value
Market Exchange	Under economics of markets, exchange is through money of alienable objects, products, services between free actors, agents, who may enact further exchange

(Hilton, et al. 1997; Choi, et al. 1999). In turn, IBM bought back part of the output from the joint venture and sold the computers in its own developed markets in Western Europe and the United States. The advantage of such an agreement was that neither side had an incentive to renege on the quality of inputs or the efforts, on the energy invested into the joint venture and, in extremes, could destrain on the other hostage to fortune. As in the case of offset agreements, there is an element of hostaging between the two joint venture partners. Both joint ventures have mutually beneficial incentives to provide their best technology, capital, labour, efforts and to making the joint venture agreement work. Table 2 summarises these concepts.

Conclusions and Further Research

This conceptual paper emphasised the 'reciprocity' in marketing in emerging and developing business environments. International marketing is taking place within a context set by specific, identified stakeholders and the institutions that support them. In mature business systems, transaction and relationship based marketing have been well researched. We posit that in less mature systems, especially transition or emerging economies, there is a third way to look at marketing and exchange, which we call 'reciprocity-stakeholder marketing.' We believe that our framework shows the importance of reciprocity as a fundamental concept for international marketing in emerging environments such as Eastern Europe.

The concept of thinking about marketing in terms of 'reciprocity,' rather than opportunism, is of assistance to the developing research paradigm that operates on the basis of a more 'ethical' approach to marketing theories. Countertrade agreements of the type presented by the authors indicate how this thinking can provide an insight into how export or trade can proceed in the absence of the institutional framework needed for transaction or relationship-based marketing. We posit that in a globalizing world more and more enterprises in more and more countries are entering exporting and international trade. To do so they may be required to compensate for

their lack of an institutional base on which to establish and sustain exchange by applying a different angle of looking at international marketing and exchange, stake-holder marketing. The objective of this paper was to introduce this new way of looking at countertrade in an international marketing context emphasising a reciprocity based relationship in the absence of a social or legally enforceable one.

The authors identified two ways in which the raised perspectives are of benefit. Firstly, there is room for further conceptual work on 'reciprocity' and ethical marketing in mature economic environments. Secondly, there is a scope for empirical work to examine the proportion of exporting or international trade that is carried out under each of the institutional forms that this paper has outlined. As stated: traditional marketing, relationship marketing, and our third category, reciprocity based stakeholder marketing.

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Linking Resource-Based Strategies to Customer-Focused Performance for Professional Services: A Structural Equation Modelling Approach

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This paper links professional service firms' resource-based strategies to their customer-focused performance for formulating service quality improvement priorities. The research applies the structural equation modelling approach to survey data from Hong Kong construction consultants to test some hypotheses. The study validates the various measures of firms' resource-based strategies and customer-focused performance and bridges the gaps in firms' organizational learning, core competences and customer-focused performance mediated by their strategic flexibility. The research results have practical implications for professional service firms to deploy resources appropriately to first enhance different competences and then improve customer-focused performance using their different competences.

Keywords: organizational learning; core competences; strategic flexibility; customer satisfaction; structural equation model; professional services

Introduction

Worldwide developed economies have been dominated by services for decades, and Hong Kong is not an exception. However, Hong Kong is also well known for its energetic real estate market and the related construction industry, evidenced by the high density of well-functioned commercial and residential buildings. In fact, of Hong Kong's limited non-service sectors, construction industry has been a major business with a share of about 35 percent in recent years.

In the construction industry, the consulting part of a project is traditionally awarded to an outsourcing consultant (architect, surveyor, etc.) who can complete it with the minimum tendering price, and commission for the consultant's professional services is agreed on a mandatory fee scale based on a certain percentage of the project's construction cost (Carr, 1982). As recent as late 1990s, the Hong Kong Housing Authority still engaged construction consultants for their housing projects based on the mandatory fee

scale. However, competitive fee tendering is rapidly gaining popularity in the construction industry as a mechanism for distributing consultancy projects to willing professional service providers, and the awarding decision is based on the consultants' tendering fees and quality scores assessed from their technical submissions by the clients (i.e., government agencies or private firms). For example, a study by Drew, Li, and Shen (2000) identified that 89 percent of quantity surveying consultancy projects in Hong Kong is allocated through the competitive fee tendering mechanism.

The special feature of the competitive fee tendering system, as compared to the traditional price bidding, is its use of a quality score in addition to the fee score in evaluating professional service providers' submissions. It is therefore important for professional consultants in the construction industry to measure and improve their service quality. However, service quality, although often 'created' by the service provider, is eventually perceived by the customers. Just as Drucker (1973) noted four decades ago, business success is not determined by the provider, but by the customer and the customer-focused dimension should be the priority of managerial attention. In today's turbulent environment, customers are playing an even more important role in business competition and, accordingly, customer-focused performance represents a decisive source of firms' competitive advantage. Taking the competitive fee tendering system for example, superior client-perceived consulting quality can help a construction consultant submit relatively higher bidding prices, while still maintaining his overall competitiveness, for higher and long-term profits.

Although customer-focused performance is important, it can only be achieved by translating into measures or actions of what a firm should do to meet customers' requirements. However, there have been few studies effectively addressing the linkage between customer-focused performance and firms' operational or resource-based strategies. Noticeable exceptions are the recent works of Wang and Lo (2003, 2004) who identify the key components and resource-based determinants of customer-focused performance and propose a conceptual framework of cause-effect paths to link firm's resource-based strategies to customer-focused performance. This provides a meaningful approach for construction consultants to identify measures, antecedents, and consequences of their client- or customer-focused service quality for successfully bidding in the competitive fee tendering system.

The current study aims to apply the conceptual framework of Wang and Lo (2003, 2004) to construction consulting services in Hong Kong. It was originated from a Hong Kong government-funded project to model competitive fee tendering in the local construction industry. An important objective of the project was to examine how service quality and customer satisfaction are linked to the strategies and core competences of professional

consultants, so as to help them formulate service quality improvement priorities and develop appropriate bidding strategies. For that purpose, this paper first reviews the conceptual framework with developed detail constructs and proposed relationships. Then sampling method, measurement scales and survey data are described and the structural equation modelling (SEM) results are analysed, such as validating the measures and testing the SEM's goodness-of-fit and the expected relationships. Detail discussions of the modelling results are presented next, which reveal a number of relationships unique to knowledge-intensive services, such as professional consulting in this study. Finally, concluding remarks are provided, including managerial implications for service firms in general, and construction consultants in particular, to improve their customer-focused performance, as well as limitations of the current research and suggestions for future studies.

The Conceptual Framework

This section will present a conceptual framework to link a firm's resource-based strategies to its customer-focused performance based on literature review with a number of research hypotheses implicitly proposed. Resource-based strategies include organizational learning, core competences and strategic flexibility, while customer-focused performance is composed of customer-perceived service quality and value, as well as customer satisfaction.

Key Components of Customer-Focused Performance

As widely accepted in the marketing literature (Chan et al., 2003; Fornell, Johnson, Anderson, Cha, & Bryant, 1996), especially due to their direct relations to customer's purchasing decisions, customer-perceived service quality, customer-perceived service value, and customer satisfaction can be regarded as the three comprehensive and effective dimensions of customer-focused performance. It is noticed that the three dimensions of customer-focused performance interact positively with one another. For example, Oliver (1993) suggests that service quality should be antecedent to customer satisfaction, and Fornell et al. (1996) further identify customer-perceived value as another key driver of customer satisfaction. It is also evident that enhanced service quality should increase service value (Chan et al., 2003; Fornell et al., 1996).

Resource-Based Determinants of Customer-Focused Performance

Superior customer-focused performance can only be achieved through a firm's resource-based strategies, which interact with one another and are combined to lay a solid foundation for the firm's distinctive competences.

The resource-based view allows each strategy or action to be referenced to the delivery of quality services of high value, which in turn lead to the satisfaction of customer requirements (Chmielewski & Paladino, 2007). The firm must build and upgrade its own competences through organizational learning and strategic flexibility to help identify business trends, track customer-focused performance, and facilitate quick market response (Akroush, 2012).

Core competences can be viewed as firm-specific skills and cognitive traits directed towards the attainment of higher customer satisfaction in comparison with the competitors (Hamel & Heene, 1994). These competences can be leveraged directly to satisfy the existing customer needs or indirectly to develop a range of core services, based on which a stream of final services of higher quality and value is delivered. According to the intensive literature reviews by Bani-Hani and AlHawary (2009) and Wang and Lo (2003, 2004), two distinct types of core competences can be identified: *marketing competence* that determines the target customers and market demand of the firm's service offerings, and *technological competence* that determines the offerings' technical contents. This is in line with the three components of dynamic capabilities, a similar concept to core competences, as summarized by Wang and Ahmed (2007): adaptive capability, absorptive capability, and innovative capability. Largely, marketing competence corresponds to adaptive capability, and technological competence relates to absorptive capability and innovative capability.

Integrative competence, although suggested by Wang and Lo (2003, 2004) as another type of core competences, is roughly a combination of marketing and technological competences and hence will not be included in this study for simplicity. It is expected that a firm's core competences positively affect its customer-perceived quality and value, which in turn help the firm achieve higher customer satisfaction (Wang & Ahmed, 2007; Wang & Lo, 2003, 2004).

Strategic flexibility is the ability of a firm to respond to the changes in the environment in a timely and appropriate manner with due regard to the competitive forces in the marketplace (Golden & Powel, 2000; Shimizu & Hitt, 2004). In modern economy, strategic, organizational, and marketing variables have to be adapted for the firms to be efficient (Milgrom & Roberts, 1995). As Kak (2004) argues, no matter how you understand the sources or contents of strategic flexibility, core competences of a firm always exert great influence on its strategic flexibility. For example, a firm's marketing competence determines its speed and cost to detect any changes in the customer requirements or market demand, and its technological competence enables its provision of technologically new services to respond to the market changes. That is, a firm's core competences constitute the ma-

jor sources of its strategic flexibility and determine the level of its strategic flexibility to a great extent.

It is also appropriate to assume positive impacts of a firm's strategic flexibility on its customer-focused performance (Matthyssens, Pauwels, & Vandenbempt, 2005). Hence it can be expected that a firm's strategic flexibility mediates the impacts of its core competences on customer-focused performance. Just as Wang and Ahmed (2007) propose, firm's capabilities or competences are 'more likely to lead to better firm performance when particular capabilities are developed in line with the firm's strategic choice.' This sounds appealing, since a firm's strategic flexibility may be more directly felt by customers than its competences, which are built by the firm in a longer process.

Organizational Learning. Addressed by Cyert & March (1963) over 50 years ago as a process by which organizations learn through interaction with their environments, organizational learning acts as an important antecedent of organizational competences (Murray & Donegan, 2003; Hung, Yang, Lien, McLean, & Kuo, 2010). That is, firms must learn in practice how to acquire, generate or explore as well as how to access, apply or exploit relevant knowledge effectively and efficiently to remain competitive and upgrade their core competences (Grant & Baden-Fuller, 2004; Kang, Morris, & Snell, 2007). As performed in Wang and Lo (2003, 2004), this empirical study will measure and test organizational learning in a narrower sense of learning orientation with three dimensions of straightforward meanings: *commitment to learning, shared vision,* and *open-mindedness.* Indeed, as Kang et al. (2007) and Murray and Donegan (2003) argue, it is the learning environment, orientation or culture that fundamentally determines a firm's learning propensity and process, and hence its competence upgrading and leveraging process.

All of the above expected relationships between the research constructs lead to a path model as shown in Figure 1, which, after detail measures for each construct are developed, forms a typical structural equation model (SEM).

Sampling, Measurements and Data

Sampling Population

This study aims to examine how service quality and customer/client satisfaction are related to the strategies and core competences of the outsourcing consultants in the Hong Kong construction industry, which generally requires data from two sources. On one hand, data from different construction consultancy firms are needed to test the interactive relationships among firms' key resource-based strategies. On the other hand, data from different customers are needed to test the interactive relationships among

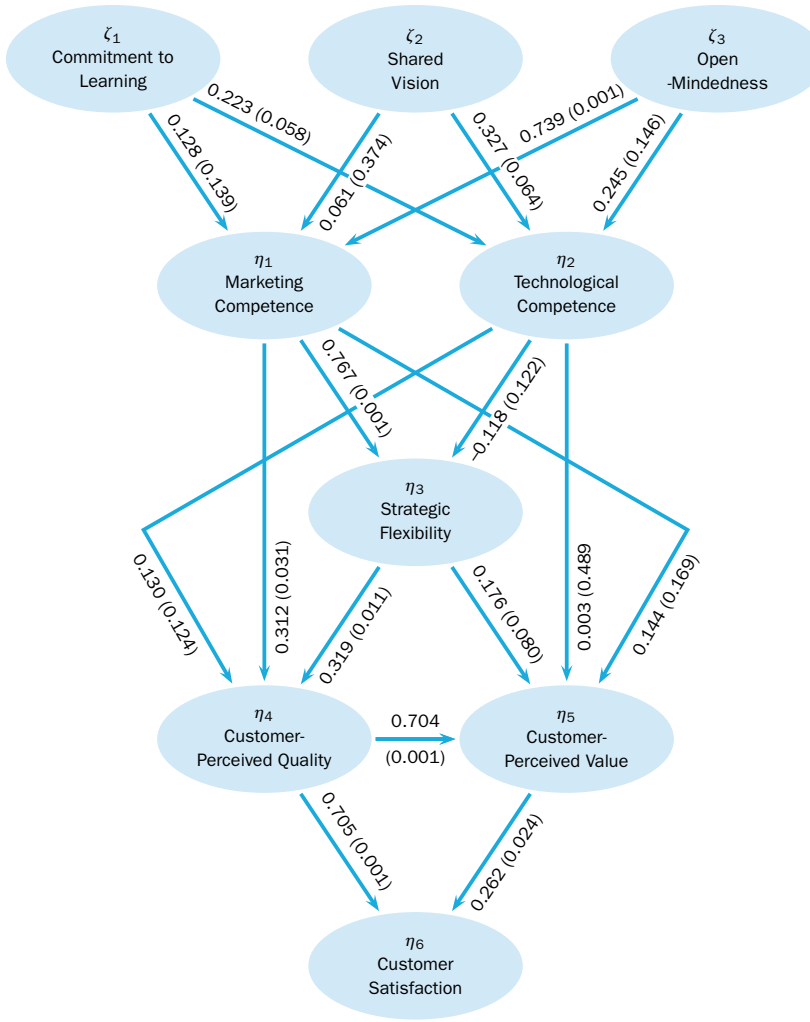

Figure 1 The conceptual model and estimated standardised path coefficients with one-tail *p*-values (in brackets)

the key components of customer-focused performance. More importantly, all of the surveyed customers should be the customers of the surveyed firms in order to link and test the relationships between the two parts, i.e., firm's resource-based strategies and customer-focused performance.

Ideally, the sampling procedure would be to first survey a number of consultancy firms in order to get their self-evaluated resource-based performance data, and then to interview a sufficient number of the customers for each firm, whose responses are averaged to get a set of customer-

focused performance data for the particular firm. A firm's resource-based performance data and its corresponding customer-focused performance data make up a complete data point or observation. For each firm, tens of, if not hundreds of, its customers should be successfully surveyed to make the customer-focused performance data representative and reliable.

In doing so, thousands of customers should be clearly identified and successfully surveyed. This can only be done with full involvement of each firm and is a heavy burden for the study. To be simple, customer-focused performance data were collected indirectly from the firms surveyed and not directly from the firms' customers, i.e. only firms were surveyed. Each surveyed firm not only supplied a set of its resource-based performance data as usual, but also provided a set of its customer-focused performance data as perceived by the firm itself, not by its customers as done in some similar studies (Salomann, Dous, Kolbe, & Brenner 2005; Nasution & Mavondo, 2008).

It is felt that professional service firms included in our study should understand the quality of their services in general and the perceptions of their customers in particular. Hence, the obtained customer-focused performance data, although potentially over- or under-estimated, could be viewed as an initial alternative in this exploratory study for the sake of simplicity and cost-saving. Otherwise, similar to many empirical studies that are primarily related to firms' resource-based strategies (Murray & Donegan, 2003; Hung et al., 2010) or their customer-focused performance (Fink, James, Hatten, & Bakstran, 2008; Hall, 2007), it is operationally and financially difficult for this research to link the two important parts. Furthermore, due to their professionalism or ethics standards, these consulting firms are also less likely to over-estimate their customers' evaluations. In case of possible over-estimations it should be noted that if all firms over-estimate their customers' perceptions in the same manner, the directions and significance levels of the links from resource-based strategies to customer-focused performance would be the same as using actual customer perceptions in a linear model as in this paper, which provides additional support for our simplified approach.

Measurement Scales

The current research developed the measurement scales according to the key ideas suggested by Churchill (1979), i.e. first mapping out the domain of each construct and then establishing the scale items to represent the domain. The first issue of specifying the domains of the constructs in this study has been addressed above where the components of customer-focused performance and its key resource-based determinants have been appropriately defined. As for the second issue, multi-item measures are

strongly recommended to represent the domain of a construct to reduce the measurement errors or increase the measurement reliability. Actually, the use of multi-item measures is almost a must for a well-developed survey instrument in practice.

Hence, a multi-item approach was adopted in this study with each construct measured by several items to capture its domain reliably. In particular, resource-based strategies were directly evaluated by the firms according to their actual performance, and customer-focused performance was indirectly evaluated by the surveyed firms in relation to their established goals, their major rivals in the marketplace, and their customers' desires in certain areas (Beard & Dess, 1981). Based on the previous discussions, and especially on the reviews and suggestions of Wang and Lo (2003, 2004), multiple measurement items were developed to reflect each of the three customer-focused performance constructs and the six resource-based strategies constructs as shown in Table 1.

Each measurement item in Table 1 corresponded to a survey question, which was answered using the popular 7-point Likert scale. For example, the third survey question for the *commitment to learning* construct (denoted as x_{13}) was: 'Learning in our firm is seen as a key to organizational survival.' Respondents were asked to show, from 'strongly disagree' (coded as 1) to 'strongly agree' (coded as 7), their degrees of agreement with this positive statement for the measurement item.

Survey and Data

Based on the above-proposed measurement scales, a questionnaire was developed and mailed with a cover letter to a population of 355 Hong Kong construction consultancy firms. These firms provided construction consulting services in architecture, building surveying, etc. to local developers, contractors, private clients and government departments. The names, addresses and persons in charge of these consulting firms were obtained from local business trade directories and professional societies and associations. Finally, 122 firms returned usable questionnaires, representing a quite high response rate of 34.4 percent as compared to many similar surveys (Salomann et al., 2005; Velcu, 2010). The corresponding data formed the basis for this study, which, due to the high response rate, can be viewed well representative of the professional consultants in the Hong Kong construction industry.

Among the 122 construction consulting firms successfully surveyed, 45.9 percent were smaller with no more than 50 employees while 41.8 percent were relatively large with more than 200 employees, and 83.6 percent had offered construction consulting services for more than 10 years. In particular, 88.5 percent of the surveyed firms used the competitive fee tendering system, of which 65.7 percent and 19.4 percent had positive and

Table 1 Constructs, Survey Items, Reliability Measures, and *R*-Squares

Constructs (ζ_i, η_j), survey items (x_{ik}, y_{jn}), reliability measures and R-squares (R^2)		SFL
ζ_1	Commitment to Learning (AVE = 0.770, Cronbach's α = 0.903)	
x_{11}	The basic values of our firm include learning and knowledge sharing as keys to improvement.	0.796
x_{12}	Our firm sees 'employee learning' an investment, not an expense.	0.927
x_{13}	Learning in our firm is seen as a key to organizational survival.	0.904
ζ_2	Shared Vision (AVE = 0.768, Cronbach's α = 0.907)	
x_{21}	There is a common goal in our firm (for example, to provide clients with quality service).	0.831
x_{22}	There is total agreement on our firm's vision across all levels, functions and divisions.	0.873
x_{23}	All employees are committed to the goals of our firm.	0.923
ζ_3	Open-Mindedness (AVE = 0.601, Cronbach's α = 0.810)	
x_{31}	We are not afraid to review critically the assumptions we have made about our clients.	0.877
x_{32}	Colleagues realize that they must continually review and discuss the way they perceive the market, in terms of the opportunities and threats in the competitive market environment.	0.780
x_{33}	We often collectively question the way we interpret clients' information.	0.653
η_1	Marketing Competence (AVE = 0.568, Cronbach's α = 0.835, R^2 = 0.801)	
y_{11}	Our capability in obtaining real time information about changes of clients' needs is very strong.	0.728
y_{12}	Our capability in communicating with clients about their potential and current demands is very strong.	0.816
y_{13}	We have strong capability in benchmarking our services to our major competitors.	0.729
y_{14}	We have strong capability of managing effectively long-term, close relationships with clients.	0.737
η_2	Technological Competence (AVE = 0.507, Cronbach's α = 0.780, R^2 = 0.550)	
y_{21}	Our firm always makes relatively heavy investment in R&D activities.	0.585
y_{22}	We have accumulated a broad spectrum of strong professional knowledge and skills.	0.665
y_{23}	We are skillful in applying new technology, knowledge or practice to problem-solving.	0.854
y_{24}	We always lead the innovation of technology or practice in the construction industry.	0.717

Continued on the next page

natural assessments of the system respectively, demonstrating the popularity and effectiveness of the new project bidding system.

Modelling Results and Analyses

The covariance-based SEM approach was used to estimate and evaluate the proposed model using the Amos package and the survey data. Following the two steps recommended by Anderson and Gerbing (1988), the various mea-

Table 1 *Continued from the previous page*

Constructs (ζ_i, η_j), survey items (x_{ik}, y_{jn}), reliability measures and *R*-squares (R^2)		SFL
η_3	Strategic Flexibility (AVE = 0.624, Cronbach's α = 0.889, R^2 = 0.591)	
y_{31}	We have strong capability to redirect the strategic positioning of our services quickly and effectively.	0.793
y_{32}	We have strong capability to respond quickly to the actions taken by our competitors.	0.822
y_{33}	We have strong capability to respond quickly to rapidly changing clients' needs.	0.829
y_{34}	We have strong capability to redeploy strategic resources quickly according to environmental changes.	0.791
y_{35}	Strategic resources in our firm can be used in many different areas.	0.709
η_4	Customer-Perceived Quality (AVE = 0.833, Cronbach's α = 0.936, R^2 = 0.464)	
y_{41}	Our clients always get services of high quality from our firm.	0.866
y_{42}	Our clients consider the quality of our services good.	0.918
y_{43}	Our clients are confident of the quality of our services.	0.952
η_5	Customer-Perceived Value (AVE = 0.582, Cronbach's α = 0.775, R^2 = 0.760)	
y_{51}	Overall, our services are value for money.	0.799
y_{52}	Considering expenses and quality they get, clients believe that it is a right decision to use our services.	0.848
y_{53}	Our firm always tries to reduce the time and effort clients have to spend in the process of obtaining and consuming our services.	0.624
η_6	Customer Satisfaction (AVE = 0.684, Cronbach's α = 0.865, R^2 = 0.878)	
y_{61}	Our firm can provide services that meet client's expectation.	0.775
y_{62}	Comparing with the desirable level, our services always make clients satisfied.	0.894
y_{63}	Taking the major competitors' services into consideration, clients are very pleased with us.	0.808

Notes SFL – standardized factor loadings.

sures were first validated and then the proposed hypotheses or structural relationships were tested.

Validating the Measures

To validate the measures of the constructs, the proposed model was first estimated with all paths deleted, but all constructs assumed to be correlated to each other. The estimated reliability results are summarized in Table 1. It can be seen that, firstly, the Cronbach's coefficient α of each construct is greater than the conventional threshold of 0.700, with a maximum of 0.936 for customer-perceived quality. This demonstrates each construct's composite reliability for internal consistency.

Secondly, the standardized factor loadings for all but one measurement items are above the conventional cut-off of 0.6. In fact, among all of the 31 measurement items, 27 have factor loadings greater than 0.7. It is also

noticed that all factor loadings are highly significant ($p < 0.001$), showing strong evidence of convergent validity of the measures. At the same time, the average variance extracted (AVE) of each construct in the model is more than 50 percent, with a maximum of 83.3 percent for customer-perceived quality, guaranteeing that more valid variance than error is explained for each construct (Fornell & Larcker, 1981).

Thirdly, the constructs should also show high discriminant validity which, according to Fornell and Larcker (1981), can be demonstrated if the square root of AVE of each construct is higher than the correlation coefficients between it and any other constructs in the model. Most AVEs and correlations from the modelling results meet this criterion, largely showing that the constructs are both conceptually and empirically distinct from each other.

Evaluating the Model's Fit

The full model estimation results provide various measures to evaluate the model's goodness-of-fit. Firstly, the estimated covariances and variances of the model's three exogenous organizational learning constructs, i.e. commitment to learning, shared vision, and open-mindedness, are highly significant ($p < 0.001$). The estimated variances for the regression errors of the model's six endogenous constructs are also highly significant ($p < 0.01$). These provide a good basis for correctly estimating the model.

Secondly, *R*-square (R^2) for the regression equation to predict each of the model's six endogenous constructs is from 0.464 to 0.878 as shown in Table 1, quite high as compared to many SEM studies. This indicates a strong predictive power of the proposed model.

Thirdly, although the estimation results show a significant chi-square ($R^2 = 748.47$, $df = 414$, $p < 0.001$), other overall fit indexes are relatively satisfactory given the smaller sample size in this study. Especially, the model has a low χ^2/df of 1.808, a reasonably high non-normed fit index of 0.874 and comparative fit index of 0.888, and a reasonably low root mean square error of approximation of 0.082. These suggest an acceptably good fit of the model to the data, providing a reliability support for testing the cause-effect relationships between the model's constructs.

Testing the Expected Impacts

The estimated standardized regression coefficient (*b*) for each path of the model and the associated one-tail *p*-value are shown in Figure 1, which can be used to test the expected impacts. It is noticed that the impact of technological competence on strategic flexibility and shared vision on marketing competence is highly insignificant ($p > 0.30$) and cannot be verified. Also, the impact of marketing competence on customer-perceived value, open-mindedness on technological competence, commitment to learning on mar-

keting competence, technological competence on customer-perceived quality and value is insignificant at the $p < 0.10$ level, although four of them are positive as expected.

Other expected impacts can be verified with significantly ($p < 0.10$) positive path coefficients, including the impact of commitment to learning and shared vision on technological competence and strategic flexibility on customer-perceived value. Especially, the impact of market competence and strategic flexibility on customer-perceived quality and customer-perceived value on customer satisfaction is significant at the $p < 0.05$ level. Most noticeable are the highly significant ($p < 0.001$) paths from open-mindedness to marketing competence, from marketing competence to strategic flexibility, and from customer-perceived quality to customer-perceived value and customer satisfaction.

Discussions of Modelling Results

Impact of Organizational Learning on Core Competences

In the current era of knowledge economy, it is not enough for firms to only possess certain competences. To succeed, they must be able to develop new competitive advantages through organizational learning to meet the changing market conditions and customer needs. This is especially true for construction consulting services, which are knowledge-intensive (but not technology-intensive) and hence continuous organizational learning of new knowledge is necessary for them to be technologically competitive. Furthermore, these services are faced with different client needs for budgets and project styles and hence continuous organizational learning of changing market conditions is necessary for them to be marketing competitive. That is, organizational learning is expected to enhance a firm's core competences. This study largely validates the hypothesis, evidenced by the positive influences of the three components of organizational learning on both technological and marketing competences as shown in Figure 1. In detail, the modelling results reveal that:

1. A firm's commitment to learning has a more significant impact on its technological competence ($b = 0.223$, $p = 0.058$) than on its marketing competence ($b = 0.128$, $p = 0.139$). This seems natural since technological competence, as opposed to marketing competence, is indeed based more on acquiring, processing and applying new information and knowledge – all reflected in commitment to learning.
2. Shared vision has a much more significant impact on the technological competence ($b = 0.327$, $p = 0.064$) than on the marketing competence ($b = 0.061$, $p = 0.374$), implying that a higher degree of shared vision can improve the technological competence, but may

not improve the marketing competence. This possibly suggests that marketing competence – building closer relationships with customers – requires more flexibility or open-mindedness than shared vision or uniformity. Another point to support this result is that shared vision is more important than flexibility for harmonious communication between experts and employees in acquiring and sharing new knowledge and skills to improve the technological competence.

3. Unlike commitment to learning and shared vision, which have more significant influences on the technological competence than on the marketing competence, open-mindedness has a much more significant impact on the marketing competence ($b = 0.739$, $p < 0.001$) than on the technological competence ($b = 0.245$, $p = 0.146$). This is understandable, since, among the three dimensions of organizational learning, open-mindedness requires the firm to continuously and critically review market conditions and customer requirements to the greatest extent, which associates more with marketing competence than with technological competence.

Impact of Core Competences on Customer Perceptions

The modelling results reveal a much more significant impact of marketing competence on customer-perceived quality ($b = 0.312$, $p = 0.031$) than on value ($b = 0.144$, $p = 0.169$). This implies that, for construction consulting services, a firm's marketing competence may be viewed more from the quality perspective than from the value side to create higher customer satisfaction. Since service quality can be perceived more easily and objectively than service value, firms tend to build their competences, including marketing competence, mainly for improving their service quality. In this study, construction consultancy firms are engaged in competitive fee tendering, which will specifically assess the firms' quality scores in addition to their bidding prices. Hence firms' endeavours or competences should indeed be devoted to the service quality side, which in fact is also the major objective – measuring and managing service quality – of this research.

This study fails to demonstrate a significant impact of the technological competence on both customer-perceived quality and value. As construction consulting services are not technology-intensive, this implies that technological competence may not considerably help a construction consulting firm in improving its customer-perceived quality and value, hence it may not be particularly necessary to be technologically competitive.

The Mediating Roles of Strategic Flexibility

Strategic flexibility plays a mediating role in the proposed model to link a firm's competences to its customer-focused performance. On one hand, the

model shows that market competence exerts a substantially more significant impact ($b = 0.767$, $p < 0.001$) on strategic flexibility than technological competence ($b = 0.003$, $p = 0.489$). This is not unexpected. A firm's market competence is based on a profound understanding of customers' current and future needs and competitors' possible actions, which will help the firm to respond quickly to market changes and hence enhance its strategic flexibility. But a firm's technological competence is unique in some sense, and hence is usually difficult to replace by substitute processes, difficult for competitors to imitate, and immobile across firm boundaries (Grant, 1991), which may not enhance its strategic flexibility.

On the other hand, the modelling results reveal that strategic flexibility has a more significant impact on customer-perceived quality ($b = 0.319$, $p = 0.011$) than on customer-perceived value ($b = 0.176$, $p = 0.080$). This could again be understood from the reasoning that construction consulting firms' endeavours are likely to focus more on their professional service quality, which can be more easily perceived by the clients. Combining with the previous results, this study also reveals a leading role of strategic flexibility in enhancing the customer-focused performance – among the resource-based determinants (i.e. technological competence, marketing competence and strategic flexibility) of customer-perceived quality and value, strategic flexibility is the most important with the largest and most significant impact coefficients.

Finally, it is interesting to examine the strategic flexibility's mediating role in linking a firm's competences to its customer-focused performance. Since the direct impact of technological competence on customer-perceived quality and value and on strategic flexibility is insignificant, strategic flexibility does not mediate the impact of technological competence on customer-focused performance at all. However, the mediating role of strategic flexibility in linking a firm's marketing competence to its customer-focused performance is obvious, evidenced by considerable direct impact of marketing competence on customer-focused performance and also indirect impact through its significant influence on strategic flexibility. This again shows that marketing competence is more important than technological competence in improving customer-focused performance for consulting services.

In detail, strategic flexibility has a strong mediating role in linking a firm's marketing competence to its customer-perceived quality, as implied by significant direct impact of marketing competence on customer-perceived quality and its significant indirect impact via strategic flexibility. But its mediating role is much weaker in linking a firm's marketing competence to its customer-perceived value, as evidenced by a much less significant direct impact of marketing competence on customer-perceived value and its less significant indirect impact via strategic flexibility. This once again demon-

strates that a consulting service firm's marketing competence has more to do with customer-perceived quality than with customer-perceived value, with or without the mediation role of its strategic flexibility.

Customer-Perceived Quality and Value

As well established in the marketing literature, this study confirms that customer-perceived quality helps enhance customer-perceived value and that both customer perceived quality and value increase the customer satisfaction. In the study it is noticed that these customer perceptions are not really from the clients themselves, but are ascertained by the consultancy firms. The confirmed significant relationships among these 'customer' perceptions prove the quality of the existing measures of structural relations among the customer-focused performance constructs. This shows the appropriateness of letting firms (indirectly) reveal customer perceptions, as performed in this study, since it is reasonable to assume that firms should be able to know, at least partly, their customers' perceptions.

The positive path coefficients relating customer-perceived quality to value and satisfaction are highly significant ($p < 0.001$), showing the strong predictive power of quality on value and satisfaction. A positive impact of customer-perceived value on satisfaction is also significant ($p < 0.05$), but weaker than the impact of quality. This is in line with the marketing notion that value may be more essential for customers' initial choices, but quality is much more fundamental for their consumption experiences (Fornell et al., 1996). In fact, the above modelling results demonstrate much stronger impacts of core competences and strategic flexibility on customer-perceived quality than on customer-perceived value, logically suggesting a higher importance of quality than value. The dominating role of quality over value in forming customer satisfaction also supports the previous results that a service firm should associate its competences and strategic flexibility more with quality than with value.

Summary and Concluding Remarks

Originated from a Hong Kong government-funded project to model competitive fee tendering in the local construction industry, this study aims to examine how customer-focused performance relates to professional consultants' core competences, and hence to help them formulate service quality improvement priorities for developing appropriate bidding strategies. By establishing a structural equation model (SEM) with the help of survey data collected from local construction consultants, the current paper largely validates the conceptual framework of Wang and Lo (2003, 2004), which links a firm's resource-based strategies to its customer-focus performance and hence accomplishes the proposed research objective. In general, the

modelling results support the positive impacts of organizational learning on a firm's core competences, which in turn positively influence customer-focused performance directly and indirectly through its strategic flexibility. In particular, a number of hypothesized impacts are verified at the one-tail 10 percent significant level, including the positive impact of commitment to learning and shared vision on technological competence, open-mindedness on marketing competence, marketing competence on strategic flexibility and customer-perceived quality, and strategic flexibility on customer-perceived quality and value.

Managerial Implications

This study also reveals several relationships unique to the construction consulting businesses that are not technology-intensive, which have managerial implications for professional services. Firstly, a firm's degree of shared vision exerts much bigger influence on its technological competence than on its marketing competence, while its open-mindedness has just the reverse pattern of effects. This implies that, if technological competence is considered more important, the firm should maintain a higher degree of shared vision or uniformity to promote harmonious communications between its experts and employees in acquiring and sharing new knowledge and information. However, if marketing competence is deemed more influential, which is usually the case for services, the firm needs more flexibility or open-mindedness to continuously review the market conditions in order to build closer relationships with customers.

Secondly, a firm's marketing competence has much stronger impact on its strategic flexibility and customer-perceived quality and value than its technological competence. This shows that the higher cost and lower provision rates of technological competence make it less influential than marketing competence for the strategic flexibility and customer-focused performance of professional service firms, which are not technology-intensive. Such service firms are better off to deploy their resources more on building marketing competences, such as actively understanding customers' current and future needs and competitors' possible actions, and quickly responding to market changes and providing operational solutions.

Thirdly, a firm's competences and strategic flexibility have greater impact on customer-perceived quality than on customer-perceived value, leading to somewhat unusual conclusion that quality is much more important than value in forming customer satisfaction for professional services. This implies the dominating role of quality over price in professional services, which are highly knowledge-intensive (but not necessarily technology-intensive) and whose clients are usually highly knowledgeable. Hence, firms should pay more attention to their service quality than offering prices by not only

maintaining their technological competences, but continuously improving their marketing competences and strategic flexibilities as well.

Research Limitations and Future Directions

This paper demonstrates the influential links from resource-based strategies to customer-focused performance for professional services using a conceptual framework and survey data from 122 construction consulting firms in Hong Kong. As reported above, the research findings are interesting and have certain managerial implications. However, since the constituents of organizational learning, core competences and strategic flexibility and their differentiated effects on customer-focused performance have only recently emerged as an important subject for empirical research (Duysters & Hagedoorn, 2000; Wang & Lo, 2003, 2004), limitations do exist in this paper, and future studies should attempt to overcome them.

Firstly, although many relationships in the conceptual framework are validated in the study, some are found to be insignificant at the one-tail 10 percent level, including the links from shared-vision to marketing competence and from technological competence to strategic flexibility. Similar studies are thus needed to verify all relevant relationships expected from the conceptual framework. Especially, more samples from not technology-intensive services are required to verify the dominating role of marketing competence over technological competence in achieving superior customer-focused performance. Studies of services with more technological requirements are also called for to distinguish the different roles of marketing and technological competences of different firms in enhancing their customer-focused performance.

Secondly, this study is based on an admittedly small sample of 122 construction consulting firms in Hong Kong, which may be the major reason for the SEM's not-so-good fitting, including a number of insignificant paths. Given the small economic scale of Hong Kong and the highly knowledge-intensive nature of the construction consulting services, the sample size of 122 is actually not unacceptably small. However, corresponding to the model's 9 constructs and 31 measurement items, the sample size is indeed small. In this regard, the current research with the limited survey data has little room to improve, and future researches are required to conduct larger scale of surveys of firms in different service settings to present more complete and reliable studies into the important cause-effect chain from organizational learning to core competences and then to customer-focused performance.

Thirdly, due to the difficulty in identifying and surveying each firm's customers, customer-focused performance data were simply obtained from the firms, not directly from the customers. Although difficult, it is still hoped

that future studies can obtain data from the firms for their resource-based strategies and data from each firm's customers for their perceptions of the firm's performance, and hence more reliably examine the conceptual framework linking a firm's resource-based strategies to its customer-focused performance.

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Virtual Competencies and Knowledge Transfer in Global NPD: A Case Study

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Virtual new product development teams are geographically dispersed and cross-functional, yet they work on highly interdependent tasks by communicating electronically in work groups. This virtual interdependence, among other issues, presents new challenges for the management of knowledge transfer in global New Product Development (NPD). In this project, virtual competencies were studied with the use of qualitative methods to assess the most significant issues affecting knowledge transfer in virtual settings in global NPD. As a result, the existing theory regarding virtual competencies and virtual organizations was refined and potential barriers for knowledge transfer were discovered. The success of knowledge workers is crucial for the performance of knowledge-based organizations, which form the basis of our global economy; therefore, this study's findings are significant.

Keywords: knowledge management; virtual organization; new product development; knowledge transfer; virtual competencies

Introduction

The competition in international markets has increased requiring rapid changes in the business environment. Accordingly, the pace of new product innovation has sped up and it has become increasingly important to rapidly leverage existing in-house competencies, resources, and capabilities into new product projects. In global companies, the only way to rapidly carry out new product development (NPD) is to form a virtual product development team (Cooper, 2001). Within a few years, more than 1,3 billion people will work in virtual organizations; therefore, it is important to better understand the development of virtual work and characteristics of this development (Johns & Gratton, 2013). Studies have produced mixed results on how technology affects knowledge transfer; therefore, more knowledge on virtual collaboration is needed. (Li, 2010; Faraj, Jarvenpaa, & Majchrzak, 2011) Research should therefore focus on understanding how virtual organizations respond to the tensions that arise in constantly and rapidly changing environments.

The above discussion can be condensed into the following research questions:

1. How is knowledge transfer in global NPD identified in the literature?
2. What are the challenges for virtual knowledge transfer in the case project?
3. What is the role of virtual competencies in global NPD?

The case study organization is a leading global enabler of telecommunications services. With its focus on innovation and sustainability, the company provides a complete portfolio of mobile, fixed, and converged network technology, as well as professional services including consultancy and systems integration, deployment, maintenance, and managed services. It is one of the largest telecommunications hardware, software, and professional services companies in the world.

Research Process and Methods

The research process started with a review of the literature on virtual organizations, including cultural issues, communications, virtual work environment structure, and knowledge transfer theories. Theoretical foundations lie mostly in knowledge management, virtual organizations and human resource management.

The literature review was synthesized and first research question is answered in the section 'Characteristics of Knowledge Transfer in Global NPD.' Consequently, the theoretical basis was outlined and research questions were formed for the case company. The actual study was conducted with qualitative semi-structured interviews, which enable flexible research design. To ensure the exploration, a qualitative method is the most appropriate method for conducting the study (Marshall & Rossman, 1999). The answer to the research question 2 is presented in the section 'Empirical Study' and, finally, the research question 3 is answered in the section 'Role of Virtual Competencies in Global NPD.' Figure 1 represents the research process.

The study focused on level four managers within the case company. Examples of managers' work positions are Head of Product Management and Head of Programs. Five of the managers' positions were in R&D, two were positioned in product management and one of the manager's positions was in the sales organization. All of their work duties were in operative management. Figure 2 describes the informants' position (L4 = Level 4) in the case company. Figure was modified by Tozer's (2012) 'Integrated levels of leadership.'

All of informants' teams are globally dispersed and involved in virtual communication on a daily basis among various different locations. These

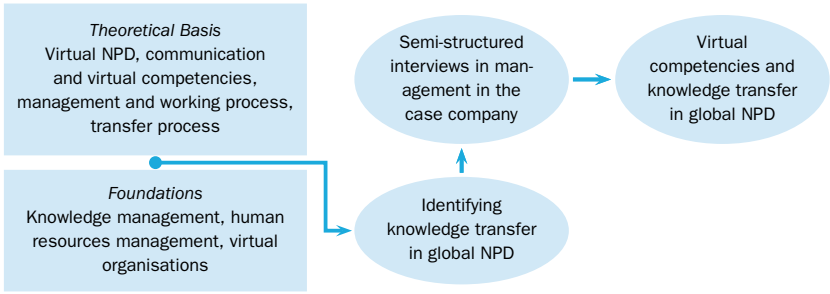

Figure 1 Research Process

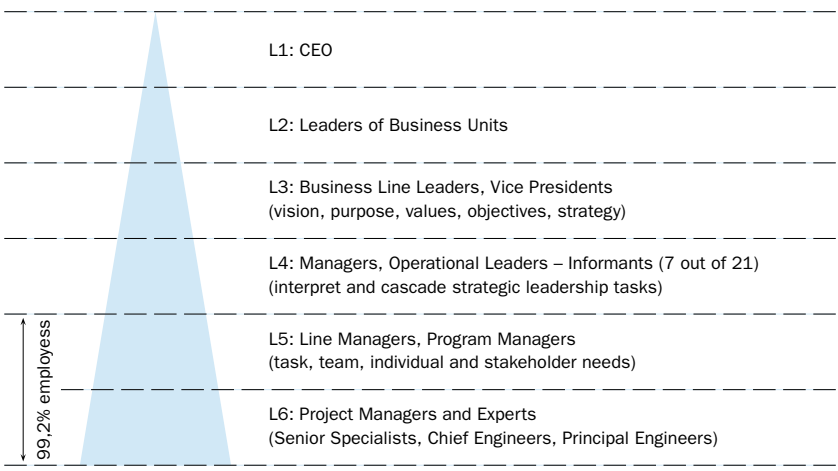

Figure 2 Informants' Position in a Case Company

managers had 14–28 years of work experience and their work experience in virtual projects was between 10–20 years. Their organizational unites have employees in 25 sites in 11 different countries.

Characteristics of Knowledge Transfer in Global NPD

It is typical for global virtual teams to rapidly change form and become matrix-managed and culturally diverse. Communication is mainly performed with the use of information and communication technology (ICT). Virtual team members usually work on several different projects with competing priorities (Daim et al., 2012.) Virtual product development teams are geographically dispersed and cross-functional, yet they work on highly interdependent tasks. This, among other issues, presents new challenges for the management of both explicit and tacit knowledge transfer (Zigurs, 2003). Furthermore, Daim et al. (2012) state that there are many risks involved

when it comes to on-time project deliveries. In following chapters, the main characteristics of knowledge transfer are summarized based on the latest research with the use of Distanont, Haapasalo, and Vaananen's (in press) solutions to overcome challenges in knowledge transfer. The classifications of this theory are based on the division of Communication, Transfer Process, Working Process and Management.

These classifications have been modified into a virtual organization context and explained further in the following chapters and summarized in Tables 1, 2, 3 and 4.

Communication

Communication and knowledge transfer are closely linked; effective communication enhances knowledge transfer and vice versa. This can be achieved by providing guidance and a standardized way of knowledge transfer, and by linking the transferring processes (Distanont, Haapasalo, Vaananen, & Lehto, 2012). *Explicit knowledge* is formal knowledge that is easy to transmit between groups and individuals as Nonaka and Takeuchi (1995) have discovered. Explicit knowledge is usually represented in the form of specifications, codes, and numbers or different kinds of formulas. Distanont et al. (2012) discovered that explicit knowledge is considered easy to transfer via e-mail, databases, and documentation, but it does not guarantee successful knowledge transfer in all cases. It is crucial to choose a proper method to transfer knowledge. *Tacit knowledge* is personal knowledge, insights, know-how, and a deep understanding of context; and is usually difficult to communicate formally to others. It develops in extended periods of time and is therefore highly personal and unique. Thus, organizations need to convert tacit knowledge into explicit knowledge in order to secure the competitive advantage in innovation and new product development (Nonaka & Takeuchi, 1995). Many studies have shown that in knowledge-intensive businesses, the main portion of critical knowledge is in tacit form and cannot be easily expressed in explicit form (Merat & Bo, 2013.) Only human beings led by tacit knowledge have the capability to generate new knowledge (Choo, 1998).

Virtual organization members' patterns of communication: when, why, how, how often, and with whom they communicate can reveal a lot about the organization's communication practices. These micro-interactions shape the dynamic negotiation of members' multiple interests and expectations (Im, Yates, & Orlikowski, 2005). In brief, knowledge transfer is a particularly specialized communication process between the source and the recipient, which results in the changed ability of the recipient or both (Wang & Haggerty, 2009). Table 1 presents a review of knowledge transfer characteristics in the Communication category.

Table 1 Review of Knowledge Transfer Characteristics in the Communication Category

Communication	Researchers
Virtual communication. Effectiveness in task-related communication is stronger in a virtual environment. Dislike is not revealed in a virtual discussion and cultural differences are not so significant.	Gressgård (2011), Wang and Haggerty (2009), Badrinarayanan and Arnett (2008).
Communication skills. Verbal, written, oral, cultural knowledge and language skills are needed in order to ensure efficient communication between parties. The goal is usually to generate action or change, or create common understanding.	Bergiel, Balsmeier, Bergiel, and Erich (2013), Holton (2013), Faraj et al. (2011), Malhotra, Majchrzak, and Benson (2007), Dennis, Meola, and Hall, (2013), Snowden and Boone (2007), Maude (2011), Luther and Bruckman (2011), Cooper, Edgett, and Kleinschmidt (2004).
Members are knowledge transfer agents. Networking in is possible across time, location, and organizational boundaries.	Wang and Haggerty (2009), Johns and Gratton (2013), Ivan, Ciurea, and Doinea (2012).

Transfer Process

Davenport & Prusak (2005) present that sharing and finding relevant information becomes very difficult in large organizations. The stock of all knowledge in an international company is scattered in offices and plants, and the complex mix of products and services is vast. As a result, it becomes very challenging for the expert to find what he needs. In summary: Knowledge is valuable only if it is accessible. However, modern technology can integrate mechanisms and systems and, in this way, provide a suitable platform for sharing internal and external resources (Cooper, 2001).

Johns and Gratton (2013) present that it is the company's responsibility to offer technologies that support higher achievement. Malhotra et al. (2007) show that there are several ways to share knowledge virtually. However, it is crucial to remember that the medium is only a tool without content (Davenport & Prusak, 2005). Vittal, Anantatmula, and Kanungo (2010) emphasize the view that virtual teams and organizations require highly skilled individuals, who participate extensively in conversations, have good communication skills, engage in trustworthy behavior, and share collectivist values. In addition, Wang and Haggerty (2009) found that early face-to-face meetings, training and assimilating other employees' backgrounds, and enhancing personal relations with team members can overcome problems in technology. Also, increasing technology skills and general familiarity with lean media is useful. Wang and Haggerty (2009) have suggested the following three competencies for successful virtual work:

- *Virtual self-efficacy* (Future-oriented belief about one's technical abilities to work in virtual settings)

Table 2 Review of Knowledge Transfer Characteristics in the Transfer Process Category

Transfer process	Researchers
Technology. Modern technology can integrate mechanisms and systems and in this way provide a suitable platform for sharing internal and external resources. Technological failures can risk on-time project deliveries.	Gatlin-Watts, Carson, Horton, Maxwell, and Maltby, (2007), Badrinarayanan and Arnett (2008), Cooper (2001), Goh (2002).
Multiple time zones & geographical dispersion. Multiple time zones can be a challenge in a global multicultural company, when there is a need for shared meetings.	Bergiel et al. (2013), Badrinarayanan and Arnett (2008), Faraj et al. (2011), Dennis et al. (2013), Zigurs (2003), Li (2010), Kankanhalli, Tan, and Wei (2007).
Virtual competencies. Virtual social skills, virtual media skills, ICT skills and virtual self-efficacy.	Wang and Haggerty (2009), Faraj et al. (2011), Dennis et al. (2013), Luther and Bruck man (2011), Foss and Robertson (2000), Kankanhalli et al. (2007), Zigurs (2003).

- *Virtual media skills* (Using ICT in its full potential to enhance communication)
- *Virtual social skills* (Recognizing the difference between communication in a regular work environment and virtual settings)

When it comes to knowledge transfer in virtual NPD, Malhotra et al. (2007) have noted that, in virtual communication, it is typical for goodwill to be hard to observe, and expectations about actions, and the actions themselves, are not visible. Also, it is notable that various uses of technological resources are socially constructed between customers, and internal and external functions. Considering this, the technological change makes the virtual organization's operating environment a very complex system in which everyone is influenced by others (Foss & Robertson, 2000). Table 2 represents the characteristics in the Transfer process category.

Working Process

Riege (2005) states that in order to achieve continuous growth in business, knowledge-sharing practices need to become a day-to-day work procedure. Successful sharing and goal achievement depend on three main factors: motivation, organizational structure and modern technology. Flat and open structures make transparent knowledge flows possible which, in turn, provides a culture of learning. In virtual organizations, structure is a fluid object, which is more dynamic than a typical organizational structure. In virtual organizations, boundaries, norms, participants, artifacts, and interactions continually change. All organizations change, but these kinds of organizations change all the time (Faraj et al., 2011).

According to Riege (2005) when an organization structure is flat and

Table 3 Review of Knowledge Transfer Characteristics in the Working Process Category

Working process	Researchers
Training for virtual work. Characteristics of virtual collaboration should be acknowledged and training provided to enhance communication among team members. The sense of 'we' rather than a sense of 'I' needs attention.	Zigurs (2003), Kankanhalli et al. (2007), Han and Harms (2010).
Relationship building and teaming. Relationships and roles between team members need to be planned, identified and evaluated.	Gatlin-Watts et al. (2007), Holton (2013), Foss, Minbaeva, Pedersen, & Reinholt, (2009), Wang and Haggerty (2009), Faraj et al. (2011), Malhotra et al. (2007), Dennis et al. (2013), Snowden and Boone (2007), Senge, Lichtenstein, Kaeufer, Bradbury, and Carroll, 2007; Zigurs (2003), Kankanhalli et al. (2007), Greer (2008), Goh (2002), Paghaleh et al. (2011).
Passion, creativity and originality of multicultural team members. Cultural and personality issues need to be considered and planned when forming teams, sharing tasks, communicating and giving feedback.	Bergiel et al., (2013), Johns and Gratton (2013), Holton (2001), Badrinarayanan and Arnett (2008), Gressgård (2011), Gatlin-Watts et al. (2007), Faraj et al. (2011), Luther and Bruckman (2011), Dennis et al. (2013), Li (2010), Snowden and Boone (2007), Maude (2011), Kankanhalli et al. (2007), Gressgård (2011), Chen, Wu, Ma, and Knight, (2011), Paghaleh et al. (2011).
Effective new product development. New product innovation has become increasingly important and rapid in its nature. In-house competencies, resources and capabilities need to be leveraged into new product projects. In global companies, this is performed with the use of modern communication technology in virtual product development teams.	Badrinarayanan and Arnett (2008), Gressgård (2011), Luther and Bruckman (2011), Kankanhalli et al. (2007), Cooper et al. (2004).
Temporary convergence. Human and ICT-related delays need to be planned and taken into consideration when planning a virtual project.	Faraj et al. (2011), Li (2010), Zigurs (2003).
Tacit knowledge transfer. Face-to-face meetings are needed and knowledge transfer in virtual collaboration needs extra attention.	Holton (2013), Dennis et al. (2013), Zigurs (2003), Distanont et al. (2012), Wang and Haggerty (2009).

open, it is easier to link goals and processes together in people's daily lives and in this way provide clear directions and feedback processes. Paghaleh, Shafiezadeh, and Mohammadi, (2011) present that knowledge sharing depends on the quality of informal and formal conversations between employ-

ees, and it is the organizational culture that decides how and with whom these conversations take place. Schein (1996) stated that culture is a set of basic tacit assumptions about how the world is and how it ought to be. Basically, culture is a group of people that share and determine their perceptions, thoughts, feelings, and, to some degree, their overt behaviour. Cultures arise within organizations based on their own histories and experiences. In virtual organizations, cultures meet on many levels.

The characteristics of virtual work need to be identified and explained to the team members through training to avoid conflict and to secure effective work throughout the project, suggests Kankanhalli et al. (2007). Possible clashes caused by cultural diversity could be minimized through the appropriate selection of virtual team members; also, in high-complexity tasks, functional diversity can be enhanced to promote discussion about the work tasks. Table 3 (p. 191) presents the characteristics of knowledge transfer in Working process category.

Management

Johns and Gratton (2013) suggest that, in virtual organizations, it is crucial to focus on collaboration, because it is the foundation of faster and better innovation. With this kind of purpose in mind, right decisions can be made and leadership becomes more effective. Distanont et al. (2012) offer the following solutions to improve knowledge transfer:

1. Organize face-to-face communication at the beginning of the project.
2. Improve stakeholders' skills.
3. Enhance social relationships.
4. Assign the right people to the right project.

Chen et al. (2011) show that collaborative activities can reduce uncertainty and improve transactional efficiency; however, some kind of social context is also needed in virtual teams to enhance their interpersonal relationships. Otherwise, virtual teams will be more fragile than regular teams.

Possible conflicts in virtual teams are broadly categorized into two main types: relationship-based and task-based conflicts. Relationship-based conflicts involve issues like mutual dislike, personality clashes, and general annoyance among team members. Some conflicts can have a severe impact on the team performance, but others can actually help teams to perform better. Task-related conflicts, in particular, seem to be more common and more severe in virtual teams than in traditional teams. Task-related conflicts are usually based on functional differences caused by different backgrounds, assumptions, and understandings based on previous employee training and experiences. However, when conflicts occur, they need to be re-

Table 4 Review of Knowledge Transfer Characteristics in the Management Category

Management	Researchers
Establish and maintain trust. Special attention to mechanisms and communication processes in establishing trust is needed.	Bergiel et al. (2013), Malhotra et al. (2007), Dennis et al. (2013), Vittal et al. (2010), Holste and Fields (2010), Mitchell and Zigurs (2009), Maude (2011), Peters and Mantz (2007), Han and Harms (2010), Holton (2001), Chen et al. (2011).
Conflict resolution strategies. Potential issues causing conflicts should be acknowledged and strategies for proper conflict resolution methods should be planned beforehand.	Bergiel et al. (2013), Zigurs (2003), Maude (2011), Kankanhalli et al. (2007), Holton (2001).
Strong leadership. A leader's presence, support, control, and motivation skills are needed in virtual collaboration. Shared goals, clear communication, and competence in managing experts is needed.	Bergiel et al. (2013), Faraj et al. (2011), Malhotra et al. (2007), Dennis et al. (2013), Snowden and Boone (2007), Zigurs (2003), Luther and Bruckman (2011), Merat and Bo (2013), Ivan et al. (2012), Cooper et al. (2004), Goh (2002), Chen et al. (2011).
Rewarding and feedback. Reward and feedback processes need to be planned and established to support virtual collaboration and goals.	Malhotra et al. (2007), Dennis et al. (2013), Snowden and Boone (2007), Zigurs (2003), Lam and Lambermont-Ford (2010), Kankanhalli et al. (2007), Cooper et al. (2004), Goh (2002).
Job satisfaction. A virtual environment can cause feelings of isolation and a lack of social contact; also multitasking and dynamic work roles can, in some cases, decrease satisfaction at work.	Dennis et al. (2013), Kankanhalli et al. (2007).
Less hierarchy and social conventions. In virtual organisations, structure is a fluid object and interaction is easier and less formal in a virtual context.	Faraj et al. (2011), Lam and Lambermont-Ford (2010).
Recruitment of talented employees. A virtual environment enables recruitment of talented employees without changing the geographical location. Moving away from the home country is not necessary.	Bergiel et al. (2013), Holton (2001), Faraj et al. (2011), Ivan et al. (2012).

solved either in integrative or distributed fashion in order to improve performance (Kankanhalli et al., 2007). Therefore, a common set of procedures and communication norms are needed to prevent misunderstandings. The absence of communication norms leads members to communicate in their own ways, which does not necessarily mean good knowledge sharing practices and, therefore, distrust may start to develop. (Malhotra et al., 2007.)

Trust is an important variable in work places and it has been addressed in great deal in previous research (Han & Harms, 2012; Huotari & Iivonen,

2004; Malhotra et al., 2007). According to Denton (2012), trust is essential to all relationships, including organizational ones, and is based on communication: how, when, and what you are communicating. Holste and Fields (2012) emphasize the meaning of trust with emphasis on knowledge-based organizations: affect-based trust is needed for an expert to be willing to use tacit knowledge. In brief, to support knowledge sharing, the structure of meetings and virtual projects in virtual organizations is very important. Giving feedback and quick responses to well performed work is crucially important in a virtual work environment (Kankanhalli et al., 2007). In addition, Tozer (2012) outlines that people don't necessarily have to like each other to work together effectively, but trust and respect is always needed. Table 4 (p. 193) represents the characteristics of knowledge transfer in the Management category.

Empirical Study

This empirical study of the case company was conducted with the use of semi-structured interviews in April of 2013. Based on their availability and ability to contribute to the study, seven informants were chosen from the management team of 21,. Interviews took place on the company's premises. Four of the informants' positions within the company are Head of Program Management in R&D, two are Heads of Product Management and one informant's title is Head of Sales. The informants' ages were from 41 to 51 years. Two of the informants' educational background was M.Sc. Eng. and five were B.Sc. Eng. Informants had work experience from 14–28 years, out of which 10–20 was in virtual organizations. Questions for the interviews were sent to the informants beforehand. Each interview lasted from 35 to 50 minutes; the interviews were recorded and transcribed.

After the interview, informants were asked to rate the challenges in the virtual knowledge transfer on a scale of 1–5 (1 = no challenge, 2 = minor challenge, 3 = average challenge, 4 = significant challenge, 5 = major challenge). Challenges were calculated and summaries were made for each topic. As the main finding, you can see a great variety and relatively big differences in opinions among the informants.

Table 5 Summary of the Challenges for Knowledge Transfer in Virtual NPD (%)

Category	(1)	(2)	(3)	(4)	(5)
Management	10.20	30.61	38.78	16.33	4.08
Communication	9.52	38.10	33.33	4.76	14.29
Transfer process	7.14	32.14	32.14	25.00	3.57
Working process	9.52	11.90	23.81	33.33	21.43

Notes Column headings are as follows: (1) no challenge, (2) minor challenge, (3) average challenge, (4) significant challenge, (5) major challenge.

The main findings regarding the challenges of knowledge transfer in the case company are presented in Table 5.

Challenges in Management

Trust has a significant role in virtual NPD according to all informants. Trust develops in face-to-face communication according to over half of the informants. Some informants stated that trust can also develop over time when communication is frequent and happens on a regular basis. Furthermore, the role of accurate information and expertise was emphasized.

Trust is rated from a minor to a major challenge and everything in between. Informant E saw only minor challenges in trust, and what stands out in the answers provided by informant E's is that he relies strongly on fact-based communication and professional competence:

> If you trust someone, you talk more openly about things. All facts will be discussed. There are all kinds of trust, but competence-related trust is received by your own actions and by your performance at work. The fact that you have earlier taken care of things reliably and successfully is one thing. Well, that is the most important thing.

Informants that saw trust as an average challenge emphasized more formal documentation and structure of messages, or the importance of phone calls instead of face-to-face conversations. Informants that saw trust as a major challenge emphasized face-to-face communication instead of just using fact-based formal communication via ICT. Table 6 presents the challenges in management.

Conflicts and conflict resolution strategies were mainly marked as either average challenge or significant challenge; however, one informant considered conflicts as a major challenge, while another informant considered them a minor challenge. All informants mentioned competence-related conflicts between sites as the most common issue behind conflicts. Other is-

Table 6 Challenges in Management

Category	(1)	(2)	(3)	(4)	(5)
Trust	0	2	2	2	1
Conflict and conflict resolution strategies	0	2	2	2	1
Leadership	1	1	4	1	0
Rewards and feedback	0	2	4	1	0
Job satisfaction	0	3	4	0	0
Hierarchy	2	4	1	0	0
Recruiting experts	2	1	2	2	0

Notes Column headings are as follows: (1) no challenge, (2) minor challenge, (3) average challenge, (4) significant challenge, (5) major challenge.

sues causing conflicts were time differences, which make it difficult to find time for meetings and also influence the availability of relevant information. Time differences also caused average challenges in the job satisfaction category. It is interesting that there are no conflict resolution strategies available and, therefore, managers are mainly the negotiators and mediators for solving conflicts. One informant mentioned co-operation in teams and on projects, which have been able to solve severe conflicts in the past. According to one informant, conflicts could be avoided by preventive actions (e.g., proactive information sharing and having shared discussions). Two informants emphasized the importance of fact-based conversations in solving conflicts. Hierarchy was not seen as a challenge despite the fact that in literature we can find certain viewpoint stating that the virtual environment can reduce hierarchy; however, according to these informants the virtual aspect does not affect hierarchy and is thus not a problem.

Generally leadership was seen as an average challenge, but what was interesting and very descriptive of this study as a whole was the fact that the informants stated altogether 24 different kinds of characteristics that mark the qualities of a good virtual leader. Almost all informants stated that the most important skill is the ability to lead people, to have 'people skills;' four mentioned that active and frequent communication is important, followed by more variety. Informants mentioned skills and characteristics such as written and oral communication skills, honesty and integrity, availability 24/7, professional competence, openness and prioritizing skills. Informants also mentioned strategy knowledge, trust, supportiveness, decision-making skills, innovativeness and the ability to see the big picture. These managers seem to do their work by applying a personal style with their own unique ways and experience.

Availability 24/7 was mentioned by all informants in the course of the interviews, which revealed that better knowledge on how to combine professional and personal life may be needed in order to enhance job satisfaction and efficiency. Two informants stated that they find it difficult to leave the office during work hours (8–16), even if there would be an opportunity to take care of some personal issues while working. Successful work in virtual organizations is hard to define, because it is hard to measure. In the literature, there are views that emphasize the successful combination of work and home life, and views that are concentrated on performance metrics at work (Muna & Zennie, 2010). Further studies of a successful combination of professional and personal life, as well as leadership in virtual organizations are undoubtedly needed.

Challenges in Communication

When informants were asked about the qualities of effective virtual communication, they mostly stressed the importance of taking into account

Table 7 Challenges in Communication

Category	(1)	(2)	(3)	(4)	(5)
Non-verbal communication	1	3	1	0	2
Task oriented communication, delegating	1	2	2	1	1
Knowledge transfer agents	0	3	4	0	0

Notes Column headings are as follows: (1) no challenge, (2) minor challenge, (3) average challenge, (4) significant challenge, (5) major challenge.

the message receiver. Correctly planning the content and outlook of the message was also mentioned as important. Decisions and information letters should be written and sent ad hoc according to almost half of the informants. Only a few mentioned the importance of clear and succinct e-mails, which is a significant part of virtual communication according to theory. Twelve other qualities of good communication were mentioned, which means a variety of different ways and kinds of practices are employed when communicating virtually. Communication is a crucial factor in a manager's work, and most delays in NPD are based on communication problems.

One informant participated in virtual communication training and he evaluated his own virtual communication competence as higher than that of others. The training issue was seen as a bigger challenge in the eyes of this informant, which might mean that he is aware of the issues concerning virtual collaboration and the connection of virtual communication competencies. This same informant mentioned that lack of face-to-face communication is a minor challenge, whereas those who evaluated their own virtual communication competence as weaker saw that a lack of face-to-face communication is a significant or major challenge. Communication training is also discussed in the working processes. Table 7 represents challenges in the communication category:

Challenges in the Transfer Process

All informants stated that there are problems with the ICT they use, but when rating the challenges, there was a lot of variety. It is surprising that informants had accepted the unbalanced situation with task-technology-structure fit. There are tools for social interaction and networking, but, according to these informants, they are not used due to many reasons, most importantly lack of time. They also did not see these tools as beneficial and useful for their work. The availability and the reliability of some virtual meeting tools posed further problems.

In rating the challenges, ICT was marked as a significant challenge, as an average challenge and also as a minor challenge, while some informants saw no challenges at all. In general, informants said that there are too many tools available and people do not seem to know where to find relevant information.

Table 8 Challenges in the Knowledge Transfer Process

Category	(1)	(2)	(3)	(4)	(5)
Technology	2	1	2	2	0
Time zones and geographical dispersion	0	1	3	2	1
My virtual communication competencies	0	3	2	2	0
My colleagues virtual communication competence	0	4	2	1	0

Notes Column headings are as follows: (1) no challenge, (2) minor challenge, (3) average challenge, (4) significant challenge, (5) major challenge.

Virtual communication competencies were an interesting issue. All informants rated their challenges regarding virtual competencies as higher than those of their colleagues.

Time differences and geographical dispersion were also mentioned by all informants; however, it was surprising that time differences were perceived as a greater challenge. Three informants mentioned that it can even be a benefit in testing new products. When the work day ends in one location, it starts in another location and the testing of products can thus be carried out continuously and effectively. Table 8 summarizes the challenges in the knowledge transfer process.

The Greatest Challenges Are in the Work Processes

From the managers' perspective, most challenges are attributed to the issues concerning work processes. In work processes the relationships, tacit knowledge transfer, effective NPD, and temporary convergence were the most challenging issues as described in Table 9.

The greatest challenges in the work processes were found in building and maintaining relationships within the multicultural virtual environment, which was stated as an average, significant or major challenge by all except one informant, who stated that it is not a challenge at all. All informants were familiar with the cultural differences and all informants mentioned that they consider cultural issues when sharing tasks and giving feedback. All informants had lived abroad and/or participated in cultural training.

Informant F describes the importance of taking the message receiver's background into consideration when sharing tasks, doing follow ups, and giving feedback:

> Delays in a project happen, because sometimes a person simply doesn't know what to do, so communication apparently hasn't been good enough. So then we come to the issue of how important successful virtual communication is. If you know who the person is, you know how to communicate the issue clearly, and then you do the follow up to see if it is going anywhere and in what direction it is going. Then depending on the culture, the feedback conversation is different

Table 9 Challenges in the Work Processes

Availability of training for virtual work	2	2	1	2	0
Relationships	0	0	2	2	3
Diversity, passion, cultural differences	1	0	3	1	2
Effective NPD	1	0	1	3	2
Tacit knowledge transfer	0	1	1	3	2
Temporary convergence	0	2	2	3	0

Notes Column headings are as follows: (1) no challenge, (2) minor challenge, (3) average challenge, (4) significant challenge, (5) major challenge.

> with each individual. Other cultures can't take feedback, but you just have to get the message through somehow. Those faults and failures need to be fixed.

In virtual projects in this field of business, fast innovation is crucial. Therefore, effective collaboration is needed and leading effective virtual teams is possible, if cultural issues are taken into consideration (Johns & Gratton, 2013). Success in any collaboration between people and organizations is based on the quality of relationships that shape cooperation, trust, mutuality, and joint learning. Some informants pointed out the importance of having face-to-face meetings first, as some informants said.

According to these managers everything, except negative personal issues, redundancy notices, and critical feedback meetings, can be handled virtually; however, it was also stated by half of the managers that if you have met face-to-face even once, everything can be handled virtually after that. Interestingly, according to one informant, everything can be handled virtually, and face-to-face conversation is not necessarily needed at all.

In building relationships within teams, the practices varied even more. Most informants stated that the quality and characteristics of team cooperation are not evaluated. Some informants said that in economically tough times there were no recreational team building events; however, one manager mentioned that creative and strong team leaders can organize low budget team building events at any time. Other ways to enhance team performance included horizontal interaction with cross-review, monthly information sharing meetings for formal and informal communication, and voluntary informal communication. In summary, there are no official procedures in evaluating team building and performance; team building practices are based on each manager's personal experience and preferences and evaluation is only performed if the team fails or performs exceptionally well.

Challenges in virtual NPD show strongly divided opinions: Most informants stated that a virtual organizational structure makes NPD more difficult and

it shouldn't even exist; however, some informants thought that virtual NPD should be seen as strength and should be built-in to the business.

Availability and participation in communication training was not seen as challenging among the informants. Most informants had participated in communication training a long time ago. Only a few informants mentioned a training portal, and only one named relevant virtual communication classes that are available. Almost all informants had not participated in virtual communication classes at all. One informant stated that he had not participated in any communication or virtual communication classes and he did not even know if there is such training available. The importance and meaning of virtual communication training is clearly not recognized.

In summary, there is a lot of variety in the managers' perspectives in a complex multicultural environment. Less than half of the informants thought that virtual NPD is an advantage, mainly due to inbuilt wide social networks and global contact surface. The rest of the informants believed that innovativeness can decrease and time differences can cause inefficiency and difficulties in decision making. Informants that saw virtual NPD as beneficial stated that it is possible to address the challenges by making preparations for virtual meetings in advance and taking time differences into consideration when making plans. Virtual NPD work is sometimes performed at home, which means that successfully combining work and home is needed in virtual work. Successful virtual work is beneficial to the company, but it is also beneficial to the manager working on virtual projects. According to Badrinarayanan and Arnett (2008), team members of successful virtual NPDs develop superior decision-making skills, perform future activities more efficiently, and also become more competent in acquiring, disseminating, and processing information.

Role of Virtual Competencies in Global NPD

Successful knowledge transfer in virtual NPD is based on personal and organizational virtual competencies. Figure 3 describes the most crucial organizational and personal virtual competencies needed in successful knowledge transfer in virtual NPD.

All communication processes are influenced by peoples' routines, which do not operate in isolation. Organizational virtual competence relates to the integration and the joint operation of routines. In this way, an organization is an effective operator that transforms employees' actions into collective actions and thus makes it possible to generate more knowledge and skills. In this way, virtual competencies give unique character to the organization and an individual (Metcalfe & James, 2000). Liker and Morgan (2006) have studied the factors behind Toyota's success and discovered that communication should be sufficient, well focused, accurate, and targeted on the

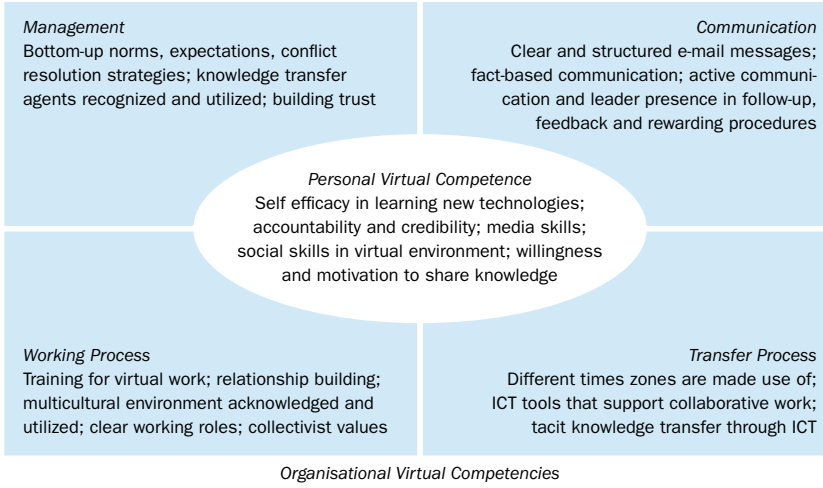

Figure 3 Organizational and Personal Virtual Competencies Based on Theory and this Study

essentials facts. Special attention is particularly needed in problem solving processes.

In contrast to virtual competencies, it can be concluded that based on the interviews and theory, there are organizational and individual level barriers that can harm efficient knowledge transfer in virtual NPD. Table 10 illustrates the other side of the coin of virtual competencies: The most common barriers for knowledge transfer based on the literature review and this study. Those are also divided into personal and organizational level barriers for knowledge transfer in virtual NPD.

According to this study, there are similarities between the case organiza-

Table 10 Potential Knowledge Transfer Barriers in Virtual NPD

Personal · Inability and unwillingness to listen · E-mail messages are extensive, lack structure and are written without taking recipients into consideration · Replying to messages by one's own routines and habits · No interest in connecting with team members at a personal level · Unwillingness to adopt new technologies · Inactivity in social media and social collaboration platforms · Lack of motivation in sharing information · Communication is performed based on assumptions and feelings rather than on facts · Individualistic values
Organizational · Absence of communication norms · Absence of conflict resolution strategies · Virtual meetings without planning, preparation and structure · Unreasonable amounts of ICT tools and systems · Information stored in too many locations · No rules in versioning and sharing documents · Communication and commenting on team's work is performed on an impulse · Employees' routines at work do not match · Organization structure that inhibits knowledge transfer · Absence of virtual feedback and rewarding procedures · Knowledge transfer agents are not recognized and utilized

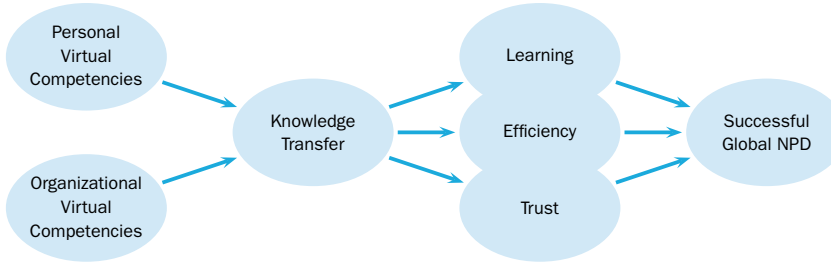

Figure 4 Connection between Personal and Organizational Virtual Competencies and Successful Global NPD

tion and virtual organizational studies. Communication without proper training in virtual collaboration leads to people communicating and operating in virtual environment in their own ways, and that can lead to development of distrust (Malhotra et al., 2007.) Also, it is evident that the possibilities offered by the new ICT aren't used to their full potential, in cases where management doesn't have proper virtual competence. It is crucial that virtual competencies are acknowledged and knowledge transfer is enabled in order for an organization to succeed in rapid new product development in global markets. Figure 4 describes the connection between virtual competencies and successful global NPD.

In this study, it can be seen that without recognizing the organizational and personal virtual competencies, managers find their own ways to solve problems and take actions based on their own experiences and preferences of leading experts. In this manner, the advantages of new ICT, knowledge transfer agents, and global environment aren't used to their full potential. It has to be noted that a limited amount of informants and analysis of one company does not allow generalizations to all organizations at this point. More information and studies about virtual competencies on an organizational and individual level in different levels of organizations are needed.

Conclusions

Success in virtual teams is based on virtual competencies on a personal and organizational level. More research of this topic is still needed, especially when newest ICT is used as a method of communication and for transferring tacit knowledge. In the evaluation of this research's validity, it should be noted that qualitative methods provide more in-depth knowledge on the complex issue of knowledge transfer in virtual NPD. Beyond that, informants had relatively lengthy work experience in virtual organizations, which is important and valuable when collecting this kind of research data and when evaluating the results. In this study, it was surprising how much

diversity exists among the managers that operate in the same company and within the same field. Informants are running their organizations with their tacit knowledge based on their past experiences, preferences, and training.

This research confirms the fact that traditional ways of communicating and managing experts may not work in best possible ways when leading experts in virtual organizations. Various ways of managing virtual NPD causes challenges and problems particularly in work processes related to human resources. It was also discovered that the connections between virtual communication competencies, relationship building, and tacit knowledge transfer have not been recognized or acknowledged within management. The importance and availability of communication training in a virtual context seems to need more attention.

What is controversial in virtual organization theory is that there are some views that point out the fact that everything can be taken care of virtually and face-to-face contact is not necessarily needed at all. Most informants in this study still emphasized the importance of face-to-face contact at the beginning of the project, which is still generally agreed in theory also; however, there were opinions stating that face-to-face contact isn't necessarily needed at all.

Newest ICT offers tools that enable contacts that are almost similar to face-to-face contact; however these tools aren't available to all users in some locations, while in other locations these tools aren't used enough, which means more development in this area is needed.

Future Research

The research results suggest that virtual team members cannot rely on simply transferring their behaviour from traditional teams and expecting it to be successful in virtual environments (Zigurs, 2003). Especially the meaning and role of virtual communication competencies at a personal and organizational level in efficient and successful knowledge transfer processes is interesting and needs further investigation. Furthermore, the characteristics of virtual leadership and the role and development of trust in knowledge transfer should be studied further in the virtual organizational context. The personal traits of the leaders and their relation to power in a virtual organization need more attention in further research. Other interesting areas are virtual collaboration tools and the role of internal and external social media within global companies. Further studies in this field are needed to enhance the quality of work and job satisfaction of employees in global virtual organizations, improve efficiency, and add the benefits of virtual collaboration in knowledge-based organizations to enrich the scientific discussion in this field.

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Clustering Organizational Learning Capability Indices for Knowledge Sharing in Different Segments of the Firm

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Since maximization of learning and organizational learning capabilities is the most important element for the success of knowledge management in each organization, this paper focuses on the dimensions of organizational learning capability. We suggest a mathematical clustering structure of dimensions according to their effect on the learning capability for different parts of the organization in order to obtain the highest level of learning capability in an organization. The proposed mathematical clustering aims to relate the needs of different sections of a firm to the corresponding learning capabilities.

Keywords: organizational learning capability; knowledge management; clustering

Introduction

Organizational learning is a process through which an organization will learn more items. Such learning means any changes in the organizational models, which may lead to recovery or maintenance of an organizational function (Alegre & Chiva, 2008). Jerez Gómez, Céspedes-Lorente, and Valle Cabrera (2004) also defined organizational learning as the creation, procurement, knowledge transfer and integration capability, and modification of organizational behavior for reflection of a new position with the improvement viewpoint of organizational function. Templeton, Lewis, and Snyder (2002) believed that organizational learning is a collection of organizational functions, such as learning knowledge, distribution and interpretation of information and memory consciously and/or non-consciously with positive effects on organizational changes. Learning capability is an important factor for further growth and innovation of an organization (Aad et al., 2011). Organizational learning capability is a collection of resources and/or tangible and intan-

gible skills for which it is necessary to also use competitive advantages. An organizational learning capability is a sign of creation capacity and combination of ideas in an effective way in contact with various organizational borders and through special managerial methods and innovations (Rashidi, Habibi, & Jafari Farsani, 2010). Ulrich, Von Glinow, and Jick (1993) also considered organizational learning capabilities as the capacity of managers in an organization for further production and combination of important and effective ideas. There are different studies for measuring the organizational learning capabilities at industrial and nonindustrial places among which are also Aydın, Zaim, and Ceylan (2009) and Hsu and Fang (2009). Aghdasi and Bafruei (2009) studied the organizational learning levels at different hospitals. In Aghdasi and Bafruei's (2009) research, knowledge transfer and integration capability had the highest mean followed by the systems perspective, openness and experimentation, and managerial obligation capabilities. Furthermore, a study was performed in India by Bhatnagar, which focused on the measuring of the organizational learning capability of managers. According to the results, IT managers and multinational companies had the highest rate of organizational learning capability, while engineering managers had the lowest rate (Bhatnagar, 2006). Based on the reviewed literature on organizational learning capability (OLC), learning capability includes following ten dimensions: Risk taking, Interaction with the external environment, Dialogue, Participative decision making, Managerial commitment, Systems perspective, Openness and experimentation, Knowledge transfer and integration, Teamwork, Demonstration of mission and goals. OLC is defined as the organizational and managerial characteristics or factors that facilitate the organizational learning process or allow an organization to learn (Dibella, Nevis, & Gould, 1996; Goh & Richards, 1997; Hult & Ferrell, 1997). Additionally, organizational learning is seen as a dynamic process based on knowledge, which implies moving among different levels of action, going from the individual to the group level, and then to the organizational level and back again (Huber, 1991). This process stems from the knowledge acquisition of the individual, and progresses with the exchange and integration of this knowledge until a corpus of collective knowledge is created (Hedberg, 1981) and embedded in the organizational processes and culture. This collective knowledge, which is stored in the so-called organizational memory (Walsh & Ungson, 1991), has an impact on the type of knowledge acquired and the way in which it is interpreted and shared. What an individual learns in an organization greatly depends on what is already known by other members of the organization-in other words, on the common knowledge base (Simon, 1991). In this paper, we focused on the dimensions of organizational learning capability for obtaining the highest level of learning capability. Increasing learning capability facilitates the knowledge

sharing process in different parts of an organization. We should allow the transfer, interpretation, and integration of knowledge in an organization. In order to obtain the maximum level of learning capability in an organization, we should implement each dimension of learning capability that has the greatest effect on learning capability when compared with other dimension parts. For this, we cluster the dimensions of learning capability in different segments based on the effect of particular dimensions.

Organizational Learning Capability

Niece and his colleagues were the first to use the concept of capability; namely, they used it as a concept of recourses and abilities. Ashkenas (1995) introduced the organizational learning capability as follows: 'The ability of an organization to learn from its experiences and taking them through times and borders.' An organization incapable of learning tends to make adjustments to its own solution, instead of investing and devoting time in changes and improvements. The learning organization or prescriptive literature mainly focuses on the development of normative models for the creation of a learning organization. Jerez Gómez, Céspedes-Lorente, and Valle Cabrera (2005) suggested three basic concepts: (1) Knowledge, its acquisition, use, distribution and integration in an organization become one of the critical strategic resources and the base of learning in an organization. Acquiring and distributing knowledge is due to the internal changes that may be the result of both conceptual, as well as behavioral levels. (2) Learning capability is based on the existence of a collective ego that helps us to see the organization as a system whose every member should to try and cooperate to reach the desirable results. (3) Because this type of learning is mostly based on time and resources, the value and stability of competitive advantage is higher. This learning needs open atmosphere for ideas and high levels of experience. One way of preparing for an open atmosphere is to devote a room to new ideas, together with improvement, and renovation of individual knowledge. Learning capability is a complex multidimensional construct. Although various studies have identified different dimensions or components (Senge, 1990; Slater & Narver, 1995; Lei, Slocum, & Pitts, 2000), most do so from a theoretical point of view, consequenly only few actually design a measurement scale based on the identified dimensions. Goh and Richard's study (1997) identified five dimensions (clarity of purpose and mission, leadership commitment and empowerment, experimentation and rewards, transfer of knowledge, teamwork, and group problem solving) and established a learning scale made up of 21 items. The questionnaire was sent to the employees of four organizations, namely two public and two private. The results enabled the authors to establish the differences among the firms with regard to their learning ability, concluding that the pri-

vate companies, operating in less-regulated environments, score highest in different dimensions. Hult and Ferrell's study (1997) is more extensive with regard to the validation of the scale they designed. The scale was formed of 23 items that attempted to measure the four dimensions they considered a part of organizational learning capability (team orientation, systems orientation, learning orientation, and memory orientation). As opposed to Goh and Richards's work (1997), Jerez Gómez et al. (2005) used a large sample of firms and paid particular attention to verifying the reliability, the content validity, and the convergent and discriminate validity of the scale, describing the whole process in detail. They developed a measurement scale for organizational learning capability supported by the results of a validation study, which included a sample of 111 Spanish firms from the chemical industry. They extracted four factors of organizational learning, which they called organizational learning capability. These four dimensions are: Managerial commitment, Systems perspective, Openness and experimentation, Knowledge transfer and integration. Chiva (2004) analyzed both mentioned works (Goh & Richards; Jerez Gómez et al., 2005) in order to determine the facilitating factors of organizational learning. Based on this comprehensive analysis, Chiva, Alegre, and Lapiedra (2007) developed an OLC measurement instrument that perceives OLC as a multidimensional concept, the dimensions of which are: experimentation, risk taking, interaction with the external environment, dialogue and participative decision making. On one hand, these five dimensions are essential enablers of the organizational learning process, while on the other hand, they represent the OLC of a particular firm.

Organizational Learning Capability Dimensions

Risk taking Risk taking is understood as the tolerance of ambiguity, uncertainty, and errors. Hedberg (1981) proposes a range of activities to facilitate organizational learning, amongst which the design of environments that assume risk taking and accept mistakes is emphasized. Accepting or taking risks involves the possibility of mistakes and failure occurrences. Sitkin (1996) goes as far as to state that failure is an essential requirement for effective organizational learning and to this end examines the advantages and disadvantages of success and errors. If the organization aims to promote short-term stability and performance, then success is recommended, since it tends to encourage the maintenance of status quo. According to Sitkin (1996), the benefits brought about by error or risk tolerance, prompting of attention to problems and the search for solutions, ease of problem recognition and interpretation, and a variety of organizational responses. Since the appearance of this work, many authors have underlined the importance of risk taking and accepting mistakes in order for organizations to learn (Popper & Lipshitz, 2000).

Interaction with the external environment We define this dimension as the scope of relationships with the external environment. The external environment of an organization is defined as the factors beyond the organization's direct control of influence. It consists of industrial agents, such as competitors, and the economic, social, monetary, and political/legal systems. Environmental characteristics play an important role in learning and their influence on organizational learning has been studied by a number of researchers (Bapuji & Crossan, 2004)]. Relations and connections with the environment are very important, since the organization attempts to evolve simultaneously with its changing environment. Hedberg (1981) considers the environment as the prime mover behind organizational learning. More turbulent environments generate organizations with greater needs and desires to learn (Popper & Lipshitz, 2000). According to Nevis, Dibella, and Gould (1995), researchers have in recent years stressed the importance of observing, opening up to and interacting with the environment.

Dialogue In particular, authors from the social perspective highlighted the importance of dialogue and communication for organizational learning (Brown & Duguid, 1991). Dialogue is defined as sustained collective inquiry into the processes, assumptions, and certainties that make up everyday experience (Isaacs, 1993). Schein (1993) considers dialogue as the basic process for building common understanding in that it allows one to see the hidden meanings of words by revealing these hidden meanings in our own communication. The vision of organizational learning, as a social construction, implies the development of a common understanding, starting from the social base and relationships between individuals (Brown & Duguid, 1991). Nevis et al. (1995) argue that learning is a function of spontaneous daily interactions between individuals. The chance to meet people from other areas and groups increases learning. Similarly, Goh and Richards (1997) advocate teamwork and problem solving in groups with particular emphasis on multi-functional teams.

By working in a team, knowledge can be shared and developed amongst its members. Easterby-Smith, Crossan, and Nicolini (2000) hold that recent literature is moving away from the vision of an integrating dialogue in which consensus is sought towards one that seeks pluralism and even conflict. Oswick, Anthony, Keenoy, and Mangham (2000) claim that authentic dialogue fosters organizational learning, since it creates plural perceptions rather than suppresses them. Individuals or groups with different visions who meet to solve a problem or work together create a dialogue community.

Participative decision making Participative decision making refers to the level of influence employees have in the decision-making process (Cotton, Vollrath, Foggat, Lengnick-Hall, & Jennings, 1988). Organizations implement

participative decision making to benefit from the motivational effects of increased employee involvement, job satisfaction, and organizational commitment (Scott-Ladd & Chan, 2004). Scott-Ladd and Chan (2004) provide evidence to suggest that participative decision making enables better access to information and improves the quality and ownership of decision outcomes. Parnell and Crandall (2000) also maintain that divulging information is a requirement for participative decision making. Subordinates are assumed to be informed in order to participate efficiently. The above reviewed literatures considered participative decision making as one of the aspects that can facilitate learning.

Managerial commitment Management should recognize the relevance of learning, thus developing a culture that promotes the acquisition, creation, and transfer of knowledge as fundamental values (Stata & Almond, 1989). Management should articulate a strategic view of learning, making it a central visible element and a valuable tool with an influence on long term results (Slocum, McGill, & Lei, 1994). Likewise, management should ensure that the firm's employees understand the importance of learning and become involved in its achievement, considering it an active part of the firm's success. Finally, management should drive the process of change, taking the responsibility for creating an organization that is able to regenerate itself and face up to new challenges (Williams, 2001).

Systems perspective Systems perspective entails uniting the organization's members around a common identity. Various individuals, departments, and areas of the firm should have a clear view of the organization's objectives and understand how they can help in their development. The organization should be considered as a system that is made up of different parts, each with its own function, that act in a coordinated manner. Viewing the firm as a system implicitly involves recognizing the importance of relationships based on the exchange of information and services and infers the development of shared mental models. Inasmuch as organizational learning implies shared knowledge, perceptions, and beliefs, it will be enhanced by the existence of a common language and joint action by all individuals involved in the process. Thus, the presence of a common language favors knowledge integration-a crucial aspect in the development of organizational learning (Grant, 1996). In this way, organizational learning goes beyond the employees' individual learning and takes on a collective nature (McGill, Slocum, & Lei, 1992).

Openness and experimentation Our unit of analysis is generative or double-loop learning, which requires a climate of openness that welcomes the arrival of new ideas and points of view, both internal and external, allowing individual knowledge to be constantly renewed, widened, and improved. To

create a climate of openness, there needs to be a previous commitment to the cultural and functional diversity, as well as a readiness to accept all types of opinions and experiences and to learn from them, avoiding the egocentric attitude of considering one's own values, beliefs, and experiences to be better than the rest (McGill et al., 1992). Openness to new ideas, coming from within the organization or from outside of it, favors experimentation, an essential aspect of generative learning, inasmuch as it implies the search for innovative flexible solutions to current and future problems, based on the possible use of different methods and procedures. Experimentation requires a culture that promotes creativity, an enterprising ability, and readiness to take controlled risks, supporting the idea that one can learn from one's mistakes.

Knowledge transfer and integration This dimension refers to two closely linked processes, which occur simultaneously rather than successively: internal transfer and integration of knowledge. The efficacy of these two processes rests on the previous existence of absorptive capacity (Cohen & Levinthal, 1990), implying the lack of internal barriers that impedes the transfer of best practices within the firm (Szulanski, 1996). Transfer implies internal spreading of knowledge acquired at an individual level, mainly through conversations and interaction among individuals. Fluid communication relies mainly on the existence of agile information systems that guarantee the accuracy and availability of the information. With regard to dialogue and debate, work teams and personnel meetings can be ideal forums in which to openly share ideas. The main role of work teams in developing organizational learning is frequently pointed out in the literature, with particular emphasis placed on multidisciplinary and multifunction teams. Team learning places the group above the individual, allowing the transfer, interpretation, and integration of the knowledge acquired individually. This integration leads to the creation of a collective corpus of knowledge rooted in organizational culture, work processes, and the remaining elements that form the 'organizational memory.' Thus, knowledge can be subsequently recovered and applied to different situations, guaranteeing the firm's constant learning in spite of the natural rotation of its members (Simon, 1991).

Teamwork In today's complex world, individuals need to help each other accomplish the organizational objectives. Structures and systems in an organization need to encourage teamwork and group problem solving by employees and reduce the dependency on upper management. Furthermore, teams need to have the ability to work cross-functionally. By working in teams, knowledge can be shared among organizational members, consequently contributing to better understanding of other individuals, their

Table 1 Items Composing the OLC Scale

Dimension/measurement items	Literature source
Risk taking	
People are encouraged to take risks in this organization	Amabile (1996)
People here often venture into unknown territory.	Isaksen, Lauer, & Ekvall (1999)
Interaction with the external environment	
It is part of the work of all staff to collect, bring back, and report information about what is going on outside the company.	Pedler, Burgoyne, & Boydell (1997)
There are systems and procedures for receiving, collating, and sharing information from outside the company.	Pedler et al. (1997)
People are encouraged to interact with the environment: competitors, customers, technological institutes, universities, suppliers etc.	Pedler et al. (1997)
Dialogue	
Employees are encouraged to communicate.	Templeton et al. (2002)
There is a free and open communication within my work group	Amabile (1996)
Managers facilitate communication	Pedler et al. (1997)
Cross-functional teamwork is a common practice here.	Hult and Ferrell (1997)
Participative decision making	
Managers in this organization frequently involve employees in important decisions	Goh and Richards (1997)
Policies are significantly influenced by the view of the employees	Pedler et al. (1997)
People feel involved in main company decisions	Pedler et al. (1997)

Continued on the next page

needs, and how they work in different parts of the organization, thus encouraging knowledge transfer.

Demonstration of mission and goals The organization, as a whole and each unit within it, needs to have a clearly articulated purpose. Employees need to understand this purpose and the contribution of their work toward the attainment of the organization's mission. In addition, the organization needs to promote employee commitment to these goals. If the employees understand the gap between the vision and the current state, they can strive to overcome that gap (Mohrman, Mohrman, & Cohen, 1995).

Problem definition and modeling

Organizational learning capability has many dimensions. Here we have involved ten dimensions of OLC dimensions for better explanation. We can choose each set of OLC dimensions. In order to obtain the maximum level

Table 1 *Continued from the previous page*

Dimension/measurement items	Literature source
Team work and group problem solving	
The current approach of the organization encourages the personnel to solve problems cooperatively, before discussing them with managers	Goh and Richards (1997)
We often cannot form unofficial groups to solve the problems of the organization	Goh and Richards (1997)
Majority of problem solving groups are members of different operating environments	Goh and Richards (1997)
Demonstration of mission and goals	
There is a widespread support and acceptance of the Organization's mission statement.	Goh and Richards (1997)
I do not understand how the mission of the organization is to be achieved (r).	Goh and Richards (1997)
The organization's mission statement identifies the values to which all employees must conform	Goh and Richards (1997)
We have opportunities for self -assessment with respect to goal attainment.	Goh and Richards (1997)
Managerial commitment	
The managers frequently involve their staff in important decision making processes.	Jerez Gómez et al. (2004)
Employee learning is considered more of an expense than an investment.	
The firm's management looks favorably on carrying out changes in any area to adapt to and/or keep ahead of new environmental situations.	
Employee learning capability is considered a key factor in this firm	
In this firm, innovative ideas that work are rewarded.	
Systems perspective	
All employees have generalized knowledge regarding this firm's objectives.	Jerez Gómez et al. (2004)
All parts that make up this firm (departments, sections, work teams, and individuals) are well aware of how they contribute to achieving the overall objectives.	
All parts that make up this firm are interconnected, working together in a coordinated fashion.	

Continued on the next page

of learning capability and facilitating knowledge sharing process in different segments of an organization, we should implement each dimension of OLC in its fitting part. At first, we should calculate the Weight of each dimension in each part, to do this; we use k measuring items that exist in OLC literature. Finally, the dimensions are clustered in different parts of the organiza-

Table 1 *Continued from the previous page*

Dimension/measurement items	Literature source
Openness and experimentation	
This firm promotes experimentation and innovation as a way of improving the work processes.	Jerez Gómez et al. (2004)
This firm follows up what other firms in the sector are doing; adopting practices and techniques it believes to be useful and interesting.	
Experiences and ideas provided by external sources (advisors, customers, training firms, etc.) are considered a useful instrument for this firm's learning.	
Part of this firm's culture is that employees can express their opinions and make suggestions regarding the procedures and methods in place for carrying out tasks.	
Knowledge transfer and integration	
Errors and failures are always discussed and analyzed in this firm, on all levels.	Jerez Gómez et al. (2004)
Employees have the chance to talk among themselves about new ideas, programs, and activities that might be of use to the firm.	
In this firm, teamwork is not the usual way to work.	
The firm has instruments (manuals, databases, files, organizational routines, etc.) that allow what has been learnt in past situations to remain valid, although the employees are no longer the same.	

tion according to their effects and the cost of implementing the aspects and presented formulas. Then we have considered k implementing methods for implementing each dimension in each part of the organization. Implementing methods for each dimension are different in different organizations. As people learn in different ways, there are different styles of organizational learning; therefore organizations select different implementing methods for implementing OLC dimensions in different parts according to the features of industrial environment, adopted strategies, business culture, technology, available resources and history of the Company. Implementation methods are determined by the organization's knowledge management. The organization limits total budget, which is considered to have increased the learning capability of the organization to a maximum value.

Our proposed formulas for clustering are described in four steps:

Step 1: Determining $n_{ijkk'}$

We should measure the weight of implementation item k of dimension i in part j by measure item k. $n_{ijkk'}$ gives a number between 0 and 100 which is determined by Knowledge Management Team.

Step 2: Calculating $w_{ijkk'}$

According to the amount of $n_{ijkk'}$, we can determine the numerical value of k by specifying the weight of implementation item k of dimension i in part j. Also the organization's knowledge management team determines the value of a, b, c, d, α, β, and γ in $w_{ijkk'}$:

$$w_{ijkk'} = \begin{cases} 0 & n_{ijkk'} < a \\ \alpha & a \le n_{ijkk'} < a \\ \beta & b \le n_{ijkk'} < c \\ \gamma & c \le n_{ijkk'} < d \\ 100 & n_{ijkk'} \ge d \end{cases}. \quad (1)$$

Step 3: Calculating w_{ijk}

Equation (2) shows the calculation of the Weight of implementation item k of dimension i in part j:

$$w_{ijk} = \sum_{k'} w_{ijkk'}. \quad (2)$$

If the implementation item k of dimension i was j, $x_{ijk} = 1$ so x_{ijk} would be 0. For measuring the effect of each dimension on the learning capability of the organization in each part, we use the measurement items in literature of organizational learning capability in Table 1.

We have k measurement items and k implementation items for each dimension. Firstly, to achieve this goal we should examine the amount of measurement item k'. This value is shown in $n_{ijkk'}$. $n_{ijkk'}$, which is a number between 0 and 100 and is determined by organization's Knowledge Management Team. According to the amount of $n_{ijkk'}$, the organization would determine the numerical value of measurement item, k to measure the weight of implementation item k of dimension i in part j. The organization's knowledge management team determines the value of a, b, c, d, α, β, and γ in the function $w_{ijkk'}$.

Step 4: Mathematical Clustering Model

Equation (3) or objective function maximizes the total effects of dimensions that are implemented in different parts of an organization:

$$\max \sum_i \sum_j \sum_k w_{ijk} x_{ijk}. \quad (3)$$

Because of capital limitation, each organization should invest in the dimensions of organizational learning capability, which have the greatest effect on learning capability of the organization to achieve the highest level of learning capability.

Table 2 Values of Fixed Variables

Part j	Max. cost of implementing dim. in part j	The minimize effect in part j
1	16000$	70
2	14000$	75
3	24000$	70
4	14000$	70
5	18000$	80

Table 3 Values of Constant Coefficients

α	β	γ	a	b	c	d
27	45	67	13	38	53	79

$$\sum_i \sum_k c_{ijk} x_{ijk} \le A_j \qquad \forall j. \tag{4}$$

This equation certifies that the total implementation cost for activating dimensions in part j is limited to a maximum value.

$$\sum_i \sum_j \sum_k c_{ijk} x_{ijk} \le B. \tag{5}$$

This equation ensures that the total budget of the organization, which is considered to have increased the learning capability of the organization, is limited to a maximum value.

$$\sum_i \sum_k w_{ijk} x_{ijk} \ge M_j \qquad \forall j. \tag{6}$$

This equation indicates that the total effect of dimensions in each part is limited to a minimum value. When the amount of a measured item reduces, its effect will be reduced and thus the total effect on the learning capability of the organization will be reduced. Since we have limited the total effect to a minimum value in each part of the organization, more dimensions will be active and so the total cost will be increased.

Computational Results

We have considered an organization including 5 segments, 3 measurement items and 3 implementation items for each dimension. The total budget of the organization is allocated to increase the learning capability, the total implementation cost for implementing dimensions in part j and the total effects in each part are shown in Table 2. Constant coefficients, $\alpha, \beta, \gamma, a, b, c$ for calculation of w_{ijk} are displayed in Table 3. These coefficients are determined by the organization's knowledge management team. We choose $n_{ijkk'}$ and c_{ijk} as follows: $10 \le n_{ijkk'} \le 87$, $1800 \le c_{ijk} \le 4000$. We solved the presented model using lingo software. Implemented dimensions of organization's different parts are displayed in Table 4.

Table 4 Output Result

		$k=1$					$k=2$					$k=3$				
i	$j=$	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5
1		0	1	1	0	0	0	0	0	0	0	0	0	0	0	0
2		1	0	0	0	0	0	0	1	0	0	0	0	0	1	0
3		0	0	0	0	0	1	1	0	0	0	0	0	1	0	0
4		0	0	0	0	1	0	0	0	0	0	1	0	0	0	0
5		0	0	0	1	0	0	0	0	0	1	0	0	0	0	0
6		1	0	0	0	0	0	1	0	0	0	0	0	0	0	0
7		0	0	0	0	0	0	0	0	1	0	1	0	0	0	0
8		0	0	0	1	0	0	0	0	0	1	0	0	0	0	0
9		1	0	0	0	0	0	1	0	0	0	0	0	0	0	0
10		0	0	0	0	0	0	0	0	1	0	0	0	0	0	1

Dimensions the organization should consider in each segment of the firm are displayed in Table 4 ($x_{ijk} = 1$). Implementing method of dimensions in each part is shown in Table 4. We have considered 3 implementing methods for each dimension ($k = 1, 2, 3$). Implementing methods for each dimension are different in different organizations.

Conclusions

This paper proposed a mathematical clustering model to disseminate the organizational learning capability dimensions within the context of knowledge management in firms. The mathematical clustering technique has determined the allocation of indices, according to their effect on the learning capability, to different parts of the organization in order to obtain the highest level of learning capability in an organization. We developed an algorithm to imply the steps of the clustering method. Computational results confirmed the effectiveness of the model. The findings confirmed that learning capabilities producing more effects are in a cluster, related to one specific segment of the firm.

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The Mediating Role of Knowledge Sharing on Information Technology and Innovation

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This study aims to investigate the relationship between information technology, knowledge sharing, and a firm's innovation. Knowledge sharing as a mediating effect is also simultaneously investigated with regard to the relationship between information technology and a firm's innovation. In this research, the quantitative method was mainly employed. The data was collected with a survey. A total of 224 respondents from herbal manufacturing companies were included in the research. The results presented in this paper demonstrate that knowledge sharing and information technology can critically influence the organization's innovation and can play a vital role as a significant success factor in this process.

Keywords: knowledge sharing; innovation; information technology; knowledge management

Introduction

Knowledge is the basic competitive advantage of a firm. Knowledge can be created, recognized, archived, accessed, and applied by people within a company (Nonaka, 1995). This organizational knowledge usually flows and is distributed within the firm. Moreover, multiple types of knowledge are required in order to improve products or services of an organization (Lee, 2001).

In particular, organization knowledge can be created from past learning, experience, and the acquisition of new information and knowledge by each individual. As a result, sharing knowledge of individuals with others will increase the ability to solve problems (Nonaka, Von Krogh & Voelpel, 2006) and enhance the innovation capability of the firm (Lee, 2001; Sáenz, Aramburu, & Rivera, 2009). Moreover, the firm cannot survive without explicit or tacit knowledge; both types of knowledge should be integrated and simultaneously performed. As Hiroshi Okuda, the chairman of Toyota, mentioned,

'The strength of Japanese manufacturing industries is in the technology (based on) tacit knowledge. With the progress in Information Technology (IT), tacit knowledge is converted into explicit knowledge. Still, we need tacit knowledge. To build a car, we have to educate people.' This statement also indicates the need for IT to support the organizational knowledge creation process within a firm, as information technology is a supporting factor of the organizational structure and enhances organizational performance.

In this research, we focused on the herbal industry, since Thailand is rich in a variety of herbs, as can be seen from the increasing number of new herbal products entering the market, and the increasing trend of herbal consumption. The herbal industry in Thailand has shown rapid growth and is becoming popular. According to the report of the Ministry of Industry, Thailand, the number of herbal manufacturers has increased by approximately 23 percent between 2004 and 2012. The creation of innovative products is an important part of the herbal industry. The main focus of the herbal industry is to reduce time-to-market, as well as launch unique products. Moreover, the herbal industry has unique characteristics such as high cost of R&D investment in developing products, and a highly regulatory environment.

Currently, most herbal manufacturers develop product formulations by themselves and keep them as a trade secret; so, in regards to the organization knowledge, the knowledge and experience of personnel is of highest value to the firm. In addition, almost all herb products in Thailand have been developed by incremental innovation.

The organizational aspect, which may be able to support increasing innovation performance, is knowledge sharing amongst individuals within the company. Knowledge sharing can bring a lot of benefits to the firm, such as faster creation of new innovative products or services. Therefore, the purpose of this research aims to:

- investigate the relationship among knowledge sharing, information technology, and innovation,
- identify the mediating effect of knowledge sharing on these relationships.

The next sections of this paper are organized as follows: the second section describes the relevant literature review; the third section develops the research model and launches the hypotheses for testing; the fourth section presents the research methodology and data collection procedure; the fifth section reports the data analysis and results; and the last section discusses the results, presents the conclusion, the limitations of this study, and further research directions.

Literature Review

Knowledge Sharing

In an era of competition, one of the most important intangible assets of an organization is knowledge rather than capital and labor. Nonaka et al. (2006) mentioned that knowledge is the key success factor of an organization. Organizations must adapt in order to gain the competitive advantage and survive in a fiercely competitive global economy.

Many earlier scholars defined knowledge in a variety of ways; however, there is no consensus about its characteristics (King, 2009). Two common types of knowledge in the field of knowledge management consist of explicit and tacit knowledge. Firstly, explicit knowledge refers to knowledge that can be easily articulated, expressed in words and numbers, and can be stored in repositories, communicated, and reproduced. Secondly, tacit knowledge refers to knowledge that is difficult to articulate, hard to transfer to others, and is based on experiences and commitments of people (Nonaka, 1994; Polanyi, 1966).

In order to gain and sustain a competitive advantage, managing the knowledge resource becomes an essential issue in the development of an organization (Davenport, De Long, & Beers, 1998). Organizational knowledge is usually accrued and distributed within an organization. Moreover, to improve products, services, or organizational performance, multiple knowledge sources are required. The integration of knowledge can be accrued based on the sharing of individual knowledge.

Knowledge sharing is defined as 'activities of transferring or disseminating knowledge from one person, group or organization to another' (Lee, 2001, p. 324). Moreover, knowledge sharing can benefit an organization if individuals are willing to share (Nonaka, 1995). One benefit of knowledge constitutes the direct effect on organizational performance, namely innovation. In other words, knowledge sharing is an ingredient of the innovation process. Moreover, it provides other benefits to the organization, such as increased intellectual capital, interchange between individual competitiveness and organizational competiveness, and reduced organizational costs of employees' knowledge gathering (Zhang, Li, & Shi, 2005).

Information Technology

During the past decade, much literature in the field of information technology demonstrated the importance of information technology in the improvement of an organization's performance. Information technology is a supporting factor of an organization that increases organizational innovation and performance. Yang and Chen (2007) suggest four main factors on the organizational level, which have an effect on knowledge sharing. These consist

of culture, structure, people, and technology. In regards to the technological aspects, they identified IT infrastructure as the most important factor, followed by IT know-how, and IT-support. In addition, Hsu (2006) suggested three approaches that are used to enhance employees' knowledge sharing within organizations: 1) technology-based approach 2) incentive-based approach and 3) organizational-based approach. A technology-based approach requires information technology to support individuals in sharing their knowledge within the organization.

Furthermore, there are two basic approaches to knowledge management for which IT can provide support: codification and personalization (Hansen, Nohria, & Tierney, 1999). In the case of the codification approach, explicit and structured knowledge is codified and stored in knowledge bases. The main role of IT is to help people to share knowledge through common storage so as to achieve economic reuse of knowledge, e.g. IT tools are electronic knowledge repositories. In the case of the personalization approach tacit and unstructured knowledge is shared largely through direct personal communication. The main role of IT is to help people locate each other and communicate so as to achieve complex knowledge transfer, e.g. IT tools are knowledge expert directories and video conferencing tools. Both are fundamental for the understanding of the role of information technology in knowledge management.

Innovation

Innovation can be defined as simply the introduction of something new (Davenport, 1993). A more extensive explanation can be found in the *Oslo Manual* (OECD, 2005), which identifies that 'innovation is the implementation of a new or significantly improved product (good or service), or process, a new marketing method, or a new organizational method in business practices, workplace organization, or external relations.' Most innovation definitions are focused on improvement within an organization in order to meet its business goals. Innovation can be categorized into various types. For instance, Tidd, Bessant, and Pavitt (2005) focused on the pathway to be examined when creating an innovation. Innovation is categorized in four types, which can be called the 4Ps of innovation. These consist of 1) Product innovation: changes in the things (products/services) that an organization offers; 2) Process innovation: changes in the ways in which they are created and delivered; 3) Position innovation: changes in the context in which the products/services are introduced; 4) Paradigm innovation: changes in the underlying mental models, which frame what the organization does. Moreover, the *Oslo Manual* (OECD, 2005) categorized innovation into four types – product innovation, process innovation, market innovation, and organization innovation.

Information Technology and Knowledge Sharing

Information technology is an essential administrative support function and can increase the competitive advantage of the firm. Information technologies can not only improve a firm performance, but also support knowledge sharing among individuals within the firm. Ng, Lee, Foo, and Gan (2012) proposed a research model which postulates that knowledge management implementation can improve the technological innovation of firms. Ismail and Yusof (2010) investigated the influence of technological factors, which included information technology infrastructure, know-how, and tools on the knowledge sharing quality of government officers in Malaysia. The results showed that information technology know-how, such as IT training of employees, is the most important variable in increasing knowledge sharing quality, followed by infrastructure, and tools. Moreover, much literature argues that IT can support employee knowledge sharing. Aulawi, Sudirman, Suryadi, and Govindaraju (2008) described IT as an important factor that has a direct effect on the knowledge sharing behavior of employees. IT can also support the sharing behavior of the informal knowledge of employees (Davison, Ou, & Martinsons, 2013).

Information Technology and Innovation

Huang, Li, and Chen (2009) stated that the level of a firm's innovation can be improved by information synergy and IT capability. Furthermore, an appropriate information technology system could improve the efficiency of knowledge management in an innovative organization (Norek, 2013). Moreover, Bartel, Ichniowski, and Shaw (2007) explained that investment in new information technology in a manufacturing firm will have a valuable effect, such as increasing productivity growth and product innovation performance. As a result, worker skills in IT should improve simultaneously.

Knowledge Sharing and Innovation

Most early literature agreed that knowledge sharing has an influence on innovation. Wang and Wang (2012) pointed out that explicit and tacit knowledge sharing both have direct influence on a firm's innovation and performance. Explicit knowledge sharing has greater influence on innovation speed, while tacit knowledge has more influence on innovation quality. Furthermore, Saenz, Aramburu, and Blanco (2012) focused on the effect of knowledge sharing mechanism on innovation capability. The results indicated that personal-interaction based knowledge sharing initiatives were the most influential, while ICT-based knowledge sharing initiatives and knowledge sharing embedded in management processes were respectively significant. Moreover, Liao, Fei, and Chen (2007) argued that knowledge sharing plays an important role in developing a firm's innovation. In addition,

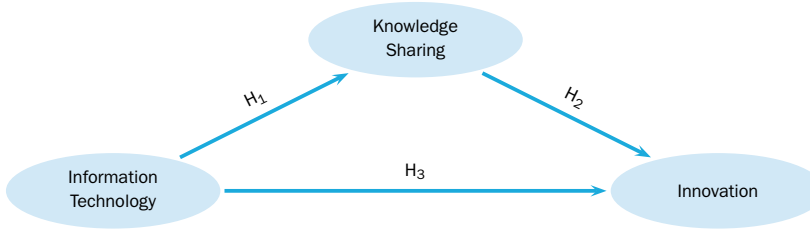

Figure 1 The Research Model

knowledge must be absorbed and then shared between employees with the purpose of increasing a firm's innovative capability, thus benefiting the company.

The Research Model and Hypotheses

The research model was constructed following earlier relevant literature as shown in Figure 1. It shows the research model with all variables. It also illustrates the relationship between knowledge sharing, information technology, and innovation. Three research hypotheses of this study were generated in order to test the relationship among knowledge sharing, information technology, and innovation. Moreover, the mediating effect of knowledge sharing on the relationship between information technology and a firm's innovation was also tested in the final step.

To establish the mediating role of knowledge sharing, three hypotheses were proposed according to Baron and Kenny (1986, p. 1177):

> First, the independent variable must affect the mediator in the first equation; second, the independent variable must affect the dependent variable in the second equation; and third, the mediator must affect the dependent variable in the third equation. If these conditions all hold in the predicted direction, then the effect of the independent variable on the dependent variable must be less in the third equation than in the second. Perfect mediation holds if the independent variable has no effect when the mediator is controlled.

The hypotheses were established following Baron and Kenny (1986) and earlier relevant literature:

- H_1 *Information technology has a positive influence on employee knowledge sharing.*
- H_2 *Information technology has a positive influence on a firm's innovation.*
- H_3 *Knowledge sharing has a positive influence on a firm's innovation.*

Research Method and Data Collection

Research Methodology

First, the hypotheses of this study were established based on the approach of Baron and Kenney (1986). Then, to analyze the mediation hypotheses, the bootstrapping method developed by Preacher and Hayes (2008) was employed. Moreover, Preacher and Hayes (2008) argued that this mediation testing procedure has more advantages than other techniques, such as the causal steps approach (Baron & Kenny, 1986). For example, the multiple mediators can be tested either simultaneously or separately. Secondly, this method can also be applied to small samples. Due to the fact that the bootstrapping method, which is based on 5,000 bootstrap samples, is mainly used to test the mediation hypotheses, there is no need to test multivariate normality. Thirdly, this method employs only one single analysis to test the multiple mediator models; therefore, the risk of making type I error is reduced. Moreover, the bootstrapping method is a non-parametric resampling procedure; the data set is repeatedly sampled and then indirect effect is estimated in each resampling data set.

Therefore, in this study, SPSS was mainly used to analyze the data, while the macro developed by Preacher and Hayes (2008), also known as the indirect macro, was used to analyze the mediator effect. Moreover, this study was based on 5,000 bootstrap samples and a 95 percent confidence interval.

Measurement Development

In this study, the measured items of all variables in the research model were primarily adopted from relevant former literature. These included three major variables – information technology, knowledge sharing, and a firm's innovation as shown in Table 1. Firstly, information technology contained six measured items, which were adopted from Yang and Chen (2007); Wang and Wang (2012); Ismail and Yusof (2010). All items focused on IT infrastructure and employees' IT knowledge. Secondly, knowledge sharing consisted of six measured items, which were adopted form Lin and Lee (2006); Baharim (2008); Wang and Wang (2012). The measured items emphasized explicit and tacit knowledge sharing of the employees. Lastly, innovation contained eight measured items, which were adopted from Liao et al. (2007), Aulawi et al. (2008), and Norek, 2013. The measured items focused on product and process innovation within the firm.

Data Collection Procedure

The quantitative method was employed in this study. Questionnaires were used as the data collection tool. The questionnaires were distributed to

Table 1 Variables Development

Variables	No. of items	Sources
Information technology	6	Yang and Chen (2007), Wang and Wang (2012), Ismail and Yusof (2010)
Knowledge sharing	6	Lin and Lee (2006), Baharim (2008), Wang and Wang (2012)
Innovation	8	Liao et al. (2007), Aulawi et al. (2008), Norek (2013)

Table 2 Profile of Herbal Manufacturers and Number of Respondents

Category		No. of respondents	Percent
Main Products	Herb medicine	92	40.9
	Herb cosmetics	45	20.1
	Herb food and supplement	67	29.9
	Herb spa products	4	1.8
	Others	16	7.3
Age of business	Less than 1 year	6	2.7
	1–5	20	8.9
	6–10	138	61.6
	11–15	30	13.4
	16–20	28	12.5
	More than 20 years	2	0.9
Number of employees	Less than 50	48	21.2
	50–199	28	12.4
	200–499	69	31.0
	More than 500	79	35.4

Table 3 Scale Reliability

Dimension	No. of items	Cronbach's alpha coefficient
Information technology (IT)	6	0.762
Knowledge sharing (KS)	6	0.739
Innovation (IN)	8	0.716

42 herbal manufacturers from November, 2012 to January, 2013 by mail and walk-in. There were a total of 224 usable questionnaires. The profile of herbal manufacturers and number of respondents is shown in Table 2.

Reliability Test

The questionnaire design was primarily based on the literature review. The questionnaires were measured by internal consistence reliability based on the Cronbach's alpha coefficient technique. The results indicating the Cronbach's alpha coefficient of knowledge sharing, information technology, and a firm's innovation are shown in Table 3. As displayed, overall the results are above the acceptable level 0.7. This indicates that each measured item

Table 4 Descriptive Statistics and Inter-Correlation Matrix

Dimension	Mean	St. dev.	IT	KS	IN
IT	3.2210	0.7190	1.000		
KS	3.5499	0.5481	0.356	1.000	
IN	3.2355	0.8185	0.252	0.278	1.000

of the questionnaire has a high internal consistency. Moreover, the mean and standard deviation of each variable and the inter-correlation among variables are displayed in Table 4.

Measurement

In this study, all of the measured items were adopted from earlier research. These consisted of the following three constructs – knowledge sharing, information technology, and innovation. Moreover, a five-point Likert scale, which ranged from '1 = strongly disagree' to '5 = strongly agree,' was employed to measure all items.

Data Analysis and Results

The questionnaires from 224 respondents from 42 manufacturers of herbal industry were used in the data analysis. Table 5 displays the respondent's characteristics according to demographics.

The results of this research display that the relationship between the independent variable, information technology, and the mediating variable, knowledge sharing, is positive and significant. Moreover, the relationship between the dependent variable, innovation, and the mediating variable, knowledge sharing, is also positive and significant. Therefore, the results of hypotheses testing are as follows:

- H_1 presents the relationship between information technology and knowledge sharing. The results display that information technology is positively and significantly ($\beta = 0.2711$, $t = 5.6689$, $p < 0.001$) related to knowledge sharing.
- H_2 presents the relationship between information technology and a firm's innovation. The results display that information technology is positively and significantly ($\beta = 0.1990$, $t = 2.5663$, $p < 0.001$) related to a firm's innovation.
- H_3 presents the relationship between knowledge sharing and a firm's innovation. The results display that information technology is significantly ($\beta = 0.3226$, $t = 3.1709$, $p < 0.001$) related to a firm's innovation.

Moreover, H_1, H_2 and H_3 are significant, and mediation analysis was tested with the use of the bootstrapping method with bias corrected con-

Table 5 Respondent's Demographic Profiles

Respondent's profile	Classification	Frequency	Percentage
Gender	Male	81	36.0
	Female	143	64.0
Age	20–29	117	52.2
	30–39	65	29.2
	40–49	20	8.8
	50 and above	22	9.8
Educational level	High school	20	8.9
	Bachelor	163	72.8
	Master	41	18.3
	PhD	0	0.0
Year of experience	Less than 1 year	28	12.5
	1–5 years	83	37.1
	6–10 years	56	25.0
	11–15 years	16	7.1
	More than 15 years	41	18.3
Department	Production	65	29.0
	R&D	54	24.1
	Engineering/maintenance	20	8.9
	Quality Control	65	29.0
	Others	20	9.0

fidence estimates from Preacher and Hayes in SPPS macro. In this study, a 95% confidence interval of the indirect effects was obtained with 5,000 bootstrap resamples (Preacher & Hayes, 2008). The mediated hypothesis was tested and the results of the mediation analysis confirm the mediation role of knowledge sharing in the relationship between information technology and a firm's innovation ($\beta = 0.0874$, $CI = 0.0344$ to 0.1611). In addition, it indicates that knowledge sharing providesa partial mediation effect between information technology and a firm's innovation. Moreover, the overall model is significant, $R^2 = 0.1265$, $F = 32.1361$, $p < 0.001$.

Discussion

This goal of this study is to develop a framework for examining knowledge sharing, information technology, and innovation. The research samples were obtained from employees of herbal manufacturers in Thailand.

Firstly, the results display that information technology has a positive influence on knowledge sharing. The results of this study are consistent with earlier relevant researches (Aulawi et al., 2008; Davison et al., 2013; Ismail & Yusof, 2010). Information technology also has a positive influence on a firm's innovation. The results of this study are consistent with earlier

relevant researches by Huang et al. (2009) and Bartel et al. (2007). Much earlier research also showed a strong relationship between knowledge sharing and a firm's innovation (Liao et al., 2007; Saenz et al., 2012; Wang and Wang, 2012). The results of this study also indicate that knowledge sharing has a significantly positive influence on a firm's innovation. Furthermore, the results indicate that knowledge sharing is a partial mediator between information technology and a firm's innovation. This means that it is not only an indirect predictor of a firm's innovation, but could also support information technology's influence on a firm's innovation.

In the field of herbal manufacturing in Thailand, innovation is the key driver of business and competitiveness. Both public and private organizations, such as The National Innovation Agency, Thailand, provided support to herbal manufacturers in order to develop their innovation. The results indicate that most herbal manufacturers focus more on their product innovation rather than on process innovation. Moreover, due to certain constraints, such as high cost of R&D investment and inadequate expertise, most of herbal manufacturers developed their products as an incremental innovation. Multiple sources of knowledge are required to develop organization innovation – not only explicit knowledge, but also tacit knowledge, such as employee experience, which becomes an essential aspect of the organizational knowledge. The ability to change tacit knowledge to explicit knowledge and share this knowledge with others is most valuable to an organization. This indicates that knowledge sharing of employees plays an important role in an organization. In this study, it also emerged that employees in herbal manufacturing shared their explicit knowledge rather than tacit knowledge. Their tacit knowledge, however, could mostly be shared through training programs.

In addition, information technology becomes an organizational factor in increasing knowledge sharing and firm's innovation. In this study, we found that many herbal manufacturers emphasize the information technology issue; however, they focus on the information technology infrastructure rather than employee information knowledge. For example, some manufacturers provided LAN system and intranet to share their information and knowledge within the organization. Moreover, some of them invested in the video conference system to communicate within the organization. Furthermore, some of them preferred to communicate with their employees and customers via social network. However, there were not many organizations which provided training courses in information technology to their employees.

Essentially, the results of this study display that knowledge sharing is a partial mediator between information technology and organization innovation. It indicates that knowledge sharing is not only directly related to organization innovation, but also leverages information technology influence

on an organization's innovation. It can be said that sharing knowledge is proportional to utilizing information technology in order to enhance the organization's innovation. In other words, information technology can support the knowledge sharing of employees with functionalities such as communication among individuals, sharing information and knowledge via the organizational network, storing data, and supporting decision making. Moreover, organizations facilitate the effectiveness of information technology infrastructures and the knowledge of employees in the field of information technology by providing training courses to increase knowledge sharing of employees, which can also drive innovation and competitiveness of the organization.

Research Implications

This study emphasizes the importance of knowledge sharing, information technology, and organizational innovation. The results of this study have both theoretical and practical implications that can be described as follows:

- *Theoretical implications.* This study discusses the theoretical development in the field of information technology, knowledge sharing, and organizational innovation. The theoretical contribution of this study is the development of a research model, which enhances the essential variable, knowledge sharing, as the mediator between the relationship between information technology and organizational innovation. The contribution of this study is valuable because, when reviewing the earlier relevant literature, we found that although much of it addressed the relationships between knowledge sharing, information technology, and organizational innovation, there is no research on knowledge sharing as the mediating variable between information technology and innovation. As displayed by the results, the implementation of knowledge sharing among employees within an organization and providing an appropriate information technology system could leverage the level of organizational innovation, for example through the creation of new ideas. Therefore, it can be concluded that knowledge sharing and information technology are the critical factors, which can increase the innovation performance of an organization.
- *Practical implications.* The results of this study also suggest some useful managerial insights. Firstly, from the managerial perspective, managers should emphasize both information technology and knowledge sharing among employees in order to increase their organizational innovation performance. With regard to knowledge sharing among employees within an organization, encouraging employees to share both their explicit and tacit knowledge represents an essential approach to increasing organizational innovation. Nevertheless,

tacit knowledge sharing is difficult to perform in the framework of routine work. Utilizing information technology is one possible approach to assisting in sharing tacit knowledge; however, it does not provide an exact method of increasing organizational innovation. Managers should also pay attention to other factors, such as improving organizational culture, providing a reward system and encouraging interaction among employees. Moreover, external knowledge sharing should also encourage employees, especially in the R&D department, to improve the product and process innovation of the organization.

Secondly, this study indicates the influence of information technology on knowledge sharing and organizational innovation. Therefore, organizations should provide an appropriate information technology infrastructure in order to support knowledge sharing and increase organizational innovation performance. Furthermore, organizations should also recognize the knowledge and skills of employees in information technology with the purpose of taking full advantage of the benefits provided by the information technology. For example, organizational managers could provide appropriate IT training programs for employees within an organization.

Significance of Research Findings

In the current fiercely competitive marketplace, an essential way for survival of an organization is effective innovation. The ability to create and continuously develop employees' own innovation should also be emphasized. There are both internal and external factors that can drive the innovation of an organization. In recent years, an increasing amount of literature addresses the issue of organizational innovation development. This study mainly focuses on the technological perspective and knowledge management within organizations in order to increase organizational innovation performance.

The relationship between information technology and organizational innovation has been widely investigated. However, this study aims to investigate the relationship between information technology and organizational innovation, and then add knowledge sharing as the mediator. Then we can hypothesize that information technology and knowledge sharing positively influence organizational innovation, while knowledge sharing as a mediating effect is also simultaneously investigated with regard to the relationship between information technology and a firm's innovation.

The results of this study confirm previous research results showing that information technology and knowledge sharing positively influence organizational innovation and provide additional evidence that knowledge sharing can play a mediating role in leveraging information technology to increase organization innovation performance.

Given the importance of information technology, knowledge sharing and

innovation in today's world, the results of this study will serve as the base for further studies in several areas, such as innovation improvement, organizational development, knowledge management, organizational planning and management, and human resource management. Moreover, it could act as a guide for developing organizational innovation through utilizing information technology in order to share knowledge among employees. In addition, the results of this study could also provide a better understanding of knowledge sharing, information technology, and innovation within organizations.

Limitations and Future Research

In this research, there are some unavoidable limitations. Firstly, it is based on a small number of organizations; therefore, the results may not be generalized to all other organizations. Consequently, future research should focus on a larger number of organizations in order to obtain a broad view of results. Secondly, this study only focused on the perspectives of staff level employees. Therefore, future research should focus on the perspectives of top level management and may compare the perspectives of managers and employees in order to examine the gap and establish appropriate strategies for increasing organization innovation performance. In addition, research of different sample backgrounds, such as other countries, other industries, or comparison between different industries could also be performed. Finally, some other relevant variables may also be added to the research model and their relationships could be investigated in further studies to better understand the critical success factors in firm's innovation improvement.

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Entrepreneurial Abilities Development at Universities: The Case of Polytechnic University of Zacatecas, Mexico

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The development of entrepreneurs is an issue that has attracted interest of higher education public institutions (HEIs); programs of entrepreneurial development, promotion of entrepreneurship, and entrepreneurial skills are certain aspects generated by this topic; however, very little attention has been given to the measuring of entrepreneurial abilities as an indicator of performance entrepreneur development programs. This study aims to measure the level of entrepreneurial skills of University students and compare them with the level of entrepreneur's skills in order to determine the impact of the program for entrepreneurial development on senior students of the Universidad Politécnica de Zacatecas in their career of administration and management of small and medium-sized enterprises.

Keywords: entrepreneurship; entrepreneur abilities; entrepreneur development programs; knowledge; learning; management

Introduction

The development of entrepreneurs is a concept whose application has grown in recent years in higher education institutions (HEIs) in Mexico, similarly the number of HEIs and programs incorporating materials which foster business creation are also increasing. There has been a considerable change in linking HEIs with government agencies that direct resources to projects that emerge from classes or programs of entrepreneurship in HEIs, as is the SME Fund of the Ministry of Economy, which is responsible for the business incubator program. This program is mostly housed within the HEIs of the country with unique sections devoted to the development of entrepreneurs.

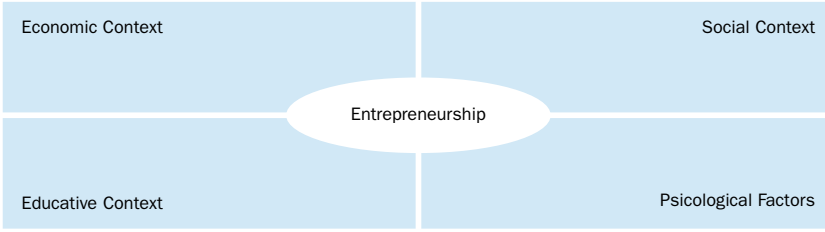

Figure 1 Factors That Determine the Creation of an Enterprise

However, although some programs offered entrepreneurship training for skill development, the end result of these programs were business plans and investment projects based on the students' ideas. There are few programs that focus on the development of the entrepreneurial skills of students, which is of paramount importance if it is intended that young people's ideas would be realized through the creation of companies. Furthermore, in order for the companies to become even more successful through the years, it is necessary to form entrepreneurs, i.e. to develop skills in young people that enable them to create, develop, and maintain a competitive business.

The present research focuses on measuring the entrepreneurial skills of students attending the ninth term (lasting four months) of the career management and business management program offered by the Polytechnic University of Zacatecas (Universidad Politécnica de Zacatecas, UPZ). The objective of this research is to uncover the level of these skills; the results will serve as a basis for further research related to improving the entrepreneurial program development of UPZ, which aims to focus on the training of entrepreneurs.

This research report consists of five sections. The first describes the problem, justification and rationale of the research. The second section presents the theoretical framework of the development of the skills of entrepreneurs. The third section analyzes the contextual framework of the Technical University of Zacatecas. The fourth section sets out the methodology used to support the research and ensure the accuracy of the results. The fifth section presents the results obtained in the research.

Background of the Problem

Within the HEIs, the entrepreneurial development courses are increasingly offered. However, certain non-academic factors are involved in the development of entrepreneurs, from the intrinsic personality traits of the individual to the environmental circumstances (Sharver & Scott, 1991). As shown in Figure 1, there are several factors that an entrepreneur must take into consideration to conduct a business.

Some HEIs are focused on the development of entrepreneurial programs from an academic viewpoint, namely the end result is the development of business plans. There are few entrepreneurial development programs (EDP) focused on gradual (in all grades) development of the students' entrepreneurial skills. This has given place and rise in the HEIs to have project banks that have very few students with the potential to be entrepreneurs.

Delimitation of the Problem

Through the results of this research, the entrepreneurial skills of the undergraduate students of business administration and management of the Polytechnic University of Zacatecas (UPZ) will be measured and serve as a basis for further analysis of the integral development program of the UPZ. The research question is: How is the level of entrepreneurial skills of young students in ninth academic term of the degree in business administration and management of the UPZ compared with the level of entrepreneurial skills of young entrepreneurs in Fresnillo, Zacatecas?

General Objective

The general objective of this research is to compare the level of entrepreneurial skills of young students in the career of administration and management of SMEs in the ninth academic term with the level of entrepreneurial skills of young entrepreneur.

Justification

Determining the level of entrepreneurial skills of the students will serve as the basis for an assessment of the comprehensive development system of the UPZ. These entrepreneurial skills show various aspects of students (psychological, social, economic, educational, etc.) in order to analyze the entrepreneurial program and also to propose a methodology that provides greater entrepreneurial skills development. At this point, it is considered that the results of the research can significantly support, not only the academic, but also the economic environment considering that developing effective entrepreneurial skills of young people will lead to a positive impact on the economic development or the environment (Crissien Castillo, 2006).

Theoretical and Conceptual Framework of Entrepreneurial Skills

The term 'entrepreneurial skills' includes a review of the concept of entrepreneurship and the main related theories. In this section, these concepts and theories are presented. Beginning with the concept of entrepreneurship, followed by the development of the use of this term through history, and finally an analysis of the theories and empirical development of entrepreneurial skills.

Chronology and Entrepreneurial Concept

The word entrepreneur comes from the Latin root *prendere,* meaning take. For many authors, including Martinez (2008), the word entrepreneur comes from the French word 'entrepreneur,' which means to undertake; however, the concept of entrepreneurship has been changing over time. Below are the most important theoretical contributions to entrepreneurship and entrepreneurial concepts:

The Concept of Entrepreneurial Development Programs (EDP)

The first courses in entrepreneurship development are rooted in the business development courses at the Harvard Business School (Katz, 2003). Starting with this moment, the addition of these courses in other universities has expanded considerably. For Lerma et al. (2007) the entrepreneur program attempts to implement, integrate and put in practice the knowledge acquired by students of various academic fields in order to generate innovative solutions that enable them to succeed in the business world and are the foundation of entrepreneurship. Yet, there are other lines or models of entrepreneurship development, as noted by Sandercock (2001):

- Creating centers to advise the entrepreneurs with researchers specializing in business areas;
- Interdisciplinary programs and entrepreneurial world recognition;
- Testing program business opportunities;
- Simulators of real environment risks and benefits;
- Implementation of technology for building consumer products;
- Developing of competitive skills for the business world.

Entrepreneurial Skills

Entrepreneurial skills are first mentioned by Jean Baptiste Say, who recognizes that an entrepreneur must be a person with perseverance and judgment of the world. Later, Marshall notes that the skills an entrepreneur must have can be acquired or developed (Rodríguez and Jiménez, 2005). Knight (1947) noted more skills such as: the capacity to plunge to risks and uncertainties, tenacity, indomitable energy, optimism, a lot of faith and confidence, creativity, imagination, achieving effective benefits, change innovation, money (as their main motivation), and knowledge of the sector in which a company is going to be created.

Empirical Results on the Entrepreneurial Skills

There are several studies that have been developed for the measurement of entrepreneurial skills. For the purpose of this study, the analysis was performed with a tool developed by Management Systems International (Wash-

Table 1 Evolution of the Concept of Entrepreneurship

Author	Contribution
Richard Cantillon	Entrepreneur is 'the person who buy means of production at prices that are uncertain at the moment that they are committed to their costs.' The author also recognizes the economic activity that takes place and highlights the elements of direction and speculation somehow entering the business activity (Rodríguez, 1999).
Jean Baptiste Say	First mentioned the skills of entrepreneurs, describes them as people who must have judgment, perseverance, great knowledge of the business and the world, and possess the art of supervision and administration, also uses the term 'entrepreneur' in many of his works.
Johann Heinrich von Thünen	The entrepreneur could have the dual characteristics of individual risk taker and is extremely intelligent (Rodríguez and Jiménez, 2005). Entrepreneurs must have an income to compensate for the risk assumed. An entrepreneur is an explorer, discoverer and inventor of his/her field of activity.
John Stuart Mill	The entrepreneur must be paid for their work, as it is responsible for the commercial and industrial operations. He mentions that the entrepreneur has an ordinary skills compare to the rest of the team (Mill, 1951).
Hans von Mangoldt	Author of *The science of profit of enterprise,* a book that talks about the income of entrepreneurship.
John Bates Clark	Notes that the profits obtained by an entrepreneur are a form of salary paid to the entrepreneur for his vision and leadership skills (Formaini, 2001). He was the first to link the benefits of the entrepreneur with the introduction of technological, commercial and organizational advances in the economic process.
Alfred Marshall	He made moral contributions to entrepreneurship in relation to the question whether the entrepreneur accumulates wealth through legal or fraudulent mechanisms; furthermore, he noted that the skills the entrepreneur needs to have can be acquired and developed.
Knight Frank	Notes that an entrepreneur takes risks and says this is the entrepreneurship spirit, recognizes certain characteristics in the entrepreneur: the ability to plunge to risks and uncertainties, tenacity, indomitable energy, optimism and a lot of faith and confidence, creativity, imagination, achieving effective benefits, agent of change and innovation, money as the highest motivation, knowledge of the sector in which a company will be created. He mentions that entrepreneurs are born and that success depends on many factors.
Joseph Schumpeter	The entrepreneur is the innovator who helps economic growth by transforming an innovation (product, process, procedure, etc.) to a practical product, also defined as a person who gathers resources, organizes and provides leadership talent for commercial success (Shumpeter, 1984)
Carland	The difference between an entrepreneur and a small business owner is that the former creates a business to make it grow and profit, using concepts and techniques of strategic direction while small business owners create businesses for personal benefit (Galan, 1994).

Notes Own elaboration adapted from Chamorro (2007) and Campos and Vargas (2011).

ington), in which a test is performed to determine the degree of development of the following skills:

- Initiative
- Persistence
- Commitment
- Efficiency
- Risks
- Goals
- Information
- Planning
- Persuasive
- Self confidence

Contextual Framework of the Polytechnic University of Zacatecas (Universidad Politécnica de Zacatecas, UPZ)

The UPZ was formed on September 2 of 2002 under the decree issued by the Government of the State of Zacatecas It is headquartered in Fresnillo, Zacatecas and is one of the forty-three higher education institutions in the country, founded and incorporated into the Polytechnic Universities Subsystem. Their main sources of funding are the Zacatecas State government and the federal government. The Polytechnic Universities subsystem is a pioneer in implementing a model of competency-based education in higher education level. This model is designed to fully form and train its students by taking them to a world-class labor competition.

The organization is committed to targeting its services to the satisfaction of its customers, making efficient use of resources in the implementation of academic and administrative processes, continuously improving our Quality Management System. The Quality Policy is: 'At the University of Zacatecas we are committed to providing quality in higher education through comprehensive training focused on learning, based on job and professional competences, spreading universal values and assuming a social commitment.'

The offered courses are technology-oriented. There are currently five engineering and two administrative career programs.

- *Engineering:* Mechatronics engineering, Industrial engineering, Computer systems engineering, biotechnology engineering and energy engineering.
- *Administrative careers:* Bachelor degree in international business, management and administration of small Business.

The Bachelor in Management and Administration of SME's started in January of 2003 with 52 students enrolled in the same year. Additional 85 students were enrolled in the month of September. The numbers increased in the following year with 143 young people willing to continue preparing professionally. In September of 2005, the program reached 235 new registrations and in September 2006 the enrollment reached 296 students; the numbers continued to increase each year, with 302 students in 2007, 360 new students in 2008, and additional 381 students in September of 2009; consequently ranking as the career program with most enrollment at the institution.

The Bachelor of Management and Administration of SME's had 305 graduates from inception to December of 2011. Today, the development of entrepreneurial skills is a part of all career programs, including engineering, as a part of human development at UPZ.

Methodology

In order to obtain the level of entrepreneurial skills of the students of ninth academic term of the degree in administration and management of SMEs in the ninth semester of UPZ, the test CEP of international Management Systems was performed on 41 students. The test group included 13 men and 28 women, who were pursuing the entrepreneurial development course. These results were compared to the test performed on 10 young entrepreneurs in the region, whose companies have been created one year ago.

Analysis and Interpretation of the Results

As a first step in analyzing the results, the information was collected and coded in order to obtain the average scores of young people skills; thus, obtaining the results shown in Table 2. It should be noted that the results were taken on average dividing male and female students, in order to collect any data that reflects whether gender interfered with the development of some of the skills. Likewise, the bar marked as average combines the average of all students (male and female combined).

The maximum value of skill development is 25. In this first stage of analysis, it is evident that, on average, the more developed skills are commitment, goal setting, and self-confidence. Among the less developed entrepreneurial skills are skills such as less power to persuade, planning and measuring risks. As for the difference in abilities between men and women, no significant distinction was found, since they only vary by 1 or 2 points.

As part of the survey methodology, surveys were also performed with young entrepreneurs in order to compare the development of skills between the two groups (Table 3).

Table 2 Level of Entrepreneurial Skills in Students

Group	Iniciative	Persistence	Commitment	Efficiency	Risks	Goals	Information	Planning	Persuation	Self confidence
Average	16	17	19	16	15	19	17	15	15	17
Men	16	17	19	16	14	19	17	17	16	16
Women	16	18	18	16	16	19	18	15	14	17

Table 3 The Level of Entrepreneurial Skills in Entrepreneurs

Group	Iniciative	Persistence	Commitment	Efficiency	Risks	Goals	Information	Planning	Persuation	Self confidence
Average	23,6	22,7	22,5	22,9	22,7	22,7	22,7	22,7	22,6	23,1
Men	23,4	22,6	22,2	22,6	22,6	22,4	22,6	22,2	22,4	22,8
Women	23,8	22,8	22,8	23,2	22,8	23,0	22,8	23,2	22,8	23,4

Table 4 Comparison of Entrepreneurial Skills between Students and Entrepreneurs

Group	Iniciative	Persistence	Commitment	Efficiency	Risks	Goals	Information	Planning	Persuation	Self confidence
Students	16	17	19	16	15	19	17	15	15	17
Entrepreneurs	23,8	22,8	22,8	23,2	22,8	23,0	22,8	23,2	22,8	23,4

As shown in Table 3, the skills of entrepreneurs fluctuate between 22.5 and 24, and when compared with the results of the student survey, it can be said that the former are above the average of entrepreneurial skills of students, in some cases by more than 8 points.

Table 4 shows the difference between the development of entrepreneurial skills among young entrepreneurs and students. An important fact to note is that in all the skills employers fluctuate at the same point, while the fluctuations of the students have more than five points between them. With these results the entrepreneurial development program of the UPZ's career of management and administration of SMEs it can be contextualized, it should be analyzed to find areas of opportunity and propose improvements in order to allowing them to be a trigger for increased efficiency in the level of entrepreneurial skills of university students, and thereby encourage entrepreneurship to increase regional economic development.

Table 5 Comparison of Entrepreneurial Skills between Students and Entrepreneurs by Gender

Group	Iniciative	Persistence	Commitment	Efficiency	Risks	Goals	Information	Planning	Persuation	Self confidence
Entrepreneurs										
Men	23,4	22,6	22,2	22,6	22,6	22,4	22,6	22,2	22,4	22,8
Women	23,8	22,8	22,8	23,2	22,8	23,0	22,8	23,2	22,8	23,4
Students										
Men	16	17	19	16	14	19	17	17	16	16
Women	16	18	18	16	16	19	18	15	14	17

Table 5 shows the skills skill comparison by gender; the results display no or very little difference between men and women; however, there is a difference between entrepreneurs and students, since the entrepreneurs, as noted above, have a higher degree in each of the skills tested.

Conclusions

As discussed in the course of this work, studies of entrepreneurship began many years ago and from the beginning it was noted that successful entrepreneurs have special features that allow them to develop competitive enterprises. Over the years, it has been observed that these qualities may be inborn or can be developed with the support of entrepreneurial development programs that enable the people involved in these programs to develop their skills in a way to better themselves in this field. However, when analyzing some of these programs, it can be concluded that not all of them have the same results. It often depends not only on the type of people involved, but also on the program itself, which might not adequately potentiate the qualities of each participant.

It can be understood that an entrepreneur is a person who changes the course and the circumstances of his environment by meeting the of needs his customers, suppliers, employees, partners and competition in an innovative way. Entrepreneur is a term that involves not only creating companies (entrepreneurs), but also applies to those who generate improvements within their firms leading them to be more competitive. These processes promote and foster the development of enterprises and thus become an essential element of an economic development of a region.

That is why the development of entrepreneurs is a model that has been applied increasingly more often in HEIs resulting in a change from the training of employees toward the training of professionals with entrepreneurial skills. Under this scheme, certain HEIs are applying entrepreneurial devel-

opment models and programs either throughout the carrier development or in the framework of a couple courses. Furthermore, the entrepreneurial development programs are offered as optional courses for students who might need them.

These programs are widely discussed; however, their effectiveness, as mentioned above, has not yet been accurately measured. In the specific case of the state of Zacatecas, there are no indicators or data demonstrating the efficiency of the entrepreneurial development programs. Within the academic context, it is considered necessary that programs with an impact on society should be evaluated their effectiveness improved based on obtained feedback. This is the reason for this research. As the starting point, it outlines the measurement efficiency of an entrepreneurial development program; namely to evaluate the level of entrepreneurial skills of students who have already taken this program. The entrepreneurial skills are measured by performing a test on the students and the results are compared with the level of entrepreneurial skills of a group of young entrepreneurs in the region, who participated in the same testing process. Through the comparison of their results, a parameter that enables the evaluation of the potential entrepreneurship skills of future graduates is obtained.

Based on the results obtained in this research, an analysis of the entrepreneurial development program of the UPZ is recommended for the following reasons: the results related to the entrepreneurial skills of the students were well below the level of skills of entrepreneurs; furthermore, students entrepreneurial skills are clearly not developed unilaterally, namely certain skills are more developed than others. Meanwhile, all the skills of young entrepreneurs range around the same levels, allowing to conclude that the application of the entrepreneurial development program does not have effective results, since it is not generating a sufficient level of entrepreneurial skills in order to have potential entrepreneurs to support the development both of the program and the region, considering that within the Mexican economy over ninety percent of businesses are MSMEs.

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Managing the Business of Social Technologies

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A greater number of consumers use social technologies-social media, social networking, and social relevance-than organizations. Economically, however, companies have much to gain by taking the plunge. Results show that organizations that have made the effort to increase their knowledge and build social technology platforms have experienced astounding results. The purpose of this article is to discuss social technology categories and present a strategy for knowledge management so that organizations may successfully implement these technologies. A huge growth is expected in the number of companies whose management will make a decision or have already made a decision to develop social technology platforms in the near future. This article provides a straight forward approach accompanied by examples of real companies who have used social technologies and experienced real returns–many in the millions of dollars. The intention is to provide a concise, up-to-date social technologies knowledge management guide.

Keywords: learning; knowledge management; social technologies; social media; social networking; social relevance

Introduction

Social Technologies encompass social media, social networking and social relevance. Social media includes the use of mobile media and the Internet (videos, photos, presentations, and documents) for sharing ideas, concepts and messages; social networking is about connecting people through online communities and communication methods; and social relevance is defined as the online reputation of an individual or organization (Klososky, 2011). Terminology varies when describing these emerging technologies. This paper will use terms and descriptions as defined by Klososky, unless directly quoting another author.

Are organizations who have *not* gained control of learning and managing the knowledge that exists around social technologies at risk? Worldwide, the use of social technologies in business and industry has steadily increased as consumer use of these same technologies has skyrocketed. Jason Breed (2011) states, 'If a company can re-imagine their business with these new ways to communicate and interact, they will have a distinct advantage over their competitors who take a long time to figure this out.' The true economic impact is yet to be determined as businesses recognize

the importance of social relevance and develop strategies to embrace and manage social media and social networking.

Overview

There are numerous online social media and social networking sites. When developing a social technology knowledge management strategy, the best bet is to go with established sites to increase the potential reach. Keep in mind, however, that with the dynamics of social technology, it can be challenging to stay on the cutting edge *and* that up-to-the-minute information is at your fingertips through the Google search bar.

A real obstacle exists with the perception of the purpose of social technologies and how (or if) these tools should be used in business. Many who have experience using these technologies view them as tools for personal communications among their friends and for keeping up with the latest news.

Organizations must have employees dedicated to becoming knowledgeable on the 'good, the bad, and the results' of using social technologies in business for increasing awareness and ultimately revenue. For best results, the principles of knowledge management-capturing, distributing, and effectively using this knowledge–should be applied. KM is the movement to replicate the information environment known to be conducive to successful R&D-rich, deep, and open communication and information access-and deploy it broadly across the firm (Koenig, 2012).

Hamilton (2012) shares a similar view:

> Where Knowledge Management and Social Business diverge is the organic nature of Social Business. Knowledge Management is about the capture, structure, organization and availability of information from all sources. Social Business is about encouraging people to share what they know, to feel good about doing so, establish relationships with others in the organization which span the organization tree and genuinely do something extraordinary. There are legs to Social Business which all organizations can benefit from.

A recent business challenge facing enterprises is that of mobile commerce (San Martin, Lopez-Catalan, & Ramon-Jeronimo, 2012). With 4.8 billion mobile users and most social technology sites now available on mobile devices, this is a reality and should be viewed as not only a challenge, but also an opportunity for organizations.

IT continues to play a vital role in business organizations (Peslak, 2012). The IT issues that are most important to companies vary, but an area that has been ignored or neglected by many is the management of social technologies in business-social media, social networking, and social relevance.

Social Media

Examples of some of the more popular social media sites include YouTube (videos), Flickr (photos), Slideshare (presentations), and Digg (articles). YouTube is the world's second largest search engine and the third most visited website with more than 2 billion views per day (Bullas, 2012):

> Communication and engagement is much more than talking or writing and the popularity of YouTube is evidence of that. The availability of cost effective high speed internet access is making it easy for people to express themselves via video. Brands have seized its power to be a viral media that augments traditional advertising media such as TV. YouTube's advantage is it is always available and searchable.

Flickr houses over five billion of the world's photos. More than just being a web site, Flickr is a community – one with a very large number of active users. Creative business people can set themselves apart by marketing through connections and photos on Flickr. Slideshare is a Web 2.0 based service for sharing slide shows. The world's largest community for hosting such documents, Slideshare is a great way to learn from others and share your expertise. Digg is a social news website with an estimated 4.4 million unique visitors per month.

Social Networking

Facebook, LinkedIn, and Twitter are the giants of social networking with plenty of competitors jockeying for position. Google's new social network Google+ is gaining 625,000 users per day and now claims over 400 million. Pinterest is generating more referral traffic to websites than YouTube, Google+, and LinkedIn combined (Bullas, 2012). Facebook has approximately one billion users; Twitter currently claims 500 million worldwide with 100 million of those in the US; and LinkedIn has 161 million accounts in over 200 countries including more than two million *companies* with a LinkedIn page. The numbers continue to increase as 200 million Facebook users are added annually, LinkedIn reports two new members per second, and 11 Twitter accounts are created every second.

Social networks are used by organizations to connect employees, reach customers and communicate with suppliers, although most companies are far from using these networks to capacity. This appears to be rapidly changing. According to Mullaney (2012), Forrester Research indicates the sales of software to run corporate social networks will grow 61% a year and be a 6.4 billion business by 2016.

Social Relevance

> Social relevance is already starting to make a difference in the world and will soon have a dramatic impact on a company's ability to sell

> products and services. Organizations are just starting to use online reputation management to understand the good, the bad, and the ugly of open and accessible public comments on products and services, there to be seen by anyone with Internet access. [Klososky, 2011]

It takes a lifetime to establish an online reputation of integrity and one negative review to cast a shadow of doubt. Does this mean that one should avoid the chance of negative comments by avoiding an online presence? Absolutely not! Comments should be taken seriously and addressed rather than being ignored. For comments that have validity, responding to the comment and attempting to right the wrong is the best approach. For those that are falsely stated, the best approach is to contact the guilty party if possible and ask them to remove the post. Otherwise, responding in a professional manner online is better than no response at all. Consumers rely on ratings and also pay attention to whether the company is alert to the concerns of their customers.

With employers now using social technologies to make hiring decisions, social relevance is not only important to an organization but equally as important to an individual.

Strategies for Developing a Successful Social Technologies Platform

Developing a successful social technologies platform requires much more than just creating profiles on social technology sites. This is a start and where many companies are at this point, but to make a difference a systematic approach followed by management and social technology strategies is a necessity.

An activity oriented process model illustrating a knowledge management approach to developing a social technologies platform is shown in Figure 1.

Each of the steps listed in the model is discussed in more detail:

1. *Hire dedicated personnel who are committed to not only learning,* but also managing the organization's social technologies, preferably an individual with proven organizational experience in this area. This step parallels with the first stage of Knowledge Management-Information Technology. As Koenig (2012) points out, the salient point is that the first stage of KM is about how to deploy a new technology to accomplish more effective use of information and knowledge.
2. *Identify the organization's social technology goals.* Historically, the second stage of KM – HR and corporate culture – emerged when it became apparent that simply deploying new technology was not sufficient to effectively enable information and knowledge sharing. This may include added exposure, increased sales, additional branding,

Figure 1 A Knowledge Management Approach to Developing a Social Technologies Platform

improved customer service, hiring, savings when compared to traditional methods, etc. Goals should be established in collaboration with a management team. Expectations should be clear and result-oriented. The implementation of Knowledge Management involves changes in the corporate culture, in many cases rather significant changes. KM therefore extends far beyond just structuring information and knowledge and making it more accessible (Koenig, 2012).

3. *Identify your audience.* If you have a global audience, the language used should be English. Demographics of the target audience may make a difference in relation to the social technology tools selected. For example, the primary users on Google+ are currently students. Like Facebook, however, this will likely change over time.
4. *Identify your competition.* Check out their social technology sites and learn from and improve upon what they are doing. There are competitive analytic sites that help monitor the competition. Anna Johnson (2010) compiled a list of sites that are free and there are many great ones that are by paid subscription. By conducting a search on Google you will find sites like *sproutsocial* and *Competitive Analytics* whose business is to keep up with an organization's competition.
5. *Create a social media policy for the organization.* In Susan M. Heathfield's (2012) words, 'These guidelines will help open up a respectful,

knowledgeable interaction with people on the Internet. They also protect the privacy, confidentiality, and interests of your company and current and potential products, employees, partners, customers, and competitors.' Templates and examples of social media policies are available on the web. Chris Boudreaux (2013) has compiled a comprehensive listing of links to over 200 companies' social media policies which can be sorted by industry. It is not only important to have a social media policy, but also to make sure that all employees read and acknowledge their understanding of it.

6. *Determine social media platforms based on goals.* It is better to manage fewer sites well than to have multiple sites that are ignored. The rule of thumb is that two hours per day should be devoted to each social technology site. An eight hour day should not include more than four sites, although this could vary depending on the organization's goals. Multiple dedicated social technology personnel may be required to properly handle the demands.
7. *Create content.* The third stage of Knowledge Management-taxonomy and content management-developed from the awareness of the importance of content, and in particular the awareness of the importance of the ability to retrieve content, and therefore of the importance of the arrangement, description, and structure of that content (Koenig, 2012). To increase the number of followers, provide content that is interesting and useful to your audience. The industry standard is 80/20 indicating that 80 percent should be content that does not include sales pitches and that would be of interest to the followers. This could be links to articles, fun facts, knowledge sharing, blogs that are on a related topic, videos, etc. and 20 percent should be directly selling a product (if that is the goal) including coupons or specials. Creating content is where many get stuck; however, the content does not all have to be original. It is acceptable to have only 20% original content with links or references to the remainder. The best way to increase your online following is to post interesting content. Credit should always be given to the source of the non-original content.
8. *Be attentive to all comments and always address negative comments or reviews.* It has been proven that unaddressed negative comments or video posts can cost companies millions of dollars in revenue. For example, after United Airlines passenger, Dave Carroll, had his $3500 guitar broken by baggage handlers and was unsuccessful in getting the issue resolved, he created a music video titled *United Breaks Guitars* that went viral on YouTube. Chris Ayres (2009), a reporter from the *Times of London,* reported that 'within four days of the song

going online, the gathering thunderclouds of bad PR caused United Airlines' stock price to suffer a mid-flight stall, and it plunged by 10 percent, costing shareholders $180 million.'

9. *Measure the results.* Although ROI is measured in almost every other aspect of an organization, an astounding number of organizations do not measure their social technologies return on investment. Shea Bennett (2012) confirms this stating, 'Measuring the return on investment (ROI) of your social media strategy is something that still frustrates a lot of brands and marketers-studies have shown that just 10 percent of marketing decision makers in the UK monitor their Twitter and Facebook ROI.' Scott Klososky (2011), expert in the social technologies arena and author of *Enterprise Social Technology*, suggests a five step process when measuring ROI:
   - Measure the current impact of your social technologies.
   - Set objectives for ROI.
   - Determine social tech results needed to meet objectives.
   - Source and implement social tech measurement systems.
   - Measure results, compare to objectives, and adapt continuously.

   Nate Elliott (2011) suggests that standardized reporting templates should be created and frequent reporting of digital measures should go to community managers and social media strategists, per-campaign with annual reporting of branding and trial metrics to other marketing team members. Distribution of quarterly or annual reporting of financial metrics to the executives should also be included in the reporting process. Without this, it is difficult, if not impossible, to know what is working and where changes need to be made.
10. *Evolve.* Social technologies are rapidly changing, so it important to stay abreast of these changes through research and training. The best way to be strategically competitive is to be informed, stay on the cutting edge, and evolve when it is economically feasible.

Many marketing campaigns combine both traditional marketing and social technologies. One of the most notable to successfully do this is Old Spice, a company that was founded in 1934. Old Spice increased their product sales over 100% through a continuous campaign that included television commercials, Twitter, Facebook and YouTube. In two days, Old Spice gained 80,000 Twitter followers and Facebook likes now exceed 2.4 million with video posts increasing interaction by 800%. They also hold the distinction of having the number one most viewed sponsored channel on YouTube. Bullas' (2011) statement sums up the bottom line. 'At the end of the day you can have all the noise, buzz and viral success you like but if you

Figure 2 Simplified Social Technologies Platform Model

don't increase sales you might as well pack up and go home. The Old Spice campaign achieved both.'

Societal and Economic Impact

Peter Kim (2012) in an internet post on January 11, 2012, listed examples of social technologies implemented by organizations and the return. As Mr. Kim mentions, results in social business and brands willing to stand behind them are difficult to find. His complete list quantified shows approximately 60% revenue generation and 40% cost reduction, a true testimony to the potential effectiveness of social technologies.

Never before have such opportunities existed for an organization's voice to be heard around the world while at the same time being vulnerable to attacks that echo throughout the atmosphere. Many hesitate to jump into the social technologies arena because they haven't seen real examples or real results and because of a lack of knowledge about the use of these technologies in business. It is impossible to manage knowledge that doesn't exist in the manager's mind. The knowledge first has to be captured before the principles of knowledge management can be applied. It could be compared to babies learning to crawl and then walk. Once the benefits are apparent, the walk becomes a run.

Social Media, Social Networks, and Social Relevance must be part of a strategically designed Social Technologies Platform, which will result in additional revenue through increased organizational sales and/or savings as illustrated in Figure 2. Social Technologies business examples follow.

Table 1 includes selected social technologies business examples as reported by Peter Kim (2012), listing brand, activity, source and year. Those selected for this paper represent a spectrum of social technology success stories including the use of blogs, Facebook, twitter, corporate social networks, YouTube videos and others. A blank cell in the table indicates that this information was not revealed, which is not surprising considering the competitive nature of most organizations. This summary is intended to serve as motivation for the implementation of social technologies and as a springboard for ideas.

Discussion and Conclusions

The overall objectives of this paper were to discuss social technology categories, present a strategy for knowledge management as organizations

Table 1 Selected Examples and Results: Companies using Social Technologies

Business	Social Tech.	Process	Results
Aflac	Community	Drove online payments process – increase of 3%	$95,000 in savings
AT&T	Community	21,000 customer issues resolved	16% improvement in call deflections
Audi	Audi A1 Community	40,000 people created customized versions of the new model. 5.5 million people visited the microsite 119 million times.	Largest number of pre-orders in its history
Best Buy	Community		$5 million in annual support savings and sales advocacy
Blendtec	Viral Videos		Increased company sales +700%
Bonobos	Twitter	Exclusive sale	1200% ROI in 24 hours on promoted tweet
Burberry	Social microsites	Secured 100,000 fans	10% increase in sales
Cerner	Community		70% decrease in internal HR issues logged
Charles Schwab		Customer referrals (ratings & reviews)	40% increase in new customers
Cisco	Community		Deflects 120,000 support cases each month
Dell	Twitter		Generated $2 million in direct sales, influenced $1 million of additional sales
Ford	Social Networks	Word of mouth campaign 31,000 pieces of original Ford Fiesta content	10,000 online vehicle reservations
Hershey's	House Party	10,000 parties, reached 129,000 people	Seen by 7 million people

Continued on the next page

implement these technologies, and illustrate examples with real results of the use of social technologies in organizations globally. Jason Breed (2011) suggests that corporate social networks or communities (as they are sometimes referred) are just now beginning to test the limits of how they can add value back to the company beyond branding and product marketing.

Social technologies have existed for almost a decade and only in recent years have businesses used this platform to generate revenue, create brands, communicate with customers or collaborate internally. This supports Clive Shepherd's (2011) philosophy that when it comes to media technologies, corporate behaviour tends to follow what happens outside of work, not the other way around. The opportunities are greater than ever be-

Table 1 *Continued from the previous page*

Business	Social Tech.	Process	Results
Honda	Facebook	Increased fans from 15K to 422K	Generated over 3500 dealer quote requests
HP	Forum	Customer service	Solved issues for 4.6 million people, made customers happier and saved the company millions of dollars
IBM	Community	Customer service	Saved $100 million annually
Intuit Quick-books		Ratings and reviews	Business owners engaged with rated ProAdvisors 555% more often than unrated counterparts
Jewelry TV		Customer ratings and reviews	Boost mobile sales by 30%
La-Z-Boy		Comfort Stories campaign	13,000 new leads
Justin Boots		Social media marketing	Exceeded sales goal for new product line by 30 percent, social media marketing accounted for 95% of sales
Logitech	YouTube	Bowiechick 'Breakup' video	Doubled webcam sales on Amazon.com
Microsoft	House Party	40,000 in 12 countries	3–4 million in software sales
Movistar	Community		Delivers 5.75 million in call deflection savings annually
NetApp	Community		$500 million in sales and drives 28% of all NetApp web traffic
Paramount Pictures	Twitter	Promoted movie through tweets using hash tag #Super8Secret	9 million impressions in less than 24 hours and mentions of the movie skyrocketed to more than 150 per minute; receipts for the sneak preview exceeded $1 million; weekend box office surpassed expectations by 52%

Continued on the next page

fore with social technologies expanding an organization's reach worldwide.

Translating the results from social technologies in order to understand the ROI is a must. Bell (2012) reported that Marshall Sponder, author of *Social Media Analytics,* confirms that social media ROI is achievable, and companies, more and more, are working with social data in an intelligent and scalable manner. Perhaps even more persuasive is a statement made by Erik Qualman (2010) – 'The ROI of social media is that your business will still exist in five years.'

The examples presented provide evidence that by strategically developing a social technologies platform based on the principles of knowledge management, an organization will significantly grow their customer base, in-

Table 1 *Continued from the previous page*

Business	Social Tech.	Process	Results
Petco		Q&A content	75% increase in sales; 100% more orders per session; 28% increase in items per order; 9% higher average order value
SAP	Community		15% reduction in product release cycles
Sprint		Brand monitoring helped uncover conversation insights to drive campaign messaging changes	$133 increased revenue
Starbucks		75,000 product and service ideas suggested	
T Mobile		Sales and product training	Reduced time from 1.5 hour sessions to 15 minutes
University of London	Internal Social Network	Students collaborate remotely	Expected to deliver future savings of £300,000 per year in print, courier and administration costs.
UPS	POPURL dashboard	Videos	32,000 video views; 25% regular return visits to the site; and average of seven minutes spent on the site per visit
Virgin America	Twitter	Exclusive flash sale	Raised the maximum $50,000 in charitable donations for Stand Up to Cancer; top five sales days ever for the airline

Notes Adapted from Kim (2012).

crease their revenue and realize considerable savings over 'doing business as usual.'

Maintaining a desirable online reputation is the key that will keep the social technology doors of opportunity open.

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Abstracts in Slovene

Razmerje med trženjem zainteresiranih segmentov javnosti (deležnikov) in recipročnostjo v vzhodni Evropi: konceptualna analiza

Ron Berger in Moti Zviling

Predstavljen konceptualni članek se posveča vprašanju pomena vpliva recipročnosti pri trženju v poslovnih okoljih v razvoju, kot na primer vzhodna Evropa. V zrelih, razvitih, donosnih poslovnih sistemih sta dva ključna vidika trženja, in sicer trženje temelječe na transakciji in temelječe na odnosih že dodobra raziskana. Predpostavljamo, da v manj zrelih poslovnih sistemih, in sicer predvsem v tranzicijskih in ekonomijah v razvoju, obstaja še tretji način trženja in izmenjave, ki ga imenujemo trženje recipročnosti deležnikov. Prepričani smo, da naš okvir prikazuje pomen recipročnosti kot ključnega poslovnega koncepta trženja v okoljih v razvoju kot je vzhodna Evropa. Članek tako postavlja pomembno izhodišče za nadaljnje empirične raziskave razvojnih strategij v vzhodni Evropi.

Ključne besede: Vzhodna Evropa; recipročnost; deležnik; talec; barter; okolja v razvoju

IJMKL, 2(2), 149–164

Povezovanje strategij osnovanih na virih z na stranko osredotočenim delovanjem na področju strokovnih storitev: pristop strukturnega modeliranja

Ming-Lu Wu

Članek povezuje na virih osnovane strategije ter na stranko osredotočeno delovanje v podjetjih, ki ponujajo strokovne storitve, z namenom oblikovanja prioritet izboljšav kvalitete storitev. Za namen testiranja postavljenih hipotez, raziskava aplicira pristop strukturnega modeliranja na rezultate ankete s svetovalci na področju gradbeništva v Hong Kongu. Študija tako preverja različne ukrepe podjetij na področju strategij osnovanih na virih in na stranko osredotočenega delovanja ter odpravlja pomanjkljivosti v organizacijskem učenju podjetij, v ključnih kompetencah, ter na stranko osredotočenem delovanju uravnavanem s strateško fleksibilnostjo. Rezultati raziskave imajo praktične implikacije za podjetja na področju strokovnih storitev, ki naj vire ustrezno razporedijo tako, da bodo najprej izboljšane različne kompetence in nato še na stranko osredotočeno delovanje z uporabo omenjenih kompetenc.

Ključne besede: organizacijsko učenje; ključne kompetence; strateška fleksibilnost; zadovoljstvo uporabnikov; strukturni model; strokovne storitve

IJMKL, 2(2), 165–184

Virtualne kompetence in prenos znanja v globalnem NPD: študija primera

Päivi Lohikoski in Harri Haapasalo

Virtualni timi na področju razvoja novih produktov so geografsko razpršeni in medfunkcijski, kljub temu pa delujejo na močno medsebojno povezanih nalogah preko elektronskih komunikacij v okviru delovnih skupin. Takšna virtualna medsebojna povezanost, med drugim, predstavlja nove izzive na področju upravljanja prenosa znanja v procesih globalnega razvoja novih produktov (NPD). V tem projektu so bile preučene virtualne kompetence z uporabo kvalitativnih metod s katerimi smo ocenili najpomembnejše problematike, ki vplivajo na prenos znanja v virtualnih okoljih globalnega NPD. Posledično je bila prenovljena obstoječa teorija glede virtualnih kompetenc v virtualnih organizacijah in odkrite so bile potencialne ovire za prenos znanje. Uspešnost znanja zaposlenih je ključnega pomena za delovanje organizacij, ki so osnovane na znanju ter predstavljajo osnovo naše globalne ekonomije, zato so rezultati predstavljene študije nedvomno pomembni.

Ključne besede: upravljanje znanja; virtualna organizacija; razvoj novega produkta; prenos znanja; virtualne kompetence

IJMKL, 2(2), 185–207

Grozdenje indeksov zmogljivosti organizacijskega učenje za izmenjavo znanja v različnih segmentih podjetja

Masoomeh Alikhani, Hamed Fazlollahtabar in Iraj Mahdavi

Povečevanje učenja in zmogljivosti organizacijskega učenja predstavlja enega izmed najpomembnejših elementov uspešnega upravljanja znanja v vsaki organizaciji. Članek se zato osredotoča na dimenzijah zmogljivosti organizacijskega učenja. Predlagamo matematično strukturo grozdenja dimenzij glede na njihov vpliv na zmogljivosti učenja v različnih delih organizacije preko katerega bi pridobili najvišji nivo zmogljivosti učenja v organizaciji. Predlagano matematično grozdenje poskuša povezovati potrebe različnih delov podjetja z relevantnimi učnimi zmogljivostmi.

Ključne besede: zmogljivost organizacijskega učenja; upravljanje znanja; grozdenje

IJMKL, 2(2), 209–225

Posredniška vloga izmenjave znanja na področju informacijskih tehnologij in inovacij

Onwika Kaewchur, Pornthep Anussornnitisarn in Zbigniew Pastuszak

Predstavljena študija poskuša raziskati odnos med informacijsko tehnologijo, izmenjavo znanja in stopnjo inovativnosti podjetja. Ob tem je raziskano tudi vprašanje izmenjave znanja kot posredovalnega učinka med informacijsko tehnologijo in stopnjo inovativnosti podjetja. V predstavljeni raziskavi je bila primarno uporabljena kvantitativna metoda. Podatki so bili zbrani z uporabo ankete v katero je bilo vključenih 224 anketirancev zaposlenih v podjetjih na

področju proizvodnje zelišč. Predstavljeni rezultati prikazujejo, da lahko izmenjava znanja in informacijske tehnologije kritično vplivajo na stopnjo inovacije organizacije in lahko igrajo ključno vlogo kot pomemben faktor uspeha.

Ključne besede: izmenjava znanja; inovacija; informacijske tehnologije; upravljanje znanja

IJMKL, 2(2), 227–242

Razvoj veščin podjetništva na univerzah: primer Politehnične univerze Zacatecas, Mehika

Rosa Elvira Campos Álvarez, José G. Vargas-Hernández, Gabriela Noemí Figueroa Ibarra in María Elena Sandoval López

Problematika razvoja podjetništva je nedvomno zanimiva za visokošolske institucije; programi na področju razvoja podjetništva, spodbujanja podjetništva in podjetniških veščin predstavljajo nekatere aspekte v okviru omenjene tematike. Kljub temu pa je bilo le malo pozornosti posvečene merjenju podjetniških sposobnosti kot kazalniku uspeha razvojnih programov na področju podjetništva. Predstavljena študija poskuša izmeriti stopnjo podjetniških sposobnosti in veščin študentov obravnavane univerze ter jih primerjati s stopnjo veščin in sposobnosti uveljavljenih podjetnikov s ciljem določitve stopnje vpliva programa razvoja podjetništva na kariero študentov Politehnične univerze Zacatecas v povezavi z upravljanjem in vodenjem manjših in srednje velikih podjetij.

Ključne besede: podjetništvo; podjetniške veščine; programi razvoja podjetništva; znanje; učenje; upravljanje

IJMKL, 2(2), 243–254

Upravljanje posla družbenih tehnologij

Jeretta Horn Nord

Večje število potrošnikov kot organizacij uporablja družbene tehnologije – družbene medije, socialne mreže in družbeni vpliv. Z ekonomskega vidika pa bi lahko podjetja s skokom v družbene tehnologije veliko pridobila. Namreč, tiste organizacije, ki so poskušale izboljšati svoje znanje in zgraditi platforme na področju družbenih tehnologij so doživele neverjetne rezultate. Namen članka je razpravljati o kategorijah družbenih tehnologij in predstaviti strategijo upravljanja znanja s ciljem uspešne implementacije takšnih tehnologij v katerikoli organizaciji. Neverjetna rast je pričakovana v velikem delu podjetij katerih vodstvo se bo, ali pa se je že, odločilo v bližnji prihodnosti razviti platforme družbenih tehnologij. Članek ponuja jasen pristop, podprt s primeri podjetij, ki so uporabila družbene tehnologije in dosegla pomembne rezultate – mnoga v milijonih dolarjev. Namen članka je ponuditi jedrnat in sodoben vodič v svet upravljanja znanja družbenih tehnologij.

Ključne besede: učenje; upravljanje znanja; družbene tehnologije; socialni mediji; družbeno mreženje; družbeni pomen

IJMKL, 2(2), 255–267

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