

Balaji Gopalan  
**A Study on  
Variables,  
Technology  
Facilitators and  
Measures of Value  
Co-creation for  
Management**



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<b>Julkaisun nimike</b> Tutkimus arvoa luovan yhteiskehittämisen muuttujista, mittareista ja teknologian fasilitoinnista johtamisen kannalta		
<b>Tiivistelmä</b> Tämä tutkimus ymmärtää arvoa luovan yhteiskehittämisen sellaisena toimintana, joka pyrkii sisäisten ja ulkoisten asiakkaiden kanssa tehtävään luovaan, kokonaisvaltaiseen ja älylliseen vuorovaikutukseen. Tutkimus koostuu kahdesta osasta. Systemaattisen kirjallisuus-tutkimuksen avulla selvitetään, mitkä muuttujat ja teknologiat edistävät arvoa luovaa yhteiskehittämistä ja mitä hyötyä arvoa luovasta yhteiskehittämisestä on. Empiirinen tutkimus hyödyntää kirjallisuuden tuloksia arvioidessaan, kuinka arvoa luova yhteiskehittäminen toteutuu 135 teollisuudessa työskentelevän, intialaisen vastaajan mukaan.  Määrällisen tutkimuksen päätuloksen mukaan älyllinen vuorovaikutus-, yhteistyö- ja taloudellinen motivaatio edesauttavat arvoa luovan yhteiskehittämisen prosessia ja edistävät arvoa luovan yhteiskehittämisen 25 hyödyn toteutumista.  Empiirinen tutkimus antaa viitteitä siitä, etteivät yritykset täysimääräisesti hyödynnä arvoa luovan yhteiskehittämisen mahdollisuuksia. Yritysten tulisi auditoida nykyinen tuote- ja palveluinnovaatioihin pyrkivä yhteiskehittämisen tapa ja tulosten pohjalta suunnitella toimenpiteet.		
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<b>Abstract</b> Value co-creation in this research is to comprehend what facilitates internal or external customers in pursuing creative, inclusive and intellectual interactions. This research consists of two studies. Study I seeks to determine which variables, technology facilitators and measures of value co-creation appear in the literature using a systematic literature study. Study II is an empirical study that uses the results of Study I and evaluates how the co-creation of value is utilized by 135 industry respondents in India.  The main theoretical contribution of this quantitative research is that intellectual, social and economic motivation facilitates value co-creation process, and impacts on the 25 outcomes of value co-creation.  The empirical study suggests that the potential of value co-creation has not been fully utilized in the companies. Companies need to conduct an audit as to what extent they have implemented value co-creation in order to promote innovations in products and services and further conceive a plan of action based on the results.		
<b>Keywords</b> Value co-creation, Technology facilitator, Open innovation, Network		



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## Abbreviations

ABS	Association of Business Schools
ACM	advanced computing machinery
CRM	customer relationship management
DART	dialogue, access, risk assessment and transparency
ICT	information and communication technologies
IEEE	Institute of Electronic and Electrical Engineers
IoT	Internet of Things
IT	information technology
MIS	management information systems
PCA	principal component analysis
SEM	structural equation modelling
WWW	World Wide Web





# 1 INTRODUCTION

## 1.1 Statement of the problem

Customers today want products and services that are personalized, customized or co-produced collaboratively. In the early part of the 21<sup>st</sup> century, increasingly informed, networked and empowered customers on the Internet were actively participating with businesses in improving products and services (Prahalad and Ramaswamy 2004). The birth of *social networks* gave rise to a new paradigm in interaction. Today, the interpretation of value and the process of *value creation* have transitioned from the perspective of an industrial approach to manufacturing products and businesses to a one involving significant creativity on the part of the customer who is enabled and facilitated by the Internet, mobile networks and *social networks*.

Design crowdsourcing has faced challenges in evaluating the effectiveness of creating new products from sourcing the best ideas on the Internet (Allen et al. 2018; Kim and Slotegraaf 2016). The Internet of Things (IOT), which aims to integrate the digital world with the real world, is witnessing new challenges in shopping for the retailing industry (Balaji and Roy 2017). Determinants of brand resurrection movements on the Internet are gathering momentum (Davari et al. 2017) along with customer-produced brand imaging (Presi et al. 2016) and evaluations on the quality of luxury brands (Quach and Thaichon 2017). Today, shopping on the Internet is exclusively facilitating the wellness and shopping requirements of customers who are disabled (Dennis et al. 2017). So, what is *value co-creation*, what are its enablers, how has it facilitated the industry and are there any integrative concepts in research applicable to industrial management? There is now a need to define *value co-creation* for industry and to present the practices of effectively implementing *value co-creation* across disciplines for better industrial management.

## 1.2 Preliminary definition

*Value co-creation* may be described as the interactivity of customers who may be internal or external to a business in creating and improving products and services requiring collaboration, which is creative, inclusive and intellectual. Infrastructures in information and communication technologies (ICT) are enabling customers to significantly enhance the process of *value creation*. They

have become co-creators of products and services with a wide range of business, civic and social establishments. The ability of ICT to allow customers (i.e., people, businesses and governments) to interact inclusively, creatively and intellectually, in an agreeable manner, has added to product and service knowledge being mutually developed across information systems (Ramaswamy 2011). This is considerable in terms of new value that creates or improves innovation in products and services.

Its objective is to encourage knowledge management, authenticity and interaction. Studies suggest that businesses have responded to this need for better products and services in *mobile networks*, *social networks* and the Internet to enable the co-design of products and services. For example, Nike's NIKEiD webpage has enabled customers to co-design shoes, personalize them and purchase them on the Internet. It also lets customers share and discuss about its creations. Lego and its Digital Designer system have created opportunities for customers to create their own customized Lego products and then share, shop for and purchase them. BMW's M division involves customers and BMW engineers in the *value co-creation* process for customizing automobiles, making product improvements and taking on challenges in engineering. Ducati has provided a virtual customer environment called Tech Café for product conceptualization. Eli Lilly, a pharmaceutical business, has facilitated collaboration networks for customers who are patients, doctors, clinicians, researchers and providers of healthcare (Roser et al. 2009). Other companies, such as IBM, IKEA, P&G, Philips Electronics, Samsung, Starbucks and Unilever, have facilitated *value co-creation*. Businesses and customers view *social networks* as an opportunity to involve them in the design of products and services for better entertainment, satisfaction, efficacy, involvement, interaction, mobility, networking, creativity and innovation, marketing and profitability (Holzwarth et al. 2006). The emphasis and mechanisms of the Internet, *social networks* and *electronic commerce* on *value co-creation* are especially discussed in research on *marketing*, *information systems*, *information management* and *strategic management*. In this context, the management viewpoint focuses on how managers improve their decision-making through *value co-creation*, for example, about what kinds of management situation *value co-creation* is seen as significant. These are explained in the next section.

The main terms of this research are defined in the following ways:

1. Variables of *value co-creation* are those factors that pre-exist, pre-qualify and enable or disable the use of *value co-creation*.

2. Technology facilitators refer to the factors that either support or disable the use of information technology (IT) for customer decision-making and problem-solving, in which authentication, interactivity and networking are required to enable *value co-creation*.
3. Measures of *value co-creation* refer to the performance scores obtained for the customer and the establishment of specific attributes that define *value co-creation* for products and services. Such measures include co-shopping, market knowledge, customer income and incentives, wellness and customer knowledge. A complete list of measures identified is provided in Table 2.

### 1.3 Theory, concepts and studies on value co-creation

*Value co-creation* research has recently focused on the IOT and the role of *social media* for sellers, retailers and consumer interactions (Balaji and Roy 2017; Rapp 2013) and how it is relevant to the creation of new products (Yuna and Chandler 2018; Allen et al. 2018; Kim and Slotegraaf 2016). Marketing research has also described interaction between businesses and customers, namely, business-to-customer networks and multichannel information management for co-creation across networks and the Internet (Vernette and Hamdi-Kidar 2013; Pozza 2013). Other researchers have explored different themes of *value co-creation* facilitated within *social media* (Kuppelwieser et al. 2013), its effectiveness in advertising, customer-produced brand imaging (Pentina et al. 2018; Davari et al. 2017; Presi et al. 2016), and the ethics associated with data analytics (Lawlor et al. 2016; Nunan and Yenicioğlu 2013). Research on the discipline of *information systems* has focused, for example, on how *value co-creation* across *mobile networks*, *social networks* and the Internet provides proficiency and measures as resources for environments in facilitating businesses (Grover and Kohli 2012). The co-creation of value research regarding collaborations in logistics has explored the facilitation of proficiency between businesses across infrastructures in technologies and the activities of logistics that support businesses and communications in managing the deliverables associated with the dispatch and receipt of products, information and finances across locations (Rai et al. 2012). *Value co-creation* within Web 2.0 has elaborated on the expansion of small and medium-sized businesses (Bell and Loane 2010). Some quantitative studies have also analysed marketplaces in networks, the efficacy of customers and their knowledge, and *electronic commerce* (Dennis et al. 2017; Füller et al. 2009; Oh and Teo 2010). Much of the research on *value co-creation* considers customer interaction in a world that is physical, while mostly neglecting the utilization of *mobile networks*, *social networks* and the

Internet except, in the case of marketing journals, which have significantly researched this topic. The existing theory on co-creation in the field of research on other management disciplines is limited.

The research that exists on *value co-creation* mainly focuses on conceptual and empirical studies, e.g., in a taxonomy for innovations in *mobile commerce* to facilitate the efficacy of the customer and co-creation based on the history of patents in software application programming (Khansa et al. 2012) and on the classifications of co-creation theory and its practice (Zwass 2010). Research within the strategy discipline has focused on employee and organizational opinions about the usefulness of Enterprise 2.0 (Denyer et al. 2011), while other papers have addressed the strategizing and sourcing of intellectuals for *open innovation* projects (Frey et al. 2011).

Research on strategy has also described how emerging leadership is identified in virtual collaboration projects (Sutanto et al. 2011) and the significance of strategies to business model management in electronic commerce (Wirtz et al. 2010). Overall, empirical research and theories concerning co-creation remain underexplored in terms of its relevance to *social networks*, *mobile networks* and the *Internet*; thus, further study and integration are needed. Integration of widely dispersed studies, as published in journals, on information systems, information management, marketing and strategy disciplines are necessary for managing, identifying and evaluating the status of research across disciplines and deriving themes and emerging theories on the subject of *value co-creation*. There is little research about what the enablers of *value co-creation* are and what their role is. There are also limitations with today's research on integrative theories that discuss the enablers of *value co-creation*.

## 2 OBJECTIVES

This research studies the co-creation of value by using a systematic literature review and a survey. The overall research question is to find to what extent the co-creation of value is utilized in companies and to identify the attributes. In order to understand this, the research first uses a literature review to identify the variables, technology facilitators and measures of co-creation of value. The variables are associated with the antecedents that pre-qualify, pre-exist and enable or disable *value co-creation*. The technology facilitators are associated with and facilitate the processes of *value co-creation*. The measures of *value co-creation* identified from literature are associated with the unit of analysis discussed in qualitative and quantitative studies on *value co-creation*.

This study has three objectives:

1. Study I is a literature study aiming to identify the variables, technology facilitators and measures of *value co-creation*. The most significant papers on *value co-creation*, as published in top-ranked Association of Business Schools (ABS) level 3 and level 4 journals, are identified. This is to complete the analysis necessary to map, derive, integrate and consolidate the literature. The aim of the analysis, synthesis and consolidation of the research using a systematic literature review of the most significant journal papers is to identify the specific enablers of *value co-creation*. This helps in verifying and identifying the specific attributes of these enablers of *value co-creation* for any statistical analysis.
2. The empirical part of the research aims to determine how the co-creation of value is utilized in companies. The objective is to statistically analyse the enablers, technology facilitators and measures that are associated with activities of *value co-creation*.
3. A link exploration study of the papers selected for the systematic literature review also facilitates an analysis of the links between the different themes of research across disciplines that are associated with activities of *value co-creation*.

### 3 STUDY I: INTEGRATIVE STUDY OF THE LITERATURE

#### Literature selection method

Study I sought to identify the variables, technology facilitators and measures of value co-creation from the literature using a systematic literature study. A systematic review of the literature and discussion was completed using an approach followed by Hutzschenreuter and Kleindienst (2006). The paper describes a methodology of completing a systematic review of the literature and encourages us to identify the variables, technology facilitators and measures of the theory under study, then interpreting them for the field of management centred on how to improve managerial decision-making. This research analysed relevant qualitative and quantitative studies from top-ranked ABS level 3 and level 4 journals in the ABS' *Academic Journal Quality Guide*, which encompasses the disciplines of information systems, information management, strategic management and marketing (Harvey et al. 2010). The literature was retrieved from the Business Source Premier Publications database for the years between 1992 and 2018. To retrieve the literature from the database, terms containing a combination of keywords associated with *social media*, the Internet, *social networks*, *value co-creation* and titles of journals were used as shown in Table 1.

A total of 286 research papers were retrieved. Articles from journals that were ABS level 1 and ABS level 2 and those not listed in the ABS' *Academic Journal Quality Guide* were excluded. A working list of literature numbering 100 on the topic of research was prepared using a process of studying the abstracts. Further, 60 of the articles were excluded mainly because they did not focus on *value co-creation* in relation to *mobile networks*, *social networks* and the Internet and did not mention *value co-creation* within the abstracts. Finally, a working list of 40 papers including empirical and qualitative research was selected for the review.

Other recently published papers of relevance were also included in the research. The link exploration of studies table shown in Appendix B presents a distribution of relevant literature from journals selected for the study. A systematic literature review begins with: (1) the definition of the concept, (2) selection of keywords, (3) selection of journals, (4) study and evaluation of the content and abstract using search keywords and (5) a final selection of relevant literature. A methodology of the study of literature from journals needs to systematically involve both the mapping and evaluation of the expansiveness of the discipline in order to define the hypotheses for research.

A comprehensive study of the abstract and content of qualitative and quantitative studies from journals was completed to identify, integrate and retrieve the variables, technology facilitators, controls and measures of *value co-creation* for customers and establishments. This in turn related to *mobile networks*, *social networks* and the Internet, with the steps involved in the research described in Figure 1. Table 2 displays the classification of variables, technology facilitators and measures. The independent variables of *value co-creation* were identified as subjectivity, norms, vocations or professions, proficiency, technologies and infrastructure, technology popularity, net neutrality, advocacy, incentives and product and service knowledge. The technology facilitators were identified as authentication and motivations, interaction and networking. The measures of *value co-creation* for customers and establishments were identified as specific attributes or the units of analysis of *value co-creation* obtained from the conclusions made during the systematic literature review. The mapping and illustrations are displayed in Figure 2 and Figure 3. Further, Figure 3 provides an illustration of *value co-creation* activity between customers and establishments. The link exploration of studies table shown in Appendix B provides a working list of papers selected for the systematic literature review and analyses the studies and their conclusions. Further, NVivo 10, as a qualitative software package, was used for visualizing, studying and integrating the variables, technology facilitators and measures of *value co-creation* for customers and establishments. The illustration in Figure 2 was replicated in NVivo 10 for further study in order to simplify and organize this information and to derive new discussions and concepts for the disciplines studied.

The study and integration of the knowledge from the literature selected from journals facilitated the identification of a theory that *intellectual, social and economic motivations* are enablers of *value co-creation*. This required a thorough, extensive and systematic comprehension of the literature. The finding from this study also highlighted other relevant attributes of *value co-creation* of significance for academics and research. This was further evaluated through a statistical study of responses to a survey among managers from industry. Hypothesis testing was performed using IBM SPSS 25, Minitab 18 and IBM SPSS AMOS 25 statistical software in the form of principal component analysis (PCA), factor analysis and structural equation modelling (SEM). The use of IT by people, businesses and governments does play its part in facilitating these three types of motivation. It adds relevance to authenticity, interaction and networking during *value co-creation*. In the subsequently performed statistical study, the *intellectual, social and economic motivations* were closely associated and identified with the response variables and predictors selected for the regression subsets and multivariate study.

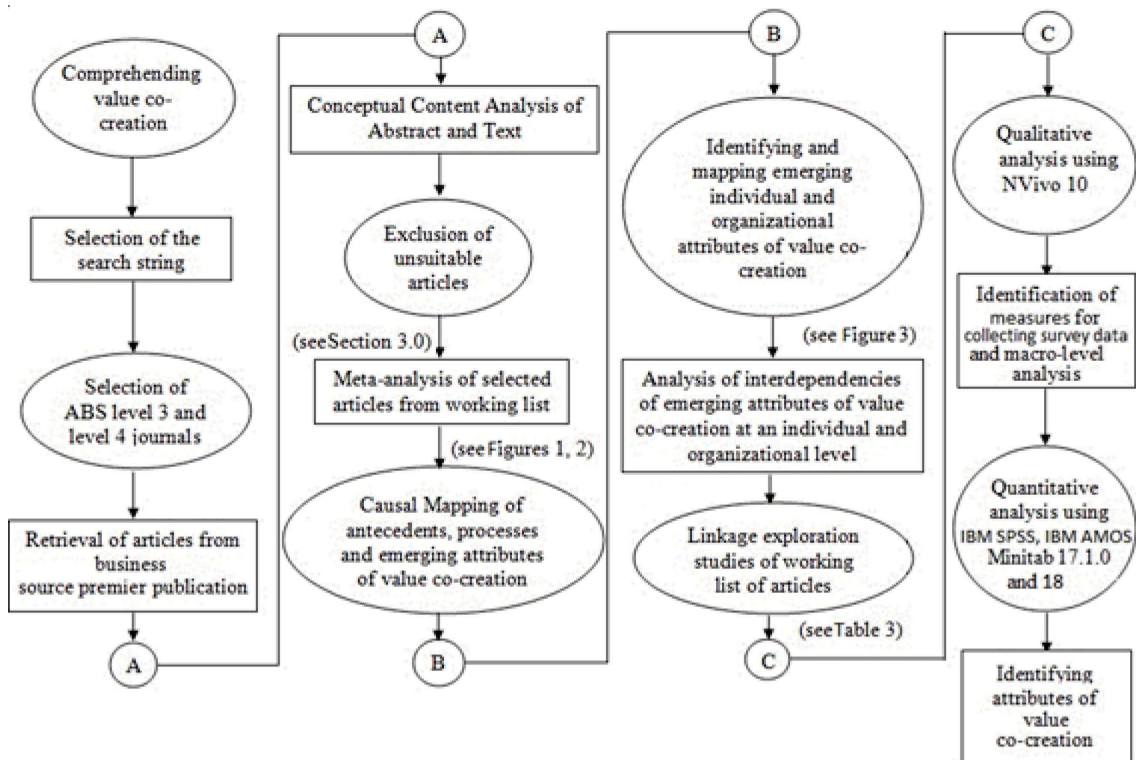
**Table 1.** Combination of keywords for the retrieval of literature from the database

Relevance	Applied keywords
Abstract search 1	- "social media" or "social network" or "Web 2.0" or "Internet forums" or "Internet" or "World Wide Web" or "WWW" or "Internet community" or "online community" or "weblogs" or "social blog" or "blogging" or "wiki" or "crowd sourcing" or blog or "social space" or "virtual community" or "virtual" or "virtual communities" or "collaborative networks" or "rss" or "really simple syndication" or "web feed" or "chat room" or "threads" or "instant messaging" or "newsgroups" or "podcast" or "blog" or "crowdfunding" or "crowd funding" or "crowdsourcing" or "crowd wisdom" or "crowdwisdom"
Abstract search 2	- "value co-creation" or "open innovation" or "cocreation" or "co-create" or "co-creation" or "co-production" or "co-design" or "collaboration"
Search on titles of journals: ABS level 3 and 4 journals in the disciplines of information systems, information management, marketing and strategic management	<p><b>INFORMATION SYSTEMS AND INFORMATION MANAGEMENT</b> - "MIS Quarterly" or "Information Systems Research" or "Journal of Management Information Systems" or "Information Systems Journal" or "European Journal of Information Systems" or "IEEE Transactions on Software Engineering" or "Communications of the ACM" or "Information and Management" or "Journal of Information Technology" or "Decision Support Systems" or "Journal of the American Society for Information Science and Technology" or "Information Processing and Management" or "International Journal of Electronic Commerce" or "INFORMS Journal on Computing" or "Information and Organization" or "Journal of the Association of Information Systems" or "International Journal of H human-computer interaction"</p> <p><b>STRATEGIC MANAGEMENT</b></p> <p>- "Strategic Management Journal" or "Journal of Economics and Management" or "Strategy Advances in Strategic Management" or "Long Range Planning"</p> <p><b>MARKETING</b></p> <p>- "Journal of Marketing" or "Journal of Marketing Research" or "Journal of Consumer Research" or "Marketing Science" or "Journal of Retailing" or "International Journal of Research in Marketing" or "Journal of the Academy of Marketing Science" or "European Journal of Marketing" or "Journal of International Marketing" or "Industrial Marketing Management" or "Psychology and Marketing" or "International Marketing Review" or "Journal of Advertising" or "Journal of Business Research" or "Marketing Letters" or "Journal of Advertising Research" or "Journal of Marketing Management"</p>



### 3.1 Research, classification, illustration and literature exploration

The overall literature analysis (Figure 1) included the analysis of literature and the identification and mapping of the customer and establishment attributes of *value co-creation*, followed by qualitative and quantitative analysis and the identification of the most significant co-creation of value attributes.

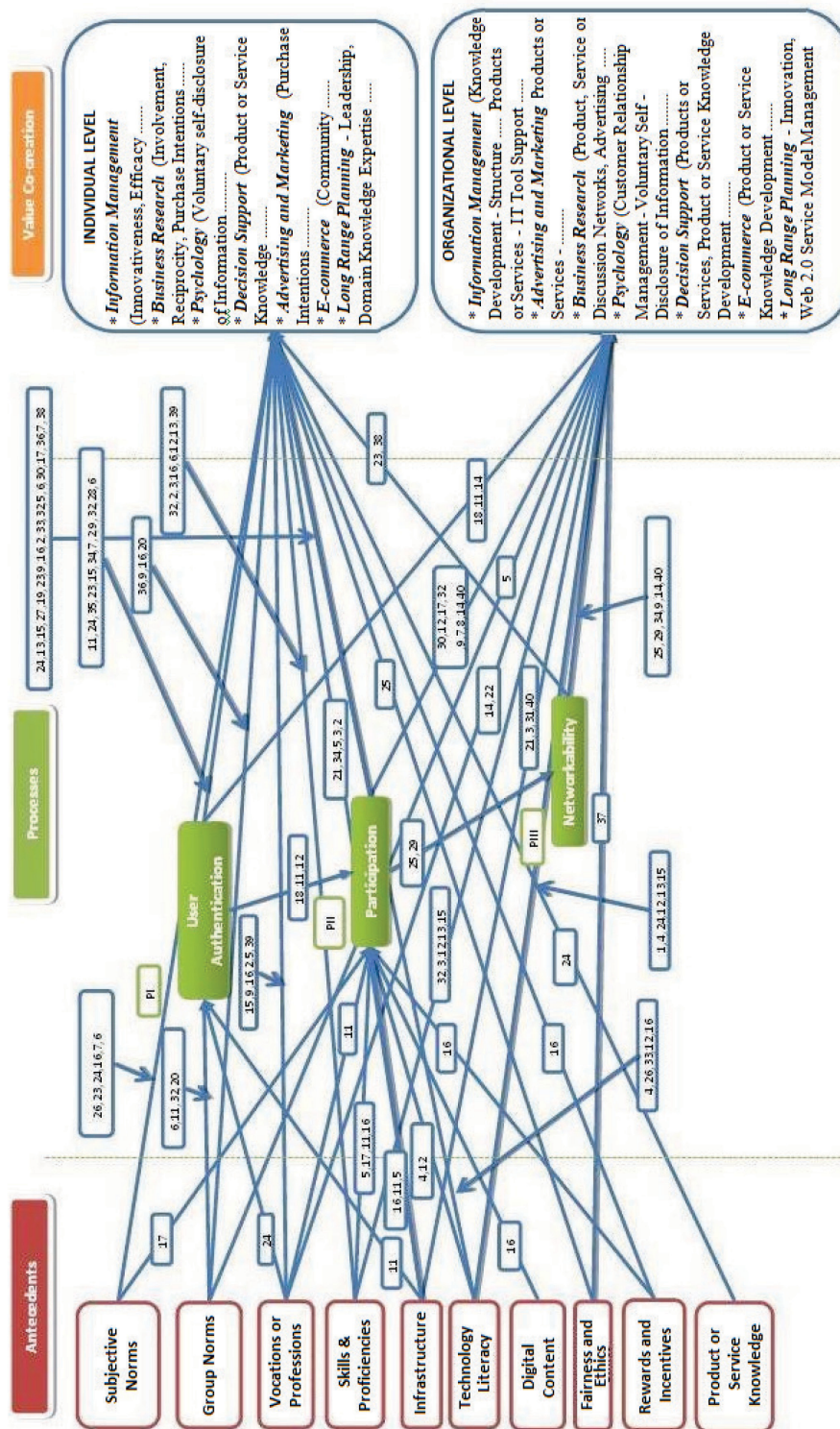


**Figure 1.** Literature analysis and research

### 3.2 Variables, technology facilitators and controls

The methodology used in the evaluation of the literature on *value co-creation* is similar to that employed in an earlier study by Hutzschenreuter and Kleindienst (2006). It identified and integrated the variables, technology facilitators and measures of *value co-creation*. Control variables were also discussed. The association between the variables, processes and measures of *value co-creation* in the case of customers and establishments are discussed in Section 3.2.4 as follows: (1) research theme 1 – how variables are associated with technology facilitators of *value co-creation*; (2) research theme 2 – how variables are associated with measures of *value co-creation* for customers and establishments; (3) research

theme 3 – how technology facilitators are associated with measures of *value co-creation* for customers and establishments. The different measures of *value co-creation* and how they are associated with customers and establishments are further discussed. Figure 2 presents the variables, technology facilitation or processes and measures of *value co-creation* identified during the systematic literature review. The independent variables are displayed in red boxes and the processes in green boxes, while the orange box lists the measures of *value co-creation* associated with customers and establishments. The numbers in blue boxes represent the serial numbers of the article selected from the link exploration of studies table shown in Appendix B, which contains a working list of papers chosen for the systematic literature review.



**Figure 2.** Illustration showing associations between variables derived from conclusions of studies on value co-creation (numbers in boxes refer to the mapping of serial numbers in the working list of literature shown in Appendix B)

**Table 2.** Classification scheme of perceived variables, technology facilitation and measures of value co-creation

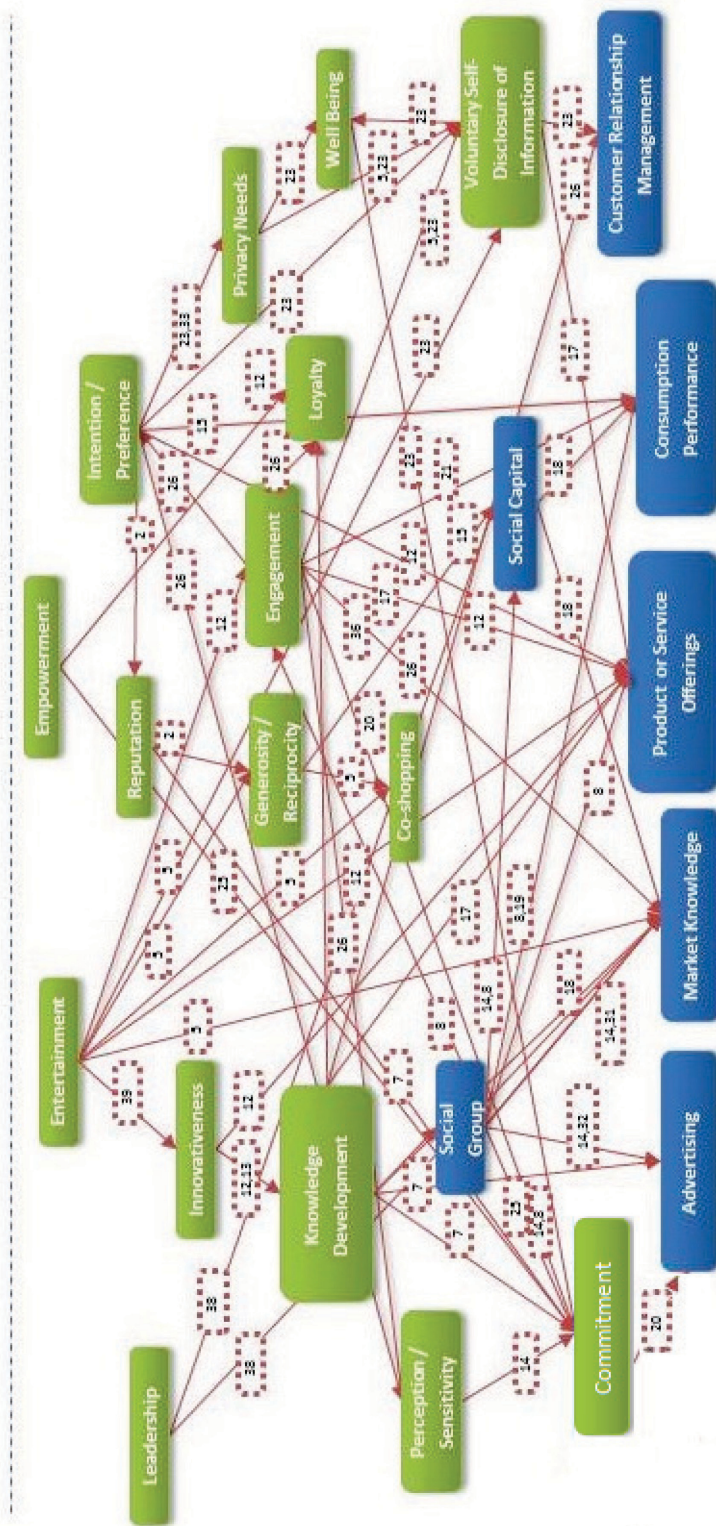
<b>Variables</b>	AI	Subjectivity
	AII	Norms
	AIII	Vocations or professions
	AIV	Proficiency
	AV	Technologies and infrastructure
	AVI	Technology popularity
	AVII	Net neutrality
	AVIII	Advocacy
	AIX	Incentives
	AX	Product and service knowledge
<b>Technology facilitators</b>	PI	Authentication and motivations
	PII	Interaction
	PIII	Networking
<b>Measures</b>	O	Customer
		Establishment

Table 2 continued:

<b>Customer attributes (unit of analysis)</b>	<b>Establishment attributes (unit of analysis)</b>
Customer interactions	Co-shopping
Knowledge/problem-solving and Learning	Market knowledge
Customer attitude	Software as a service/cloud services
Generosity and reciprocity	Customer relationship management (CRM)
Customer values/interpretation	Advertising/promotion/business strategy
Customer motivation	Social network
Customer loyalty and trust	
Voluntary disclosure of information/customer Experiences	
Customer income and incentive	
Customer and employee wellness	
Productivity in networking	
Customer commitment	
Customer entertainment	
Customer knowledge	
Purchase intentions	
Customer leadership	
Customer innovation	
Customer efficacy	
Customer Intentions and preferences	

Table 2 above describes the classification of variables, technology facilitation and measures of value co-creation. These have been identified from Figure 2 and classified. The variables, technology facilitation and measures are described in detail in Section 3.2.1. The link exploration of studies table shown in Appendix B provides a more comprehensive link exploration using the classification scheme given in Table 2 and discusses the most significant measures of *value co-creation* identified during the systematic literature review. Figure 3, as shown on the next page, associates the *value co-creation* attributes of customers with the *value co-creation* attributes in establishments. The numbers in red boxes in Figure 3 refer to the serial numbers from the working list of literature selected for the systematic literature review.

The illustration shows how *customer commitment* facilitates the *advertising* needs of firms. Other customer attributes, such as *perception and sensitivity*, *knowledge creation*, *empowerment*, *reputation* or *status* and *wellness*, are directly associated with *customer commitment* and *interactivity* in terms of using the Internet during the evaluation of products and services. *Customer intentions and preferences*, their *reputation* or *status* and *customer interactions* associated with products and services directly add to their *perception and sensitivity*. This knowledge created on the Internet can also be added to *market knowledge*, *advertising*, *products and services*, and *CRM*. The creativity of *customer innovations* also benefits *knowledge management* in terms of personalizing and standardizing products and services for markets on collaborative projects on the internet, qualities such as *customer leadership* in innovation can be added to *market knowledge* and *social capital*. The sociability of the Internet and mobile and *social networks*, along with the *entertainment* of customers, has facilitated *customer innovations*, *market knowledge*, *products and services*, *co-shopping preferences*, *generosity and reciprocity*, *customer experiences* and *customer interactions*.



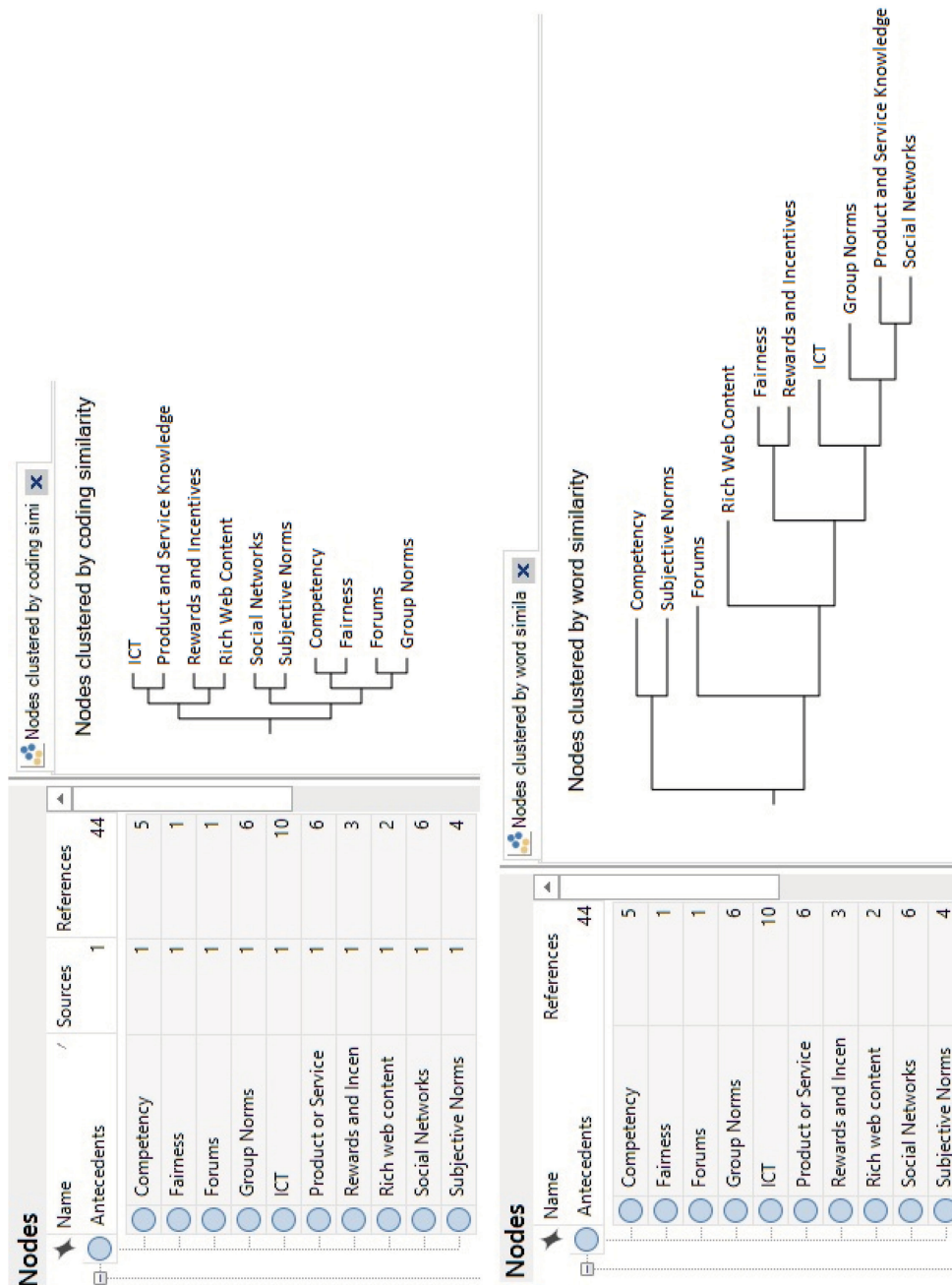
**Figure 3.** An extended illustration of Figure 2 displaying the measures of value co-creation and how they are associated with customers and establishments (numbers in boxes refer to the mapping of serial numbers in the working list of literature shown in Appendix B)

This *customer empowerment* leads to *customer loyalty* and *customer commitment* to use the Internet, mobile and *social networks*. Further, *customer intentions and preferences* regarding use of products and services have resulted in awareness being created regarding *perceptions and sensitivity, product and service knowledge, customer experiences* and *privacy management*. This has resulted in improved *CRM* for customers when raising concerns about their *wellness*. In terms of value addition, *customer leadership, generosity* and *reciprocity of interactions* on the Internet have resulted in the formation of *social capital* and also the management of *product and service knowledge*.

The link exploration of studies table shown in Appendix B provides a working list of papers selected for the systematic literature review and also provides a comprehensive link exploration of the associates between the different variables, technology facilitations and measures of *value co-creation*.

### 3.2.1 Variables of value co-creation

The variables of *value co-creation* were identified as independent variables affecting the processes and *value co-creation* in customers and establishments. The variables from previous studies on *value co-creation* were identified as subjectivity, norms, vocations or professions, proficiency, infrastructure, popularity of technologies, net neutrality, equity and incentives, along with knowledge about products or services. The variables were organized within NVivo 10 and derived during the evaluation of the literature, which included studies that were qualitative and quantitative. The illustration demonstrates how the variables that add to *value co-creation* are associated with the analysis of the systematic literature review. ICT complement product and service knowledge, while rewards and incentives and rich Web content have added to *value co-creation*. Subjective norms are significant in social networks. Competency and fairness or equity are associated with interactions facilitating *value co-creation*. Forums evolve based on group norms.



**Figure 4.** Qualitative analysis of the reviewed literature on value co-creation using NVivo 10

The hierarchy displayed in Figure 4 shows how NVivo 10 interprets the grouping of variables that adds to *value co-creation*. In a hierarchical analysis of how *forums* add to *value co-creation*, it can be seen that *social networks* and *product and service knowledge* are associated with *group norms*. *Group norms* are further associated with how design principles need to be incorporated into the ease of using *ICT*, which along with *equity*, *rewards and incentives*, and *rich Web content*



add to the *value co-creation* of forums. Forums, together with *competency* and *subjective norms* of interactions in ICT add to *value co-creation*.

### Proficiency

Proficiency is associated with learning and knowledge management. For example, this is linked to how many staff in a company have received an education. Research demonstrates that employees' learning and proficiency in knowledge management, measured by the social bookmarking of knowledge libraries, expand their subject knowledge, resulting in creativity and innovation within firms (Gray et al. 2011; Frey et al. 2011). Proficiency and customer experiences of using IT have facilitated knowledge management across networks, interactivity and profitability (Stephen and Toubia 2010). Prahalad and Ramaswamy (2003) have also focused on this perspective of the customer experience during *value co-creation*, in turn facilitating resource management (i.e., firm resources, business affiliates and networked customers). The experience and knowledge of intellectuals, entrepreneurs, researchers, universities and governments participating in projects across networks have facilitated knowledge management, creativity and innovation. This has resulted in collaborative IT projects where businesses provide incentives to attract intellectuals with both intrinsic and extrinsic motivation for knowledge management, creativity and innovation (Frey et al. 2007).

For example, the incentives for interaction within blogs have facilitated enthusiasm, while product and service knowledge management have improved the intention to use *social networks* (Cheung et al. 2010; Hsu and Lin 2008). In successful *social networks*, the multiplicity of knowledge management, customer efficacy and experience of virtual sociability have encouraged programmers to pursue socio-technological innovation (Cova and White 2010; Messinger et al. 2009; Wagner and Majchrzak 2007).

### Norms

Norms of participants on the Internet are associated with the demography of cultures. The resourcefulness and popularity of the Internet and *social networks* have facilitated enthusiasm and creativity in design principles (Kohler et al. 2011; Hsu and Lin 2008; Nambisan and Watt 2011). Interaction in *social networks* and *electronic and mobile commerce* has improved knowledge management and customer efficacy. Attributes of information organization, convenience and ease of use, incorporated into IT, *social networks*, the Internet, electronic libraries and knowledge networks, have added value to knowledge management (Valck et al.

2009; Hung and Li 2007). Further, referrals for products and services in *social networks* facilitate shopping among customers who are proactive, vigilant and interactive (Chan and Li 2010). Authentication is a variable of control for interaction in *social networks*; the literature demonstrates that it is a moderator of interaction and a facilitator of personalizing profiles (Dholakia et al. 2004).

### Information technology, social networks and the Internet

The popularity of technologies and the infrastructure of networks have facilitated interactivity between IT, *social networks* and the Internet. Online networks have created value across IT, *social networks* and the Internet by presenting opportunities for customers in co-designing products and services for enhanced entertainment, satisfaction, efficacy, interaction, mobility, networking, differentiation, marketing and profitability (Zhu and Zhang 2010; Holzwarth et al. 2006; Viswanathan et al. 2007). Management of portfolios in businesses across the Internet has brought about capabilities and measures for improving interactivity in the use of IT, *social networks* and the Internet (Grover and Kohli 2012). These technology-enabled customer experiences have facilitated *value co-creation* in Web 2.0, especially across social, public and non-proprietary innovation networks for collaborative product or service knowledge management, which have further improved decision quality, attitudes and purchase intentions among customers (Riegner 2007; Riedel et al. 2013).

*Social networks* have facilitated knowledge management across networks during the interactive creation and aggregation of knowledge (Ransbotham and Kane 2011). Online networks have improved the efficacy of interaction needed in managing knowledge and intellect among populations for improving product and service knowledge on economies, markets and norms. Web 2.0 management and implementation have facilitated interaction and reform across online networks. For example, IT, *social networks* and the Internet facilitate *value co-creation* during collaborations within logistics by reducing the complexities associated with automation, co-ordination, integration and synchronization of logistics processes, thereby enhancing inter-firm IT capabilities and improving communications required for business and IT management (Rai et al. 2012). IT, *social networks* and the Internet within Web 2.0 have enabled small and medium-sized businesses towards capability expansion by expediting and enabling their infrastructural management for optimizing costs and efficiencies in leveraging both internal and external knowledge to businesses (Bell and Loane 2010).

### Product or service knowledge

Knowledge about products or services facilitates interaction across online networks. Interaction across these networks and geographies actively involves knowledge management regarding products and services and facilitates customer efficacy (Colliander and Dahlén 2011; Nambisan and Watt 2011). Interaction, vigilance and communication in networks have proactively promoted customer referral-based shopping requiring the incorporation of design principles into IT, *social networks* and the Internet (Chan and Li 2010). Ease of interaction in *electronic commerce* has improved the level of customer efficacy in managing knowledge for business innovation by association with the geographical location of economies, markets and norms (Lechner and Hummel 2002). Knowledge management concerning product and service markets and customers' definition of value occurs during purchase evaluations of products and services (Zhao et al. 2007). Further, popular *social networks*, knowledge repositories and information resources have facilitated customer efficacy (Kim et al. 2008; Valck et al. 2009; Rafaeli and Noy 2002).

### Incentives

Incentives, equity and interactivity have facilitated enthusiasm, product and service endorsements and knowledge managed across online networks (Cheung et al. 2010; Hsu and Lin 2008). Factors such as incentives and knowledge management for improving the quality of products and services also support customer efficacy, resulting in social rewards, in turn multiplying across networks (Hsu and Lin 2008). Networked interaction has promoted membership and knowledge management by providing businesses with an estimate of the limit on financing incentives required for marketing products and services across popular networks (Trusov et al. 2009). Studies suggest that businesses have responded to customers by providing improved and personalized customer experiences within social technologies, which have enabled customers to co-design products in *electronic commerce* (e.g., Nike). The resourcefulness, creativity and popularity of *social networks* have prompted enthusiasm, resulting in improvements in the design of IT, *social networks* and the Internet (Kohler et al. 2011; Hsu and Lin 2008; Nambisan and Watt 2011). *Social networks* enabling authentication and the multiplicity of interaction themes have provided for incentives, reciprocity and motivation for knowledge management (Antin and Earp 2010; Shen et al. 2010; Chan and Li 2010; Hsu and Lin 2008). Due to a visible increase in customer interactions across *electronic commerce*, IT needs to meet ever-increasing customer demands concerning efficient network connectivity. This requirement has facilitated new economic value propositions and customer-friendly social

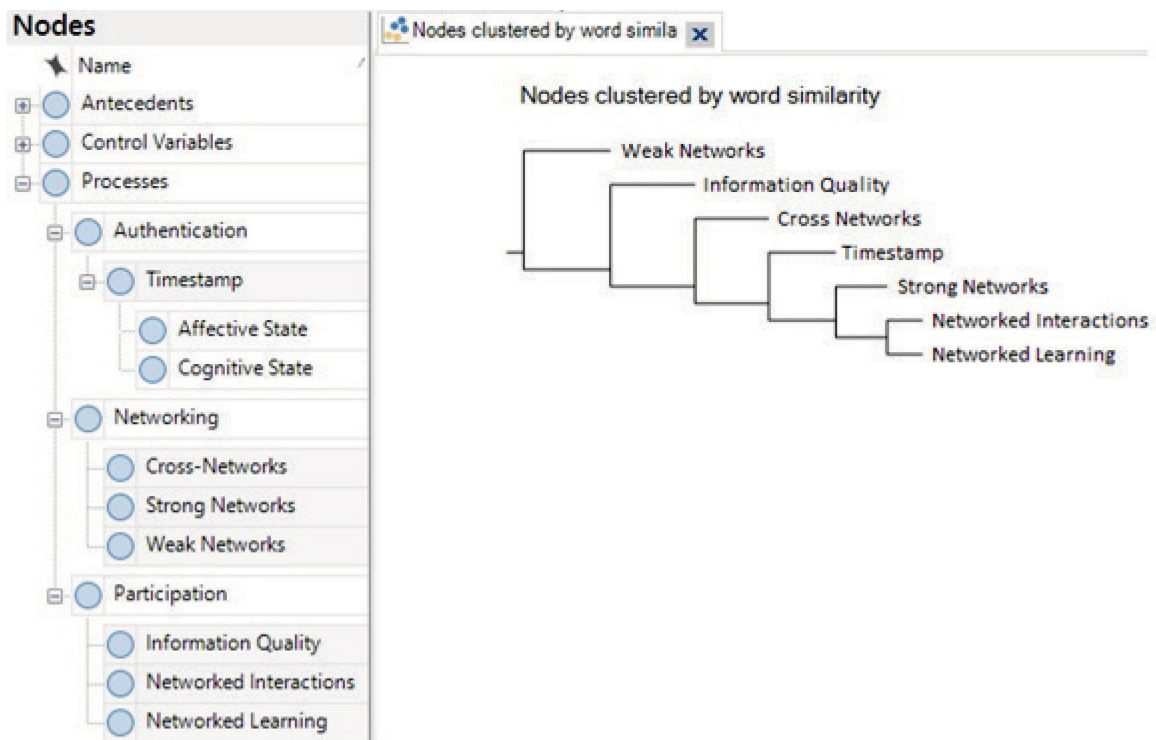
technologies. Awareness created in active public and news media collaborations has also led to an efficient digital economy.

### Information technology usage

Net neutrality and sociability within popular *social networks* have resulted in creativity and innovation; further, the resourcefulness and sociability of online networks have facilitated interaction, co-ordination and occupation (Chan and Li 2010). The multiplicity and quality of interactions within *social networks* and knowledge networks have improved customer efficacy, in turn enabling knowledge management and social media interactivity (Valck et al. 2009). These attributes have also created value for *electronic commerce*, connecting sellers across markets, thus enabling increased revenue (Stephen and Toubia 2010).

#### 3.2.2 Processes of value co-creation

Authentication in *social networks* has facilitated personalized interaction and networking. The sociability of online networks has also added value in terms of encouraging the motivation to network. Therefore, the popularity of knowledge networks has facilitated interaction and learning resulting in the creation of quality standards for industrial management. The design principles of attributes of *mobile networks*, *social networks* and the Internet, which facilitate the better organization of information, are convenient and easy to use, as well as having improved interaction, while the facilitation of geography, cultures and themes has enhanced sociability.



**Figure 5.** Nodes clustered by word similarity in NVivo 10 for technology facilitators of value co-creation identified from the literature review

In Figure 5, the left portion shows the *processes* associated with *value co-creation* and are grouped as *timestamp*, *networking* and *interaction*. Networking, according to Figure 5, is associated with the dynamism of online interactivity and the extent of network usage. The participation of people in *social networks*, *mobile networks* and the *Internet* is what defines and enables the effectiveness of using networks. These also consist of sub-processes. In the text analysis of the systematic literature review in NVivo 10, which identifies the *processes* associated with *value co-creation*, it can be observed that *networked interactions* and *networked learning* are significant attributes of *strong networks*. *Strong networks* evolve over a timeline. This adds to the interactivity of *cross networks*. The *information quality* thus improves over a timeline of interactivity across networks. *Weak networks* also emerge during the interactivity.

### Authentication

Personalization, authentication and the multiplicity of *social network* interactions, facilitated by the motivation and reciprocity to create value, have provided for the classification and management of knowledge (Antin and Earp 2010; Shen et al. 2010; Chan and Li 2010; Hsu and Lin 2008). Interaction in *social networks* and the cultural, geographic and thematic attributes have added to the

economics, information quality and management of knowledge (Harwood and Gary 2010; Hsu and Lin 2008; Valck et al. 2009; Antin and Earp 2010). Interaction and customer efficacy across *social networks* and *electronic commerce* have qualitatively improved customer experience by enabling authenticity, management of knowledge and the content for making decisions (Valck et al. 2009; Chan and Li 2010; Stephen and Toubia 2010).

Facilitating design attributes of interaction within *social networks*, which organize information are convenient and easy to use within knowledge *networks*, support product and service knowledge management that enhances customer efficacy (Valck et al. 2009; Hung and Li 2007). Innovations in social technologies and programming have created value by enabling geography, cultures, safeguards and activism (Messinger et al. 2009). This multiplicity of interaction across *social networks* and knowledge networks has facilitated customer efficacy, knowledge management and innovations in communication (Valck et al. 2009).

The multiplicity of knowledge, customer facilitation and sociability experienced across networks has enabled application programming in social technologies for the Internet (Wagner and Majchrzak 2007). Principles of design for IT, *social networks* and the Internet, along with the facilitation of authentication in *electronic commerce*, have significantly enhanced interactivity required for creativity and innovation (Köhler et al. 2011; Suh et al. 2011).

For example, in banks, the provision by bank employees of IT services to existing and new customers in order to complete routines has enhanced customer efficacy, improved firm performance and resulted in better information management (Köhler et al. 2011). Knowledge networks, *social networks* and innovations in IT have improved creativity, learning and system designs resulting in better business management (Gray et al. 2011; Hsu and Lin 2008; Antin and Earp 2010; Au et al. 2009). The popularity of *social networks* and knowledge networks has led to improved customer efficacy across geographies (Kim et al. 2008; Valck et al. 2009; Rafaeli and Noy 2002). While this has seen an increase in interaction across *electronic commerce*, the news media, along with customers, has added value by creating awareness and sharing information regarding products and services (Rafaeli and Noy 2002; Valck et al. 2009; Kerrigan and Graham 2010).

### Sociability

Incentives, equity and sociability have enabled enthusiasm and knowledge management regarding products and services across portals in networks (Cheung et al. 2010; Hsu and Lin 2008). Multidimensionality, efficacy and sociability in the

management of knowledge across portals of networks have encouraged innovations in IT, *social networks* and the Internet (Cova and White 2010; Messinger et al. 2009; Wagner and Majchrzak 2007). Innovation projects and broadcast searches by businesses have facilitated crowdsourced knowledge management on the Internet, which has attracted potential problem-solvers with domain knowledge expertise and intrinsic motivation for firms' innovation needs (Frey et al. 2011), as well as helped to examine the leadership characteristics of participants within social computing (Sutanto et al. 2011).

In *social networks*, such as personal blogs, publicizing professions and vocations, documenting life and seeking knowledge, along with a personalized experience, signify market attributes, efficacy and subjectivity. Networked complementarity and the popularity of blogs, as well as writer credibility and authorship, have improved customer efficacy, para-social rapport and knowledge management. This has helped businesses to create and improve products and services successfully (Shen et al. 2010).

#### Intellectual motivation

Authenticity and themes of interaction in *social networks* encourage knowledge management and motivation during reciprocity (Antin and Earp 2010; Shen et al. 2010; Chan and Li 2010; Hsu and Lin 2008). The *intellectual motivation* of customers towards developing and managing knowledge is identified as a direct result of *authentication*, *networking* and *interactions* across *social networks*, *mobile networks* and the *Internet*. This is demonstrated in the figure in Appendix A, which associates the variables, technology facilitators and measures of *value co-creation*. Customer interaction in product and service networks are associated with *value co-creation* and production (i.e., product customization and product co-evolution), information quality and customer proficiency (Harwood and Gary 2010; Hsu and Lin 2008; Valck et al. 2009; Antin and Earp 2010). Business practices thus benefit from knowledge management across interactive knowledge networks (e.g., wikis) that demonstrate greater custodianship (Wagner and Majchrzak 2007) and virtual organizational learning in collaborative IT projects and information sharing across the Internet (Au et al. 2009). Knowledge networks, *social networks* and collaborations in projects have improved innovativeness, product and design management, resulting in new products and services (Gray et al. 2011; Hsu and Lin 2008; Antin and Earp 2010; Au et al. 2009).

## Networking

Networked connectivity, product or service knowledge networks and experience of virtual sociability across the globe cumulatively add to economic and social value within networks. Further, the resourcefulness and sociability of networks require effectiveness in maintenance with regard to IT, *social networks* and the Internet and stability in interaction for commerce (Chan and Li 2010). Collaboration across portals in networks, which focus on knowledge management (e.g., wikis), has demonstrated that customers create and add value that is intellectual (Wagner and Majchrzak 2007). Further, portals in networks, which are explorative in co-creating value, improve when IT, *social networks* and the Internet across Web 2.0 facilitate knowledge management (Harwood and Gary 2010; Nambisan and Watt 2011; Oh and Teo 2010; Stephen and Toubia 2010).

Design principles for IT, *social networks* and the Internet enhance customer efficacy in the case of knowledge management regarding products and services that facilitate economies, markets and norms (Lechner and Hummel 2002). Demonstrating virtual problem-solving, experiences of virtual sociability in *social networks* and networked knowledge add value to knowledge seeking and participant learning. Further, the compatibility of IT, *social networks* and the Internet for businesses improves both *value co-creation* and appropriation. Collaborations and projects in knowledge management help to realize the objectives of both custodianship and interaction (Wagner and Majchrzak 2007), along with learning opportunities supported by IT, *social networks* and the Internet (Au et al. 2009). Collaborative *social networks* facilitate product and service knowledge management in the creation and aggregation of knowledge (Ransbotham and Kane 2011).

Studies have found that connecting sellers in marketplaces within networks increases the revenue levels generated and improves the effectiveness of *electronic commerce* (Stephen and Toubia 2010). Customers feel empowered with IT, *social networks* and the Internet, as well as the sociability and quality of interaction within networks (Messinger et al. 2009). The above-mentioned factors also encourage motivation for knowledge management, learning and facilitating co-shopping in *social networks* (Chan and Li 2010). Multiple product and service evaluations during event-based purchases in *electronic commerce* and value definitions add to product and service knowledge management (Zhao et al. 2007). Additionally, the sociability and resilience across *social networks* enhance knowledge and facilitate value, based on geography, cultures and themes (Messinger et al. 2009), and improve customer efficacy (Kim et al. 2008; Valck et al. 2009; Rafaeli and Noy 2002).



The credibility of *social networks* depends on customer cognition of network value, while social capital is generated when attributes of sociability required for organizing information, and its convenience and ease of use, are incorporated into IT, *social networks* and the Internet (Hung and Li 2007). Interaction in *social networks* promotes membership and provides businesses with an estimate of the investments required to market products and services in popular *social networks* (Trusov et al. 2009). Integrating *social networks* with *electronic commerce* has generated additional revenue from purchases and customer referrals, which also add to the creativity and innovativeness required for product and service knowledge management (Lechner and Hummel 2002).

In collaborative IT innovation projects, participant retention in networks does not necessarily improve collaboration. However, moderating interactions across networks impacts project success. Effective value creation depends upon membership stability in such projects. Personalized themes on the Internet facilitate authentication and motivation, which enhance collaboration and interaction across networks required for knowledge management (Ransbotham and Kane 2011). *Social networks* and services supporting customers improve the effectiveness and efficacy of interactions for creativity and innovation (Füller et al. 2009). Such services on the Internet, which are configurable and secure, facilitate effective interactions and encourage innovation across geographies, cultures and themes (Messinger et al. 2009).

In this regard, it becomes necessary to facilitate navigability and resourcefulness within *social networks* in order to improve the interaction for customers (Chan and Li 2010). Further, in terms of privacy within *social networks*, the acceptability of services for collaboratively managing privacy depends on the usefulness, ease of use and convenience of the system balanced against its affordability (Squicciarini et al. 2011). The creation of knowledge from services facilitated across networks can vary, based on the requirements of markets. Businesses and establishments with infrastructures, which manage internal and external knowledge regarding markets, improve performance by evaluating, reforming and configuring their services with markets (Shang et al. 2011).

## Interaction

The ability to add geographies, cultures and themes to *social networks*, along with their offer of sociability and the ability to personalize and authenticate profiles, encourages simultaneous knowledge management and the reciprocity and motivation required for innovation (Antin and Earp 2010; Shen et al. 2010; Chan and Li 2010; Hsu and Lin 2008). Interactivity enabled by social technologies and

*social networks* has created economic value and enabled information quality and customer efficacy (Harwood and Gary 2010; Hsu and Lin 2008; Valck et al. 2009; Antin and Earp 2010). Attributes such as incentives, equity and sociability in *social networks* have facilitated enthusiasm, marketing of products and services, and knowledge management (Cheung et al. 2010; Hsu and Lin 2008). The usefulness of the Internet and its resourcefulness, as well as the popularity of product and service networks, has led to enthusiasm, interaction and creativity, in turn encouraging design improvements in IT, *social networks* and the Internet (Kohler et al. 2011; Hsu and Lin 2008; Nambisan and Watt 2011).

Internet-based co-creation projects for new products, which call for a significant amount of participant creativity, proficiency and product knowledge, also require IT that enables efficacy, offers IT support and virtual sociability, and provides ease of control for completing complicated innovation tasks (Füller et al. 2009). Resourcefulness, sociability and ability to personalize *social networks*, leading to reciprocity, commitment and referral shopping, enhance customer interaction to the level required for product and service knowledge management (Chan and Li 2010). The structuring of communications in knowledge networks improves interaction and customer efficacy during collaborations for the purpose of knowledge management (Wagner and Majchrzak 2007). Further, networked connectivity, product and service knowledge networks and experienced virtual sociability across the globe result in networked value creation. Integration of popular *social networks* serving as a reference for customers has improved their efficacy in creative knowledge management and allowed for interaction across geographies (Valck et al. 2009).

Increased interaction in *social networks* adds value to marketing (Trusov et al. 2009) and provides businesses with an estimate of the investments required for marketing products and services. Further, businesses have improved network interactions by enabling communication, supported by chats, emails, references and queries that enable productivity, learning and creativity (Song and Zinkhan 2008). Research demonstrates that, in collaborative knowledge networks, the creation and aggregation of knowledge are distinct activities and that stability in interaction is required during the aggregation of knowledge (Ransbotham and Kane 2011).

#### (i) Information quality

Design attributes of IT, *social networks* and the Internet, which organize information and provide convenience and ease of use, add value to libraries and improve the effectiveness of interaction during product and service knowledge

management (Valck et al. 2009; Hung and Li 2007). This improves the effectiveness in facilitating customer efficacy, motivation and provision of quality information. In *electronic commerce* that involves both physical and virtual worlds, the quality and management of information and the delivery of purchases improve convenience for customers (Oh and Teo 2010). Research also demonstrates that, for businesses, employee proficiency and learning across electronic libraries and knowledge repositories, enabled by referencing, improves creativity and innovation within firms (Gray et al. 2011; Frey et al. 2011). For example, netbank service professionals have supported new customer adjustment with complicated Internet bank routines, enabled by the delivery of socially and functionally relevant content (Köhler et al. 2011). Knowledge networks, *social networks* and collaborative projects facilitating innovations in IT and the Internet have encouraged and improved innovation, product knowledge management and product design improvements (Gray et al. 2011; Hsu and Lin 2008; Antin and Earp 2010; Au et al. 2009).

#### (ii) Interaction and learning

The integration of news media organizations and *social networks* enables *value co-creation* during interaction between customers and establishments (Kerrigan and Graham 2010). News media organizations have generated revenue from on-demand advertising requirements of region-specific *social networks* and populations. The interaction, motivation and customer sociability in *social networks* improve the effectiveness of collaborative knowledge management and facilitate reciprocity and learning (Antin and Earp 2010; Shen et al. 2010; Chan and Li 2010; Hsu and Lin 2008). Interactive and collaborative product and service knowledge management within *social networks* generates value when customers become facilitators of innovation (Harwood and Gary 2010; Hsu and Lin 2008; Valck et al. 2009). In the case of celebrity *social networks*, incentives, equity, endorsements and sociability have allowed for an enthusiastic, interactive and personalized experience for the public (Cheung et al. 2010; Hsu and Lin 2008). As such, the usefulness, popularity and service convenience of IT have encouraged creativity and design improvements on the Internet (Kohler et al. 2011; Hsu and Lin 2008; Nambisan and Watt 2011). In turn, integrating participants into projects facilitating IT, *social networks* and the Internet for product creation requires effectiveness in services, co-ordination and knowledge management (Füller et al. 2009; Messinger et al. 2009; Wagner and Majchrzak 2007). For businesses, attributes such as net neutrality, sociability and the management of product and service knowledge across geographies of *social networks* facilitate reciprocity and ease of shopping during referrals (Chan and Li 2010). As a consequence, net

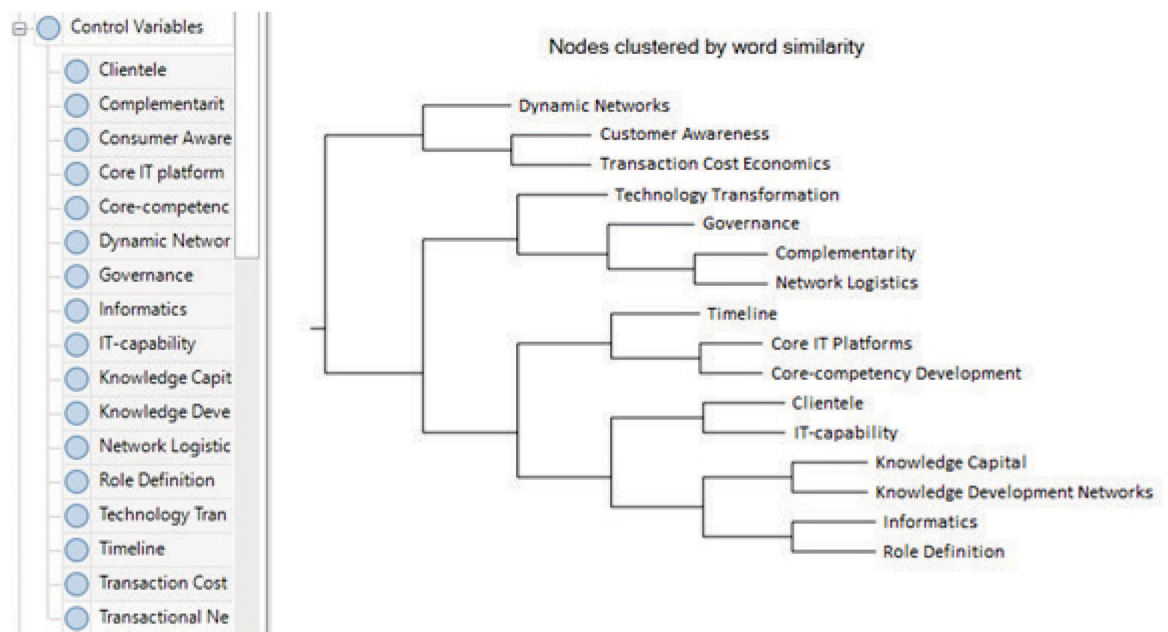
neutrality and the integration of *social networks* with *electronic commerce* enhance customer efficacy for ease of doing business (Valck et al. 2009; Chan and Li 2010; Stephen and Toubia 2010).

Popular *electronic commerce* networks serve as reference groups, while the availability of instant texting and referrals across *mobile networks* improves customer decision-making for purchases. *Social networks* and knowledge networks that facilitate customer efficacy also enable knowledge management and improved communication and interactions (Rafaeli and Noy 2002; Valck et al. 2009). These networks further generate value when the vigilance, awareness and resourcefulness of customers support ethical conduct in *electronic commerce* (Chan and Li 2010). This is seen in *social networks* when customer efficacy improves collaborative product and service knowledge creation for management (Cheung et al. 2013). Customers enhance their efficacy during their quest for learning. This is evident from the customer proficiency and efficacy in decision-making during purchases and evaluations (Schlosser et al. 2006; Füller et al. 2009; Huang et al. 2007). In *social networks* such as blogs, research shows that authors' motivation to document knowledge facilitates information management, which leads to customer efficacy (Huang et al. 2007). Business communication enabled by IT, *social networks* and the Internet allows managers to co-ordinate rhetorical communication with personnel and customers when sourcing the knowledge required for innovations.

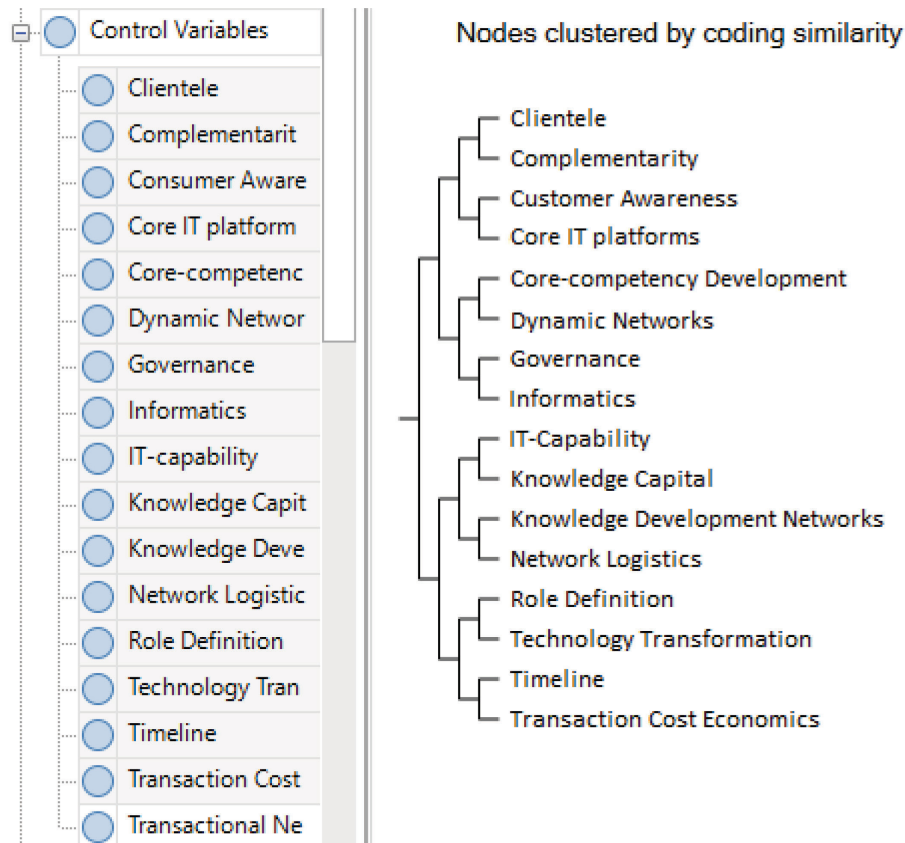
### 3.2.3 Controls of value co-creation

The literature selected for the study centres on the various controls associated with *value co-creation*. A comprehensive study and integration were required to identify the controls and consolidate them. This was performed using NVivo 10 qualitative software. Complementarity, advocacy and proficiency are controls that facilitate knowledge management across networks. Due to increasing membership in networks, establishing governance becomes necessary for managing the dynamics of interaction and the costs of transaction. During the systematic literature review on *value co-creation*, *control variables* were identified from the various published papers and then grouped into a listing of the most significant ones using NVivo 10. In Figure 6, a text analysis facilitated by NVivo 10 shows how these control variables were grouped by NVivo, based on the similarity of words used in the content of the systematic literature review and also the similarity in the phrasing of discussions by the author within the systematic literature review. The figure shows a significant difference in the comprehension of control variables during the analysis in NVivo 10 when considering the use of similar words and the

similarity in discussions across the content of the systematic literature review. *Dynamic networks* are facilitated by attributes such as *customer awareness* and *transaction cost economics*. In terms of *technology transformation*, the *complementarity* of *customer interactions* and *network logistics* of *network interactivity* are associated with better *governance*. *Core IT platforms* and *core competency management* for industry evolve over a *timeline*. *Information management*, *authentication* and *knowledge management*, along with *IT infrastructures* and *clientele* during network interactivity, are significant control variables.



**Figure 6.** Cluster analysis of control variables for value co-creators identified using NVivo 10



**Figure 7.** Cluster analysis of control variables for value co-creators identified using NVivo 10 showing nodes clustered by coding similarity

The above illustration Figure 7 is closely associated with Figure 6 shows how the *control variables* are grouped, based on the similarity in the analysis and discussions associated with them. The *control variables* displayed in Figure 6 and 7 were grouped and system generated by NVivo 10 in terms of both word similarity in the text and content used in the systematic literature review, and similarity in the phrasing of the content and discussions in the systematic literature review regarding the variables, technology facilitators and measures of *value co-creation*. An industry's *clientele* and *complementarity* of interactivity are closely associated. *Customer awareness* is prominent in *core IT platforms*, popular *social networks* and ICT. *Dynamic networks* may be associated with *core competency management*. These are closely associated with attributes such as *governance* and *information management* in the IT industry. The IT industry depends on the *IT capabilities* of businesses and the *knowledge capital* associated with them. From this perspective, *knowledge management networks* and *network logistics* complement these attributes. The *authentication* needs of the customer and *technology transformation* in ICT, along with the *timeline* of managing *transaction cost economics* incurred, are also significant. Thus, informatics,

infrastructures and facilitators of knowledge across *IT*, *social networks* and the Internet enhance creativity and innovation during interaction. Knowledge management and logistics in the facilitation of networks have improved products and services for *electronic commerce*. Savings in time, transaction costs and networks associated with *electronic commerce* have brought about a transformation in the way in which businesses create and improve products and services for markets.

### Complementarity, advocacy and proficiency

Complementarities of networks (i.e., provision of resources), the popularization of *social networks*, and the authorship and credibility of writers improve efficacy, interaction and management of knowledge across networks (Füller et al. 2009; Colliander and Dahlén 2011; Shen et al. 2010). In the case of *social networks*, it is demonstrated that publicity effectiveness and perceived content credibility regarding products and services have qualitatively improved knowledge management among networked customers (Colliander and Dahlén 2011). Technically, in infrastructures facilitating Web 2.0, *value co-creation* requires three attributes for integration: (1) interactivity for value addition, facilitated by IT, *social networks* and the Internet (Rai et al. 2012); (2) resources for effectiveness across IT (Sarker et al. 2012); and (3) infrastructure for telecommunications.

### Interaction, dynamism and governance

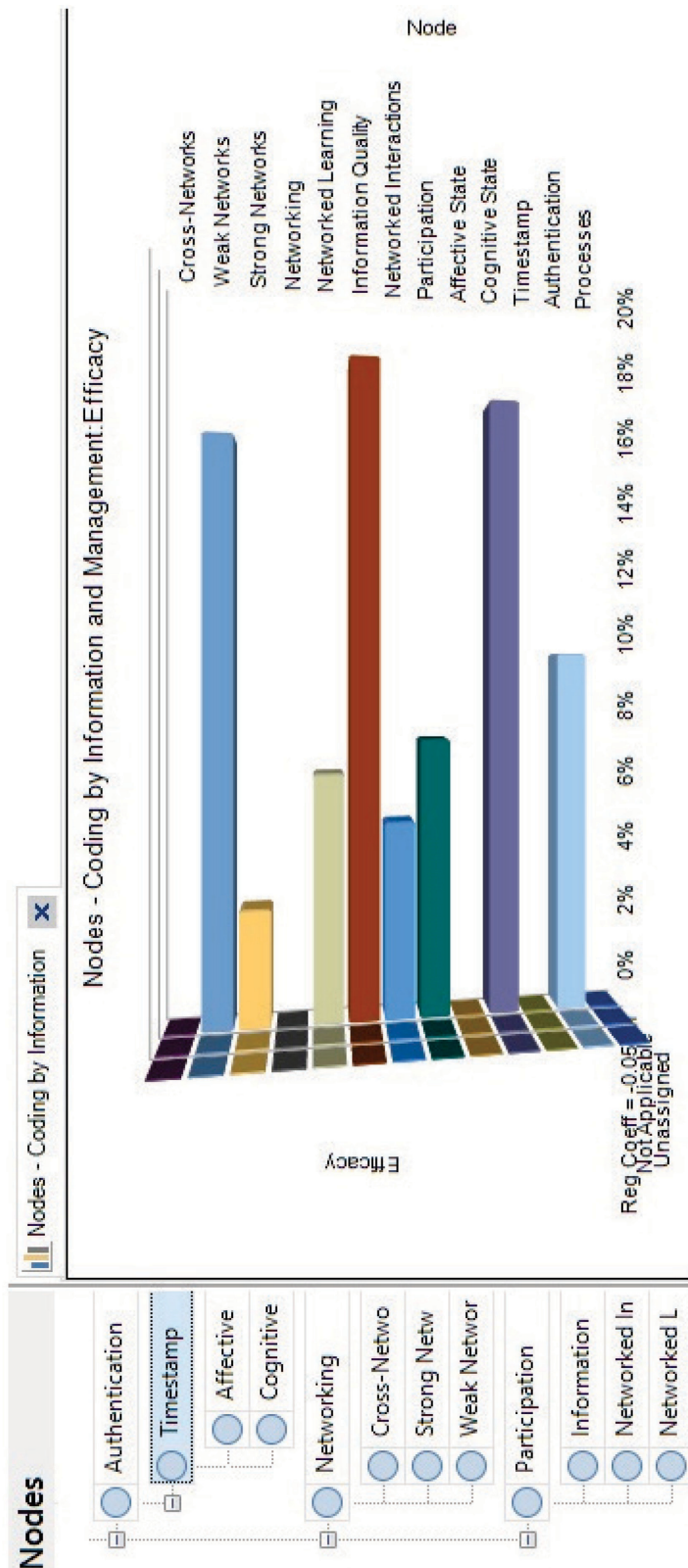
Interaction and dynamism in networks have resulted in the need for governance. For the management of businesses, the innovation centre (i.e., infrastructure for creativity) is essential for *value co-creation* in terms of economizing the time required to create and improve products and services in order to meet the supply and demand needs of customers (Prahalad and Ramaswamy 2003). In terms of *value co-creation* within *social networks*, businesses have improved the interaction between customers and *electronic commerce* by enabling technologies in communication, such as chats, emails, links and directories (Song and Zinkhan 2008). Governance provides control for the collaborative use of IT, *social networks* and the Internet, as well as allowing for the capabilities and measures associated with the objective of optimizing transaction costs for customers (i.e., people, businesses and governments) during *value co-creation* (Grover and Kohli 2012).

### Informatics, capabilities and knowledge management

The management of information, proficiency and knowledge facilitate effectiveness and quality in interactions. Research demonstrates that employees working with service firms improve the level of proficiency and resourcefulness required for creativity and innovation using informatics and referencing acquired from libraries of knowledge (Gray et al. 2011; Frey et al. 2011). For retail businesses involved in *electronic commerce*, which requires the integration of physical and virtual worlds, the competitiveness of markets, the quality and management of information, and the completion of purchases facilitate value and service convenience for the customer (Oh and Teo 2010). This requires businesses to mobilize resources, infrastructure and networks (Prahalad and Ramaswamy 2003).

Complementing capabilities in IT, *social networks* and the Internet for businesses are infrastructures that improve customer efficacy during interaction. This facilitates learning and product and service knowledge management, thus providing firms with the measures of economies, markets and norms.





**Figure 8.** NVivo 10 qualitative analysis: enabling efficacy from information management by facilitating process variables

The above figure illustrates how the published literature on *value co-creation* have discussed and associated the *processes* of *value co-creation* with attributes such as *customer efficacy*. *Customer efficacy* is considered more in terms of network attributes such as *weak and strong networks*. The *information quality* of the discussion and content in networks, along with *networked learning* and interactions, is equally significant in facilitating *customer efficacy*. The *ease of use* and *service convenience* of ICT, along with the ability to follow *timelines of interactivity*, also add to *customer efficacy*.

### Knowledge management networks and network logistics

Networks of knowledge and logistics have added value to *electronic commerce* during interactive knowledge management. *Social networks* and *service networks* have enhanced knowledge management in collaborative wikis and interactive networks by enabling temporal co-ordination among users. This has improved product and service knowledge across networks during the creation and aggregation of knowledge (Ransbotham and Kane 2011). *Electronic commerce* has also created awareness among local businesses, which recognize the need for substantial investments in infrastructure and logistics to secure their business.

This has led to small and medium-sized businesses improving their logistics know-how for securing their businesses. In logistics, controls are moderators in the *value co-creation* for business-to-business collaborations; namely, they are: (1) the size of business of the buyer; (2) buyer investment in logistics; (3) supplier dependencies; (4) IT maintenance requirements ; (5) duration of collaborations; (6) incidence of problems; (7) satisfaction of the buyer; (8) use of IT, *social networks* and the Internet; and (9) portfolio of the buyer (Rai et al. 2012). Incentives and efforts to manage product and service knowledge have led to better transaction cost economics.

### Personalizing and transformation

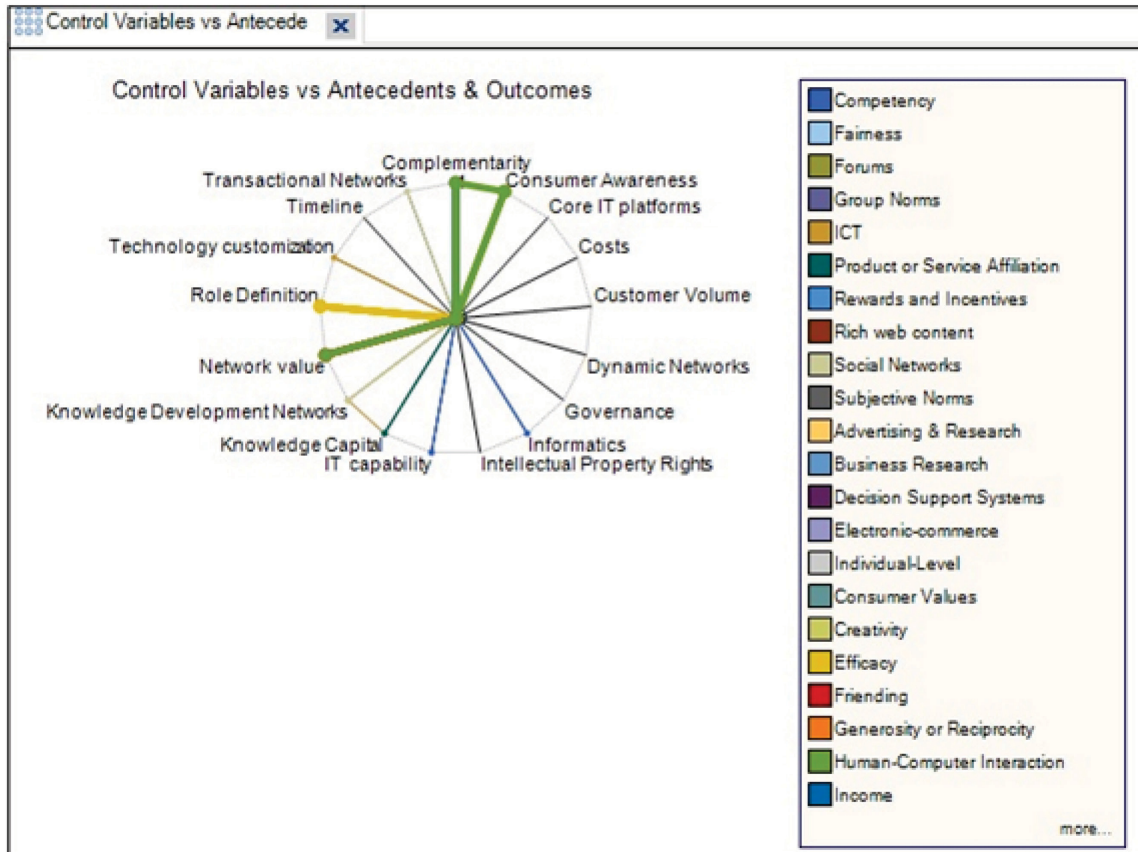
The ability of customers to personalize profiles in *social networks* has made interaction both enjoyable and sociable. On the Internet, authentication is seen as a control, as it is considered as a moderator of interaction within *social networks* and a facilitator for customers to create their own profiles (Dholakia et al. 2004). Interaction across *social networks* is determined by subjectivity and the ability of customers to personalize their experience. In professional *social networks*, the ability of customers to personalize their profiles has enabled intellectuals to

enhance their credentials and visibility to a bigger and more significant audience (Cheung and Lee 2010).

#### Savings in time, transaction costs and transaction networks

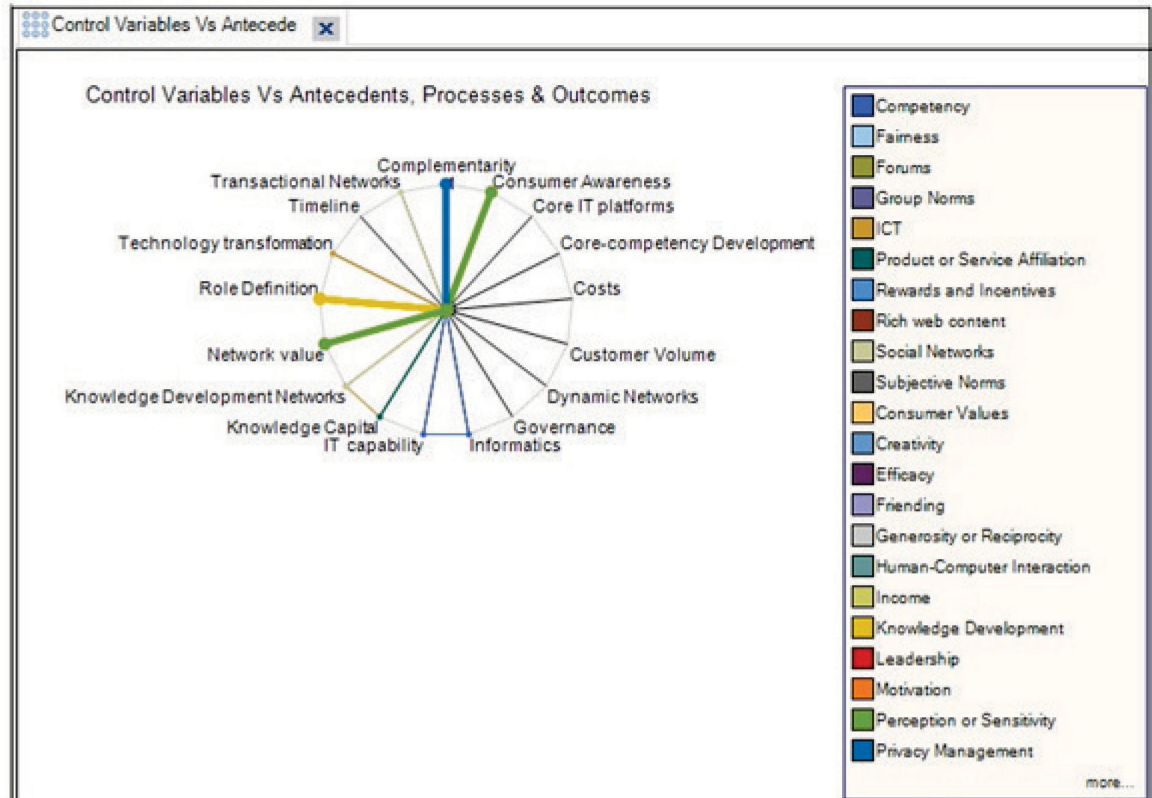
Transactions and service convenience for customers in *electronic commerce* have become ecological, inexpensive and time-friendly. Integrating *electronic commerce* with *social networks* faces the challenges in growing and collaborating with other businesses in a competitive market and requires proficiency on the part of software programmers to manage the infrastructure and portfolios required for expansion. Thus, developing portfolios, services and technologies, along with marketing and advertising, becomes necessary for businesses to collaborate, legitimize, lobby for and manage their resources (Gnyawali et al. 2013).

In the case of netbanking, professionals have facilitated service convenience for customers by providing relevant content, leading to profitability for banks and better information management for customers (Köhler et al. 2011). Further, by incorporating international standards in business and telecommunications, financial transactions and service convenience have significantly improved quality of life and mobility for the customer. Integrating financial services with *electronic commerce* has facilitated a limitless infrastructure, connecting sellers across geographies who now generate additional profits and facilitate other businesses to thrive with increased visibility and accessibility to customers browsing the Internet (Stephen and Toubia 2010), without the constraints and restrictions associated with the locations or centrality of shops.



**Figure 9.** NVivo 10 qualitative analysis: control versus variables and measures of value co-creators

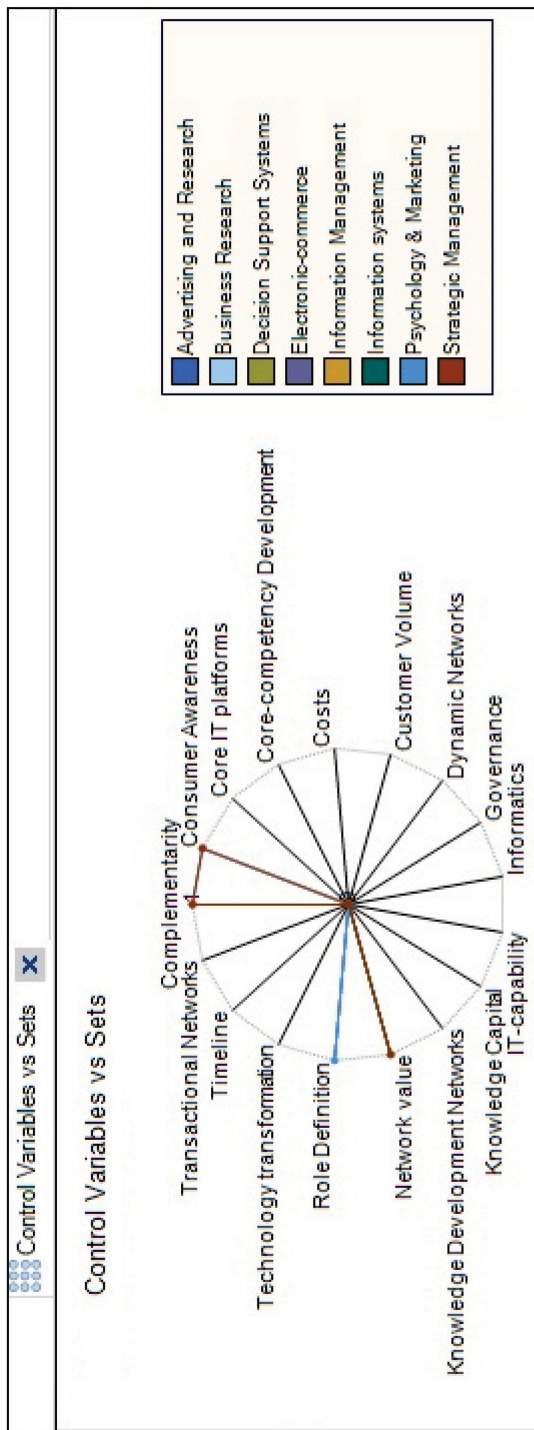
The above figure presents an analysis of the systematic literature review in NVivo 10, associating the controls, variables and performance measures of value co-creation. Further, it illustrates the intensity of association between them. In comparison to Figure 6 and Figure 7, Figure 9 clearly visualizes the most significant controls of *value co-creation* discussed in the content of the systematic literature review. *Complementarity* and *customer awareness*, along with *network value*, are associated with significant *human-computer interactions*. *Role definition* or *authentication* of customer interactions on the Internet is a *control variable* that complements *customer efficacy*. Similarly, *technology customization* is facilitated by the ability to do so within ICT. Other *control variables*, such as *knowledge capital*, *IT capability*, *informatics* and *timeline* of interactivity, are also significant for *value co-creation*.



**Figure 10.** NVivo 10 qualitative analysis: control versus variables, technology facilitators and measures of value co-creators

Figure 10 illustrates how the analysis during the systematic literature review brought together the controls, variables, processes and measures of value co-creation. *Customer proficiency* on the Internet is closely associated with the *complementarity* of interactions in networks. *Customer awareness* and *network value* are associated with measures such as *perception* and *sensitivity*. The *role definition* and *authentication* needs of customers are associated with processes such as *knowledge management*. ICT complement *social networks*, which in turn complement *knowledge management networks*, *transactional networks* and *knowledge capital*.

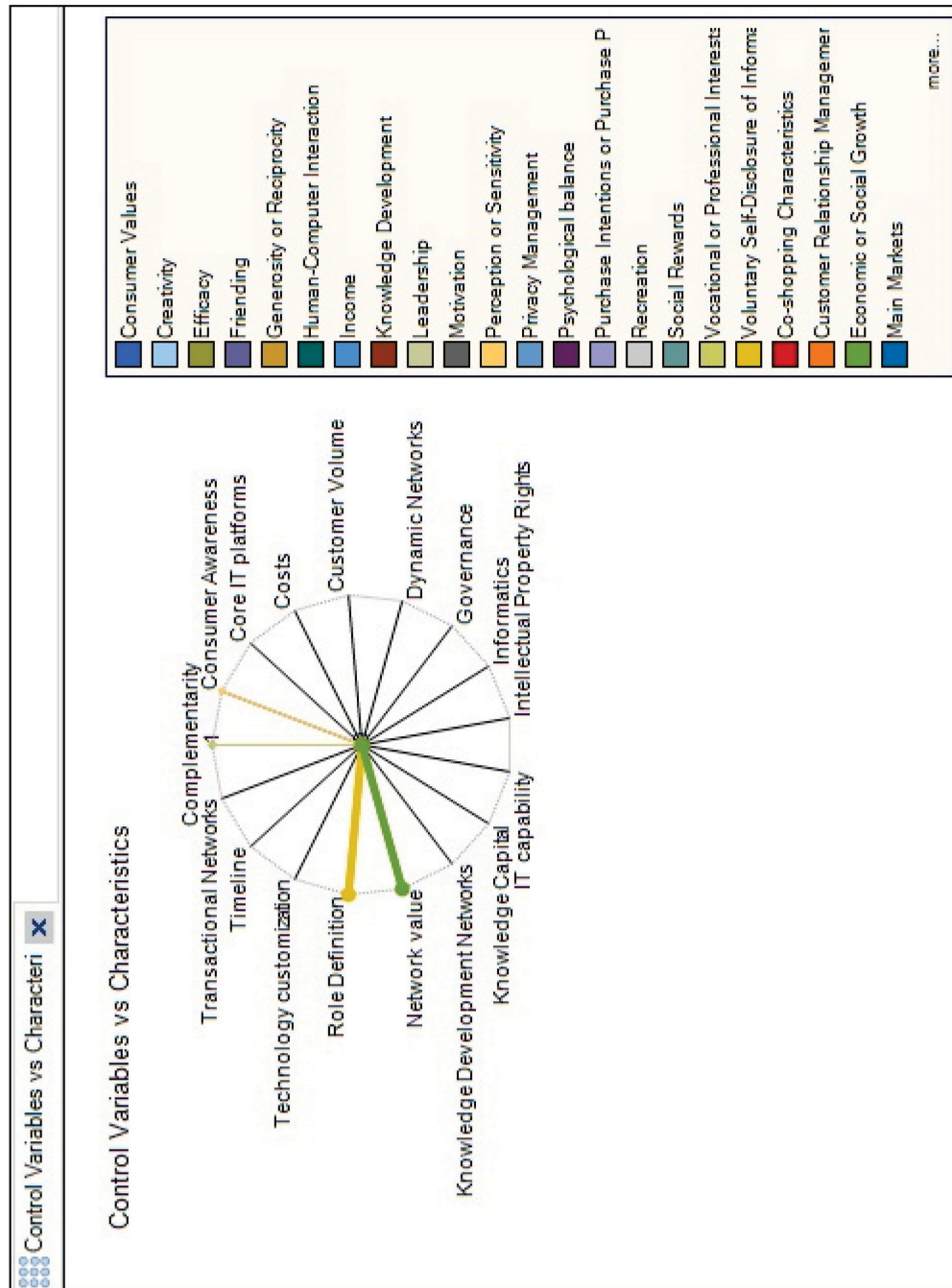
Other identified control variables of significance are *timeline* of interactivity, *IT capability*, *informatics* and *technology transformation*.



**Figure 11.** NVivo 10 qualitative analysis: control variables versus management disciplines

Figure 11 identifies the different *control variables*, which are taken into consideration across various management research disciplines, associated with *information systems, information management, marketing and strategic*

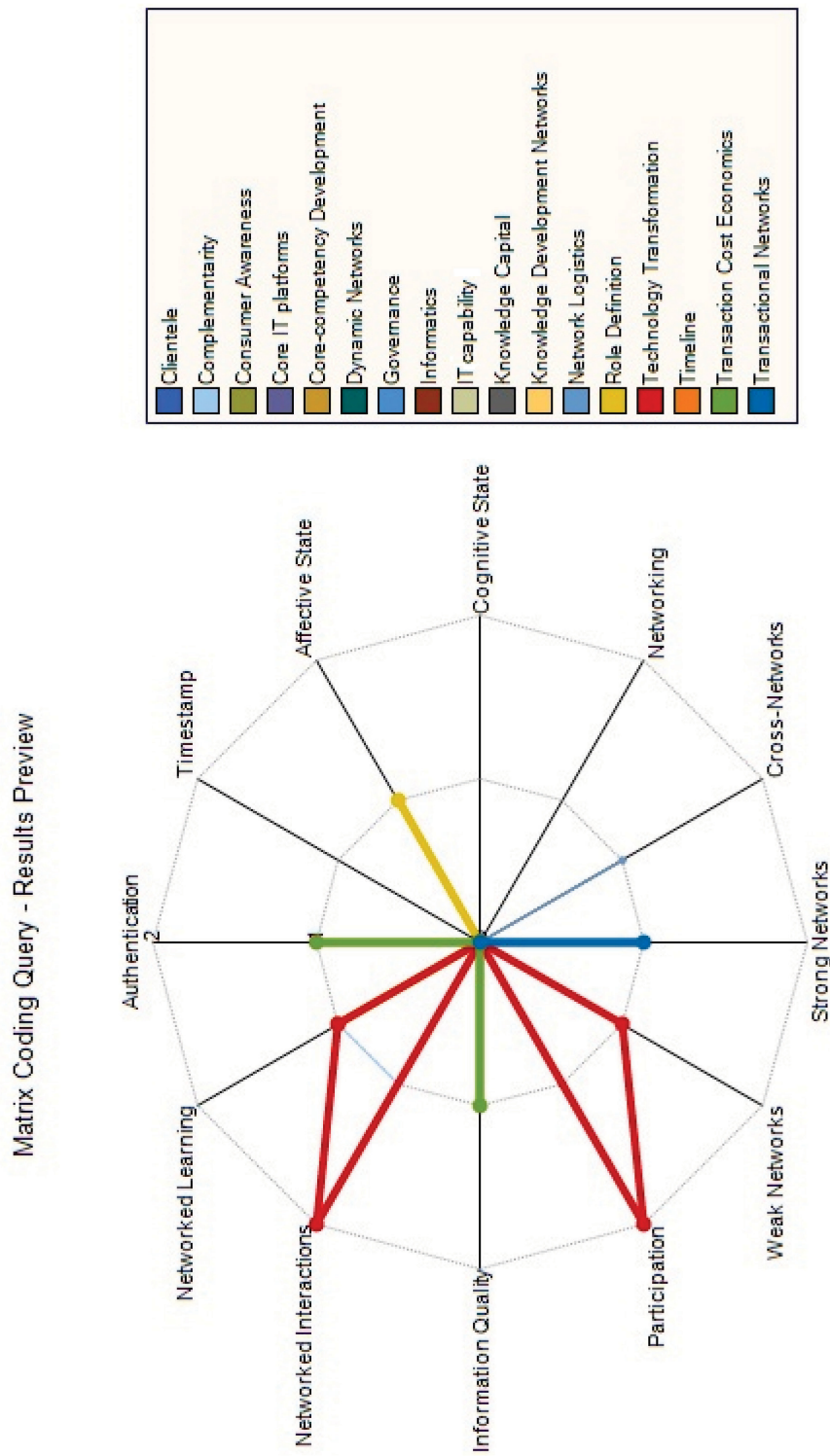
management. The significant *control variables* discussed across these management disciplines are *complementarity*, *customer awareness*, *network value* and *role definition*.



**Figure 12.** NVivo 10 qualitative analysis: control variables versus characteristics

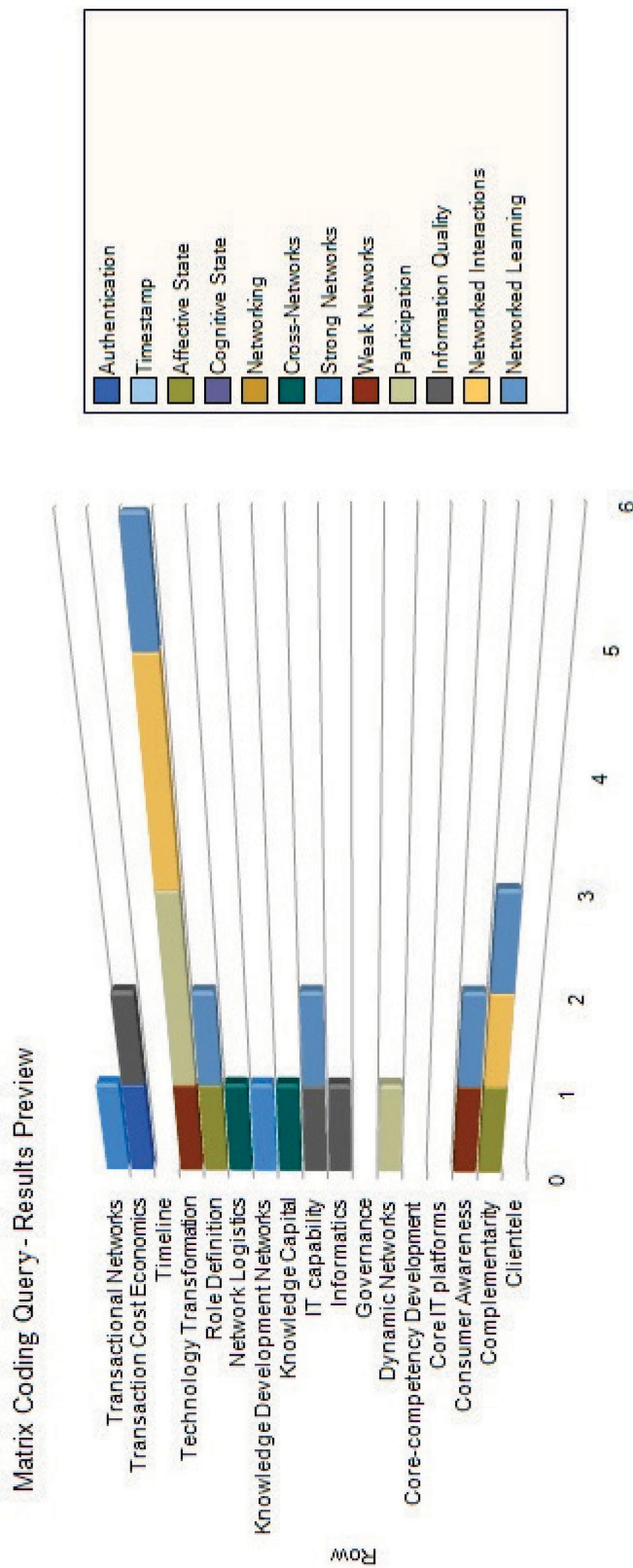
Figure 12 demonstrates how *control variables* are associated with the measures of *value co-creation* that are relevant to customers and establishments. *Network value* is associated with the *economic and social growth* of industry. The *role definition* and provision for *authentication* of customers are *control variables* associated with customer intentions to document and archive content from the Internet. *Customer awareness* as a *control variable* on the Internet is associated with measures such as *perception and sensitivity*. The facilitation of *vocations and professions* as a measure of *value co-creation* is associated with the complementarity of networks.





**Figure 13.** NVivo 10 qualitative analysis: interactivity between control variables and technology facilitators of value co-creation

Figure 13 links the processes or technology facilitators of value co-creation with the control variables of value co-creation on the Internet. The provision for the authentication of customers and the information quality of content on the Internet are associated with the benefits of controls, such as visibility of transaction cost economics. Customer retention in networks is facilitated by the capacity for authentication during the use of ICT. Networked interactions and networked learning are processes of value co-creation that can be controlled by technology transformation. Strong networks are associated with controls such as better transactional networks.



**Figure 14.** NVivo 10 qualitative analysis: histogram of interactivity between control variables and technology facilitators of value co-creation

Figure 14 shows a histogram that again associates the *control variables* of *value co-creation* with the technology facilitators or processes of *value co-creation*. Controls such as *transactional networks* and *knowledge management networks* are associated with *strong networks*. *Transaction cost economics* provide controls that are facilitated by customers' ability to *authenticate* on the Internet. The ability to *authenticate* also complements the *information quality* of content on the Internet. *Technology transformation* is a control enabled by the needs of *weak networks*, *interactions* and *networked learning*. *Role definition* and *authentication* on the Internet are controls enabled for *customer retention* and *networked learning* purposes. In *electronic commerce*, this phenomenon facilitates *networked logistics* and *knowledge capital* associated with *cross networks*. Controls in *IT capability* and *informatics* or *information management* are facilitated by *information quality*. *Dynamic networks* are required and enabled by the capacity for *networked interactions*. *Customer awareness* on the Internet is discussed and associated with *weak networks* and *networked learning*. *Complementarity* on the Internet is enabled by *customer retention*, *networked interactions* and *networked learning*.

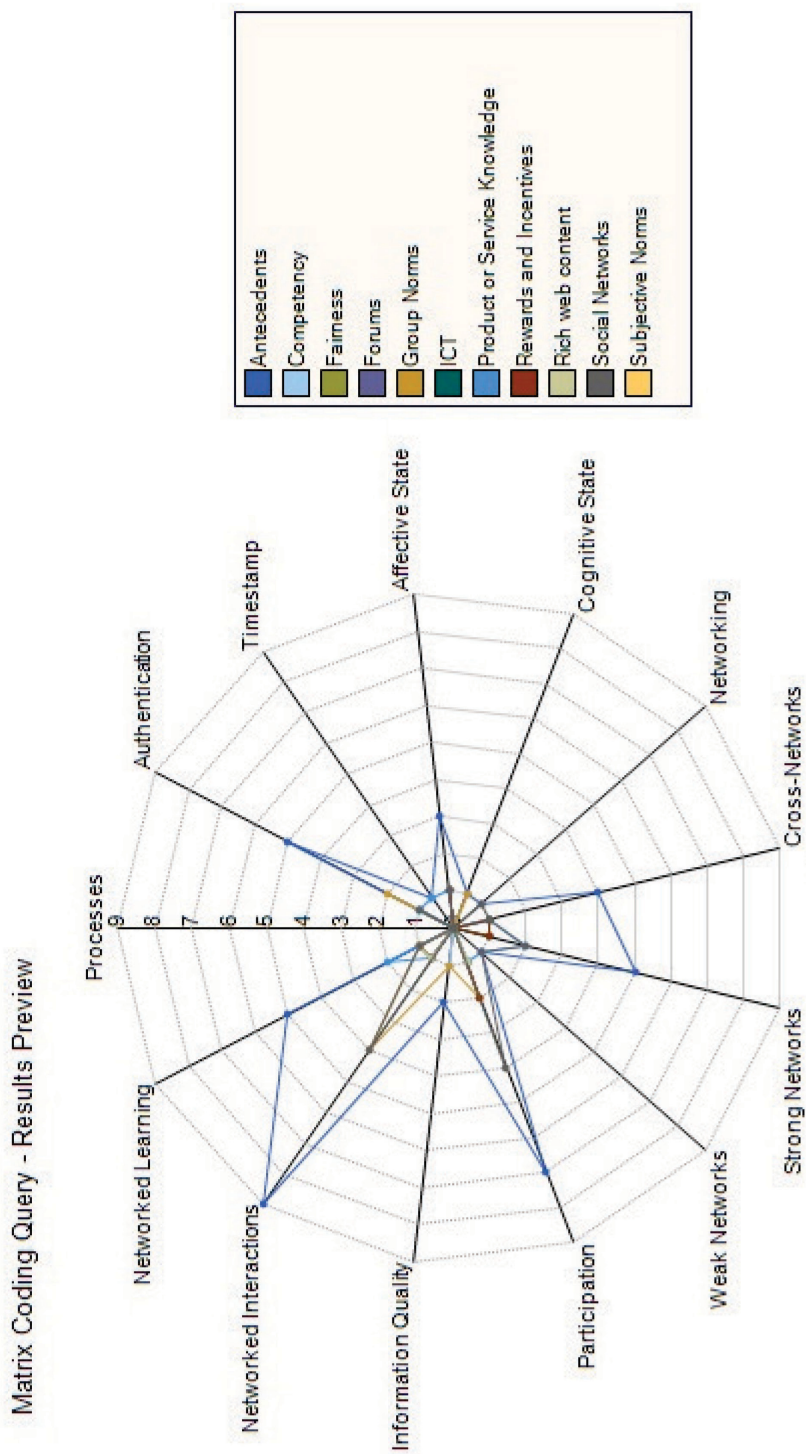
#### 3.2.4 Association of variables and technology facilitators

Mapping the variables, technology facilitators and measures of *value co-creation* was utilized to discuss their associations. The systematic literature review, along with further study in using the NVivo 10 qualitative software, was completed for the purposes of reorganizing and integrating the findings. This endeavour required five years of analysis, carefully curating knowledge from the literature review and classifying it based on variables, technology facilitators, controls and measures. NVivo 10 enables the researcher to create and classify nodes based on the causative themes. These nodes, when classified, may be populated and enriched with texts of knowledge documented during the systematic literature review. Queries run on the data obtained from these nodes provide for both textual and visual interpretations on the dependencies and mapping of possible interactivity between attributes. This becomes significant for businesses seeking to manage tacit and intangible knowledge regarding products and services, as well as the requirements for implementing *value co-creation* and the facilitation of requirements for different disciplines of research. In our case, this resulted in three research themes.

##### Research theme 1: variables associated with technology facilitators

Innovations such as *social networks*, norms and knowledge among customers regarding products and services are enhanced with the ability to personalize and

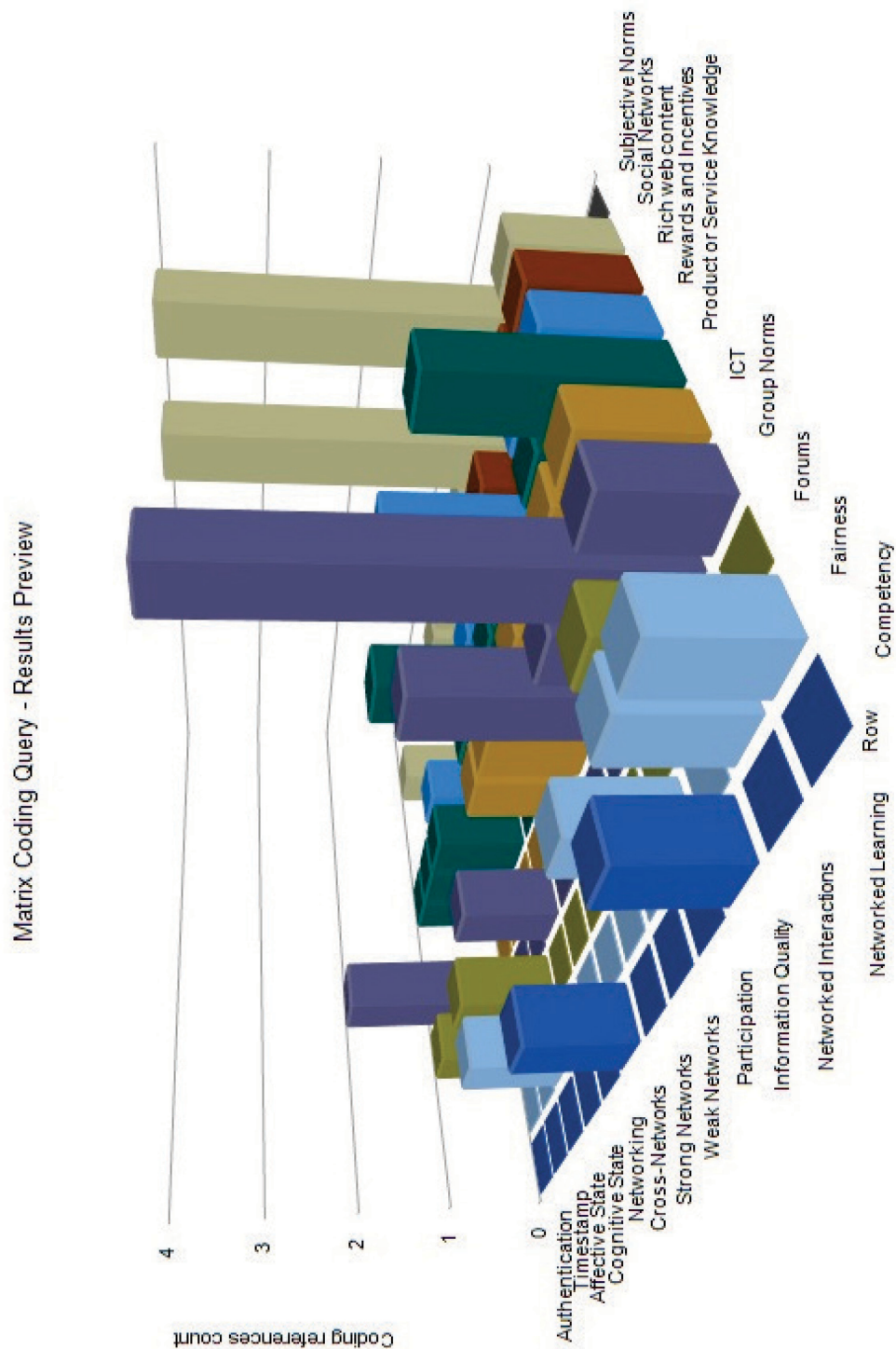
authenticate their profiles. Norms also personify and signify traits of interaction within networks. The multiplicity of knowledge, along with customer efficacy and sociability, across the Internet have significantly enabled interactions, authenticity, and product and service innovations (Messinger et al. 2009; Wagner and Majchrzak 2007; Valck et al. 2009). Popular *social networks*, knowledge networks, and product and service networks across geographies have also significantly enhanced customer efficacy (Kim et al. 2008; Valck et al. 2009; Rafaeli and Noy 2002). Thus, net neutrality for better customer efficacy becomes relevant to the optimum use of the Internet. In this regard, it has been argued that net neutrality provides the significant advantage of enhancing both the knowledge of customers and their efficacy (Valck et al. 2009; Chan and Li 2010; Stephen and Toubia 2010).



**Figure 15.** NVivo 10 qualitative analysis: interaction between variables and technology facilitators of value co-creation

Figure 15 associates the technology facilitators or processes of value co-creation with the independent variables that add to value co-creation. It can be observed

that networked learning, networked interactions, network typologies and authentication are strongly associated with product and service knowledge management.



**Figure 16.** NVivo 10 qualitative analysis: histogram of interactions between variables and technology facilitators of value co-creation

Figure 16 is a histogram of the interactions associating the technology facilitators of value co-creation on the left with the independent variables of value co-creation on the right. Group norms significantly add to the interactivity of networked



interactions. Social networks are significantly associated with technology facilitators such as networked interactions.

Due to the dynamism of interactivity across *social networks*, *mobile networks* and the *Internet*, the temporal co-ordination of online resources for information exchange, along with the navigability and ease of use of ICT and the sociability of participants, improves content creation, aggregation and knowledge management regarding products and services. Equity initiates sociability during interactions in networks. The incentives, equity, net neutrality and sociability of *social networks* have facilitated enthusiasm, shopping referrals and knowledge management (Cheung et al. 2010; Hsu and Lin 2008; Chan and Li 2010). Further, customer proficiency in using IT, *social networks*, and product and service knowledge networks have demonstrated that the creation and aggregation of knowledge initiate interactions and sociability, in turn generating additional revenue across geographies and economies (Ransbotham and Kane 2011). Infrastructures for IT, *social networks* and the Internet help to develop knowledge and learning among world populations. This further promotes products and services that emphasize the needs of economies, markets and norms, as well as the incentives required (Lechner and Hummel 2002).

Customer evaluations of products and services in *electronic commerce*, with a view to immediate or future purchases, improve product and service knowledge management by estimating the preference consistency of markets (Zhao et al. 2007). Interaction of customers in networks may also promote product and service referrals, thus providing businesses with an estimate of the financial incentives required for marketing (Trusov et al. 2009) across *electronic commerce*. Net neutrality, which facilitates interactivity for customers and accessibility of shops within *electronic commerce*, improves the effectiveness of generating additional revenue (Stephen and Toubia 2010). Further, it becomes necessary to enable interactivity and navigation in *social networks* in order to improve customer experiences (Chan and Li 2010).

Research has demonstrated that employees' proficiency within service firms and the subjects learned from referencing libraries across the Internet expands their knowledge, resulting in information novelty, proficiency and creativity (Gray et al. 2011; Frey et al. 2011). The usefulness and popularity of services on the Internet, together with resourcefulness and product and service networks, have generated enthusiasm and creativity, leading to improvements in the design of IT, *social networks* and the Internet (Kohler et al. 2011; Hsu and Lin 2008; Nambisan and Watt 2011). Customer referrals for products and services within interpersonal networks allow for co-shopping by sharing product and service knowledge during

interactivity, awareness and a sense of humanity (Chan and Li 2010). In blogs, customers' ability to personalize profiles and document their product and service experiences provides data for marketing and advertising purposes, and the co-production of value and customer support (Lee et al. 2008).

#### Research theme 2: variables associated with value co-creation in customers and establishments

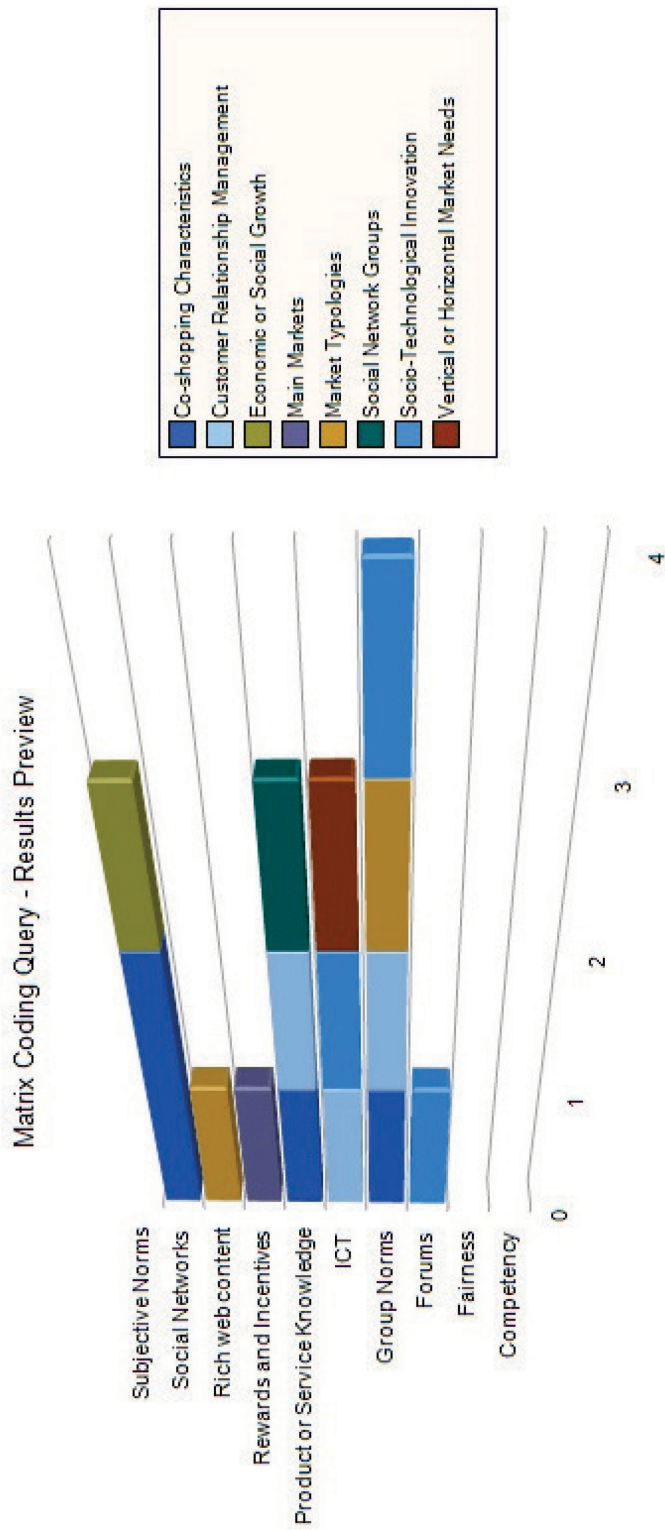
The independent variables that facilitate *value co-creation*, as identified during the literature review, and its definitions for customers and establishments, are described throughout Section 3.

#### Variables associated with measures of value co-creation in people

The quest and incentives for sociability and equity across the Internet have initiated enthusiasm, knowledge management and interaction among intellectuals with the proficiency and motivation required for projects in creativity and innovation (Frey et al. 2011; Cheung et al. 2010; Hsu and Lin 2008). Customers' interactions in product- and service-based social networks improve their market knowledge. Popularity, interaction, recreation and the ability of customers to personalize profiles and sociability within social networks supports the management of tangible and intangible knowledge regarding markets. Thus, facilitating net neutrality across geographies improves customer efficacy (Valck et al. 2009; Chan and Li 2010; Stephen and Toubia 2010). Further, the navigation and resourcefulness of IT, *social networks* and the Internet improves the authenticity of knowledge and innovations (Cheung et al. 2010; Hsu and Lin 2008). Innovations in software programming for social technologies provides for the management of professions and vocations, in turn enabling sociability, efficacy and improvements in the design of IT, social networks and the Internet (Messinger et al. 2009; Wagner and Majchrzak 2007).

Figure 17 provides a histogram of the interactions between the independent variables of value co-creation and the measures of value co-creation associated with establishments. Here, social networks are associated with co-shopping and economic or social growth. Rich Web content is associated with market typologies. Rewards and incentives add value to significant markets. Product and service knowledge is associated with co-shopping, CRM and social network groups. The systematic literature review links discussions about ICT with CRM, socio-technological innovation and industries. Group norms are associated with co-

shopping, CRM, market typologies and socio-technological innovation. From this perspective, forums are associated with socio-technological innovation.



**Figure 17.** NVivo 10 qualitative analysis: interaction of variables with the measures of value co-creation

## Variables associated with the co-creation of value in establishments

The success of the Internet service firms in enabling referrals and providing for marketing and advertising within *social networks* depends on the psychology, norms and shopping preferences related to information management needs for customer support (Chan and Li 2010; Kim et al. 2008; Valck et al. 2009; Rafaeli and Noy 2002; Zhao et al. 2007). Further, the innovations in IT, *social networks* and the Internet that facilitate interactivity during product and service knowledge management provide for efficacy, motivation and purchases (Riegner 2007; Riedel et al. 2013). Thus, IT, *social networks* and Internet resource capabilities and measures can add value to information management, socio-technological innovation and services for markets (Grover and Kohli 2012).

## Research theme 3: technology facilitators' association with value co-creation

IT acts as an intermediary for communication and interaction during *value co-creation*. Authentication, interaction and networking were identified as routines that facilitate *value co-creation*. These IT-enabled interaction routines were identified during the systematic review of the literature, as published in journals, and further studied and managed in order to identifying the attributes of *value co-creation* in customers and establishments.

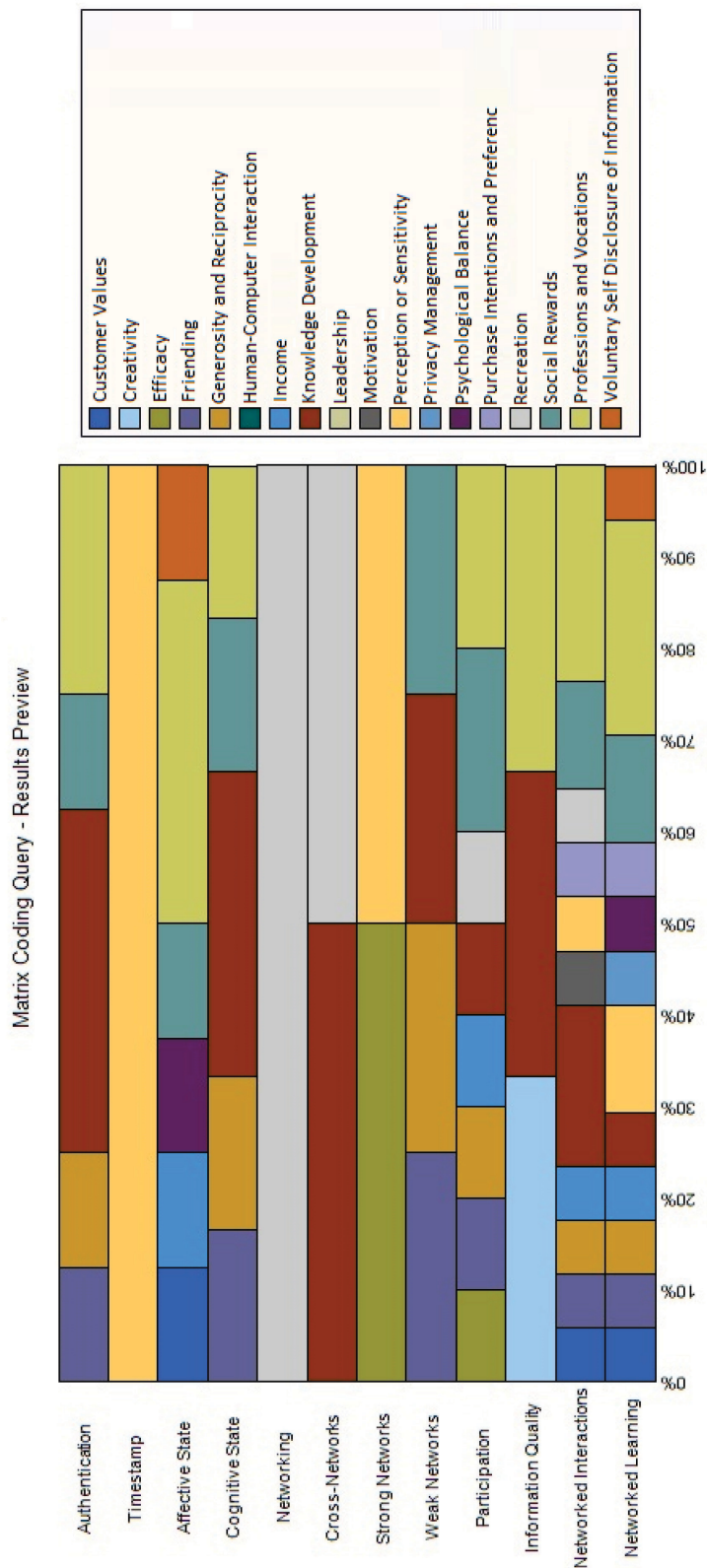
## Technology facilitators' association with value co-creation in people

From the perspective of proficiency and values, the capabilities of learning in networks and popularization of *social networks*, authorship and authenticity lead to efficacy, sociability and knowledge management for both authors and customers (Füller et al. 2009; Colliander and Dahlén 2011; Shen et al. 2010; Hamilton and Hewer 2010). In businesses associated with services, employees expand their creativity by practising routines associated with referencing and the integration of knowledge, which distinctly and directly support innovation within firms (Gray et al. 2011). The connectivity, sociability and efficacy of IT networks improve interactivity for the customer.

With reference to professions and vocations, interaction in *social networks* has facilitated recreation, purchases and incentives for socializing. Incentives also facilitate knowledge management regarding the values, psychology and wellness needs of markets. This interaction has also elicited customer vigilance. In this regard, *electronic commerce* has been faced with the challenges of incorporating privacy needs for secure customer transactions. Authentication and customers'

ability to personalize profiles and the level of motivation, efficacy and reciprocity within *social networks* facilitate simultaneity, creativity and learning motivation required for knowledge management (Antin and Earp 2010; Shen et al. 2010; Chan and Li 2010; Hsu and Lin 2008). Thus, this collaborative approach to learning within IT requires the temporal co-ordination necessary for effective interactions.

Crowdsourced contests and broadcast searches initiated by businesses, in order to create an unknown and unrestricted audience, have attracted people with substantial problem-solving proficiency. This has called for incentives to invite participants with the adequate intrinsic and extrinsic motivation required for problem-solving. Participants enjoy these incentives for problem-solving as a form of recreation by reciprocating, networking and enhancing professions and vocations. It has been observed that, in firms, the creativity of employees who reference knowledge improves their proficiency in practising rhetorical communication and routines for improving information quality, information novelty and innovations for their firms (Gray et al. 2011).



**Figure 18.** NVivo 10 qualitative analysis: technology facilitators of value co-creation

Figure 18 is a histogram of the attributes of *technology facilitators* or enablers of *value co-creation*. *Networked learning* and *networked interactions* are the most significant *technology facilitators* that are associated with almost all the *measures of value co-creation*, as discussed in the systematic literature review. *Service convenience*, *customer retention* and *authentication* are also necessary facilitators of *value co-creation*. Other *technology facilitators of value co-creation* are *information quality*, *network typologies* and *timestam p*.

### Technology facilitators' association with value co-creation in establishments

Net neutrality, product and service networks, and sociability across geographies provide the value creation necessary for creativity and innovation. Further, the resourcefulness and sociability of networks improves interactions, experiences and referral-based shopping among customers (Chan and Li 2010). The popularity of *social networks* and product and service knowledge networks has resulted in quality content, authenticity and information management for services across geographies, which have seen increased sales (Kim et al. 2008; Valck et al. 2009; Rafaeli and Noy 2002). These popular networks require an infrastructure that is able to facilitate increased interaction among customers in order to improve efficacy and create value (Wagner and Majchrzak 2007). Estimating the size of crowds within *social networks* provides an accurate upper limit for financial incentives required to stimulate product and service advertisements in these markets (Trusov et al. 2009).

Web 2.0 and Enterprise 2.0, as knowledge- and value-creating concepts, provide for multiplicity in socio-technological innovation, adding value to the learning experience across networks (Valck et al. 2009). As such, the value of service infrastructures for businesses across networks is enhanced when the geographies, cultures and themes of audiences participating are reflected in the value creation (Messinger et al. 2009), leading to the co-creation of economic and social value for markets. The usefulness of the Internet, as well as resourcefulness and service popularity, have prompted enthusiasm and creativity, resulting in design improvements and upgrades (Kohler et al. 2011; Hsu and Lin 2008; Nambisan and Watt 2011). Meanwhile, authentication, personalized profiles and interaction in *social networks* initiate the motivation and reciprocity required for knowledge management, creativity and innovation (Antin and Earp 2010; Shen et al. 2010; Chan and Li 2010; Hsu and Lin 2008).

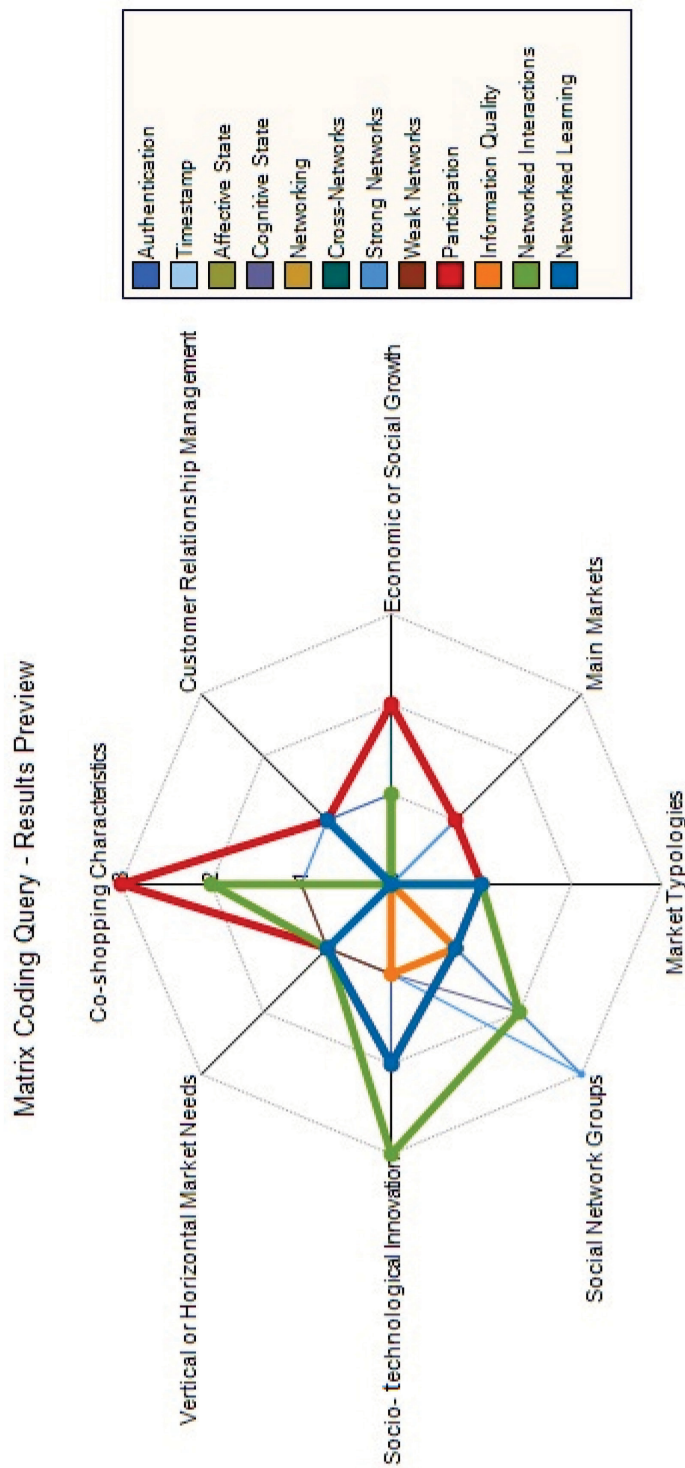
Figure 19 on the next page presents the measures of value co-creation in establishments associated with the technology facilitators or processes of value co-



creation. Co-shopping, economic and social growth, and significant markets are associated with the extent of interaction in networks. Socio-technological innovation, social network groups, co-shopping, and economic and social growth are significantly associated with networked interactions. These are further associated with market typologies, CRM and networked learning.

The effectiveness of interaction on the Internet and within *social networks* is enabled by the facilitation of information, navigation and convenience, adding value to the sociability and innovation (Hung and Li 2007). It leads to multiplicity in the knowledge management of tangible and intangible product and service concepts. Thus, customer efficacy and the experience of virtual sociability enable socio-technological innovation.

Further, marketing studies have described how new product or service purchases are associated with people's evaluations of their immediate and future purchase needs (Zhao et al. 20007).



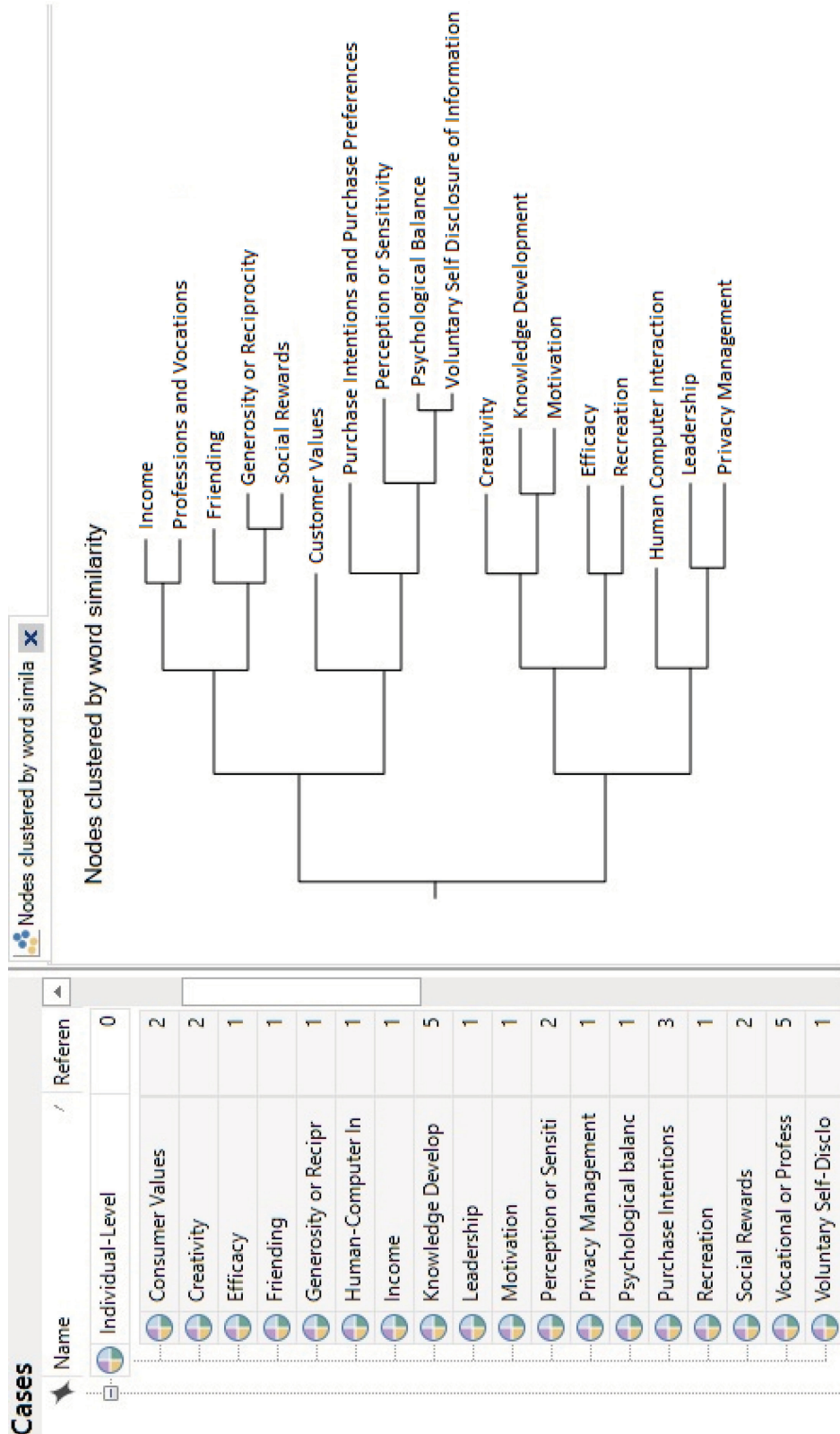
**Figure 19.** NVivo 10 qualitative analysis: technology facilitators versus value co-creators in establishments

Knowledge networks and collaborative projects involved in innovations and IT management have promoted novel creativity and the design of products and

services (Gray et al. 2011; Hsu and Lin 2008; Antin and Earp 2010; Au et al. 2009). This has also led to customers' creation of economic and social value, which is initiated, localized and personalized during collaborations between them and news media organizations (Rafaeli and Noy 2002; Valck et al. 2009; Kerrigan and Graham 2010).

Quality interactions in the context of IT, *social networks* and the Internet require customers' proficiency and their temporal co-ordination, meaning that the availability of customer support services within knowledge networks across geographies improves the level of customer efficacy required for creativity and innovation. For example, this has added value to IT-based new product management projects and brainstorming sessions contingent on proficiency (Füller et al. 2009). Industrial business practices are able to source quality custodianship in order to manage the necessary degree of proficiency and knowledge during collaborations (Wagner and Majchrzak 2007; Au et al. 2009). In turn, effective knowledge creation in *social networks* for businesses, enabled by infrastructures supporting a significant portfolio of products and services, adds value to businesses. This has also allowed service industries to efficiently integrate internal and external knowledge about markets to reorganize, re-evaluate and manage their portfolios (Shang et al. 2011).

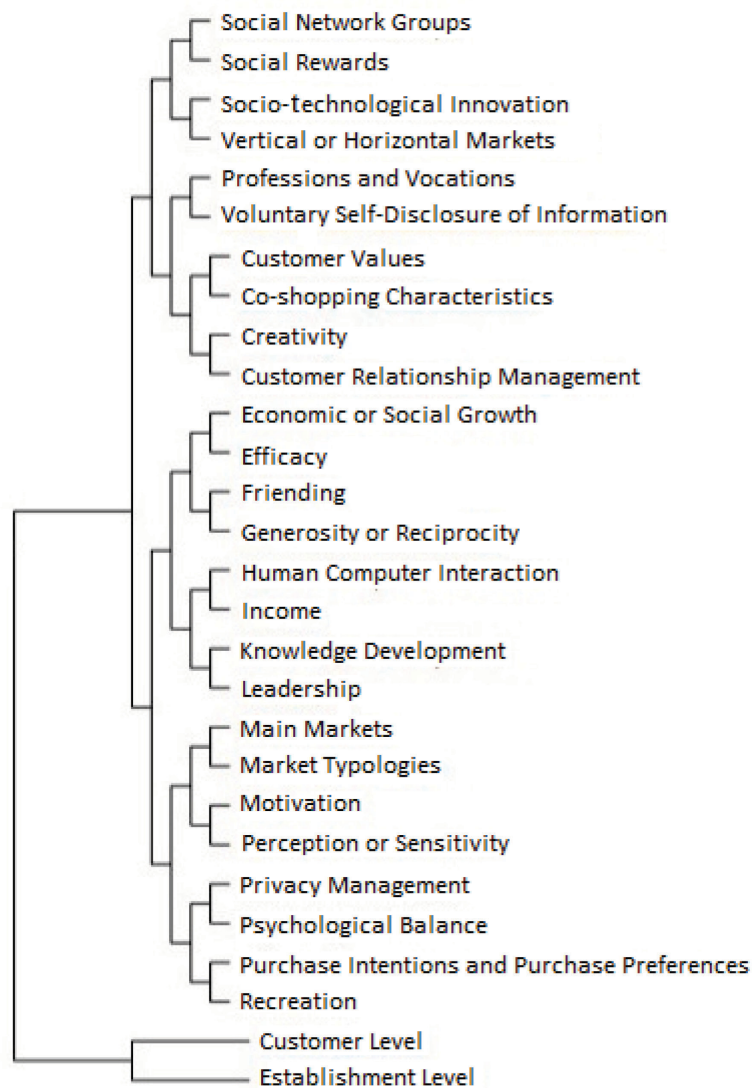
Figure 20 is a visualization of the text analysis facilitated by NVivo 10 concerning the measures of *value co-creation* associated with customers. *Interactions* on the Internet concerning *professions and vocations* provide a source of income. *Friending* on the Internet is facilitated by *social rewards* as well as *generosity and reciprocity*. *Customer values* are associated with *purchase intentions and preferences*. These are facilitated by *perceptions and sensitivity* associated with *psychological balance*, complemented by the documentation of information. Creativity is enabled by *knowledge management* and *motivation*. *Customer efficacy* complements *recreation* needs, while *human-computer interaction* complements qualities such as *leadership* and *privacy management*.



**Figure 20.** NVivo 10 qualitative analysis: nodes clustered by word similarity from measures of customer attributes of value co-creation

### 3.2.5 Value co-creation between customers and establishments

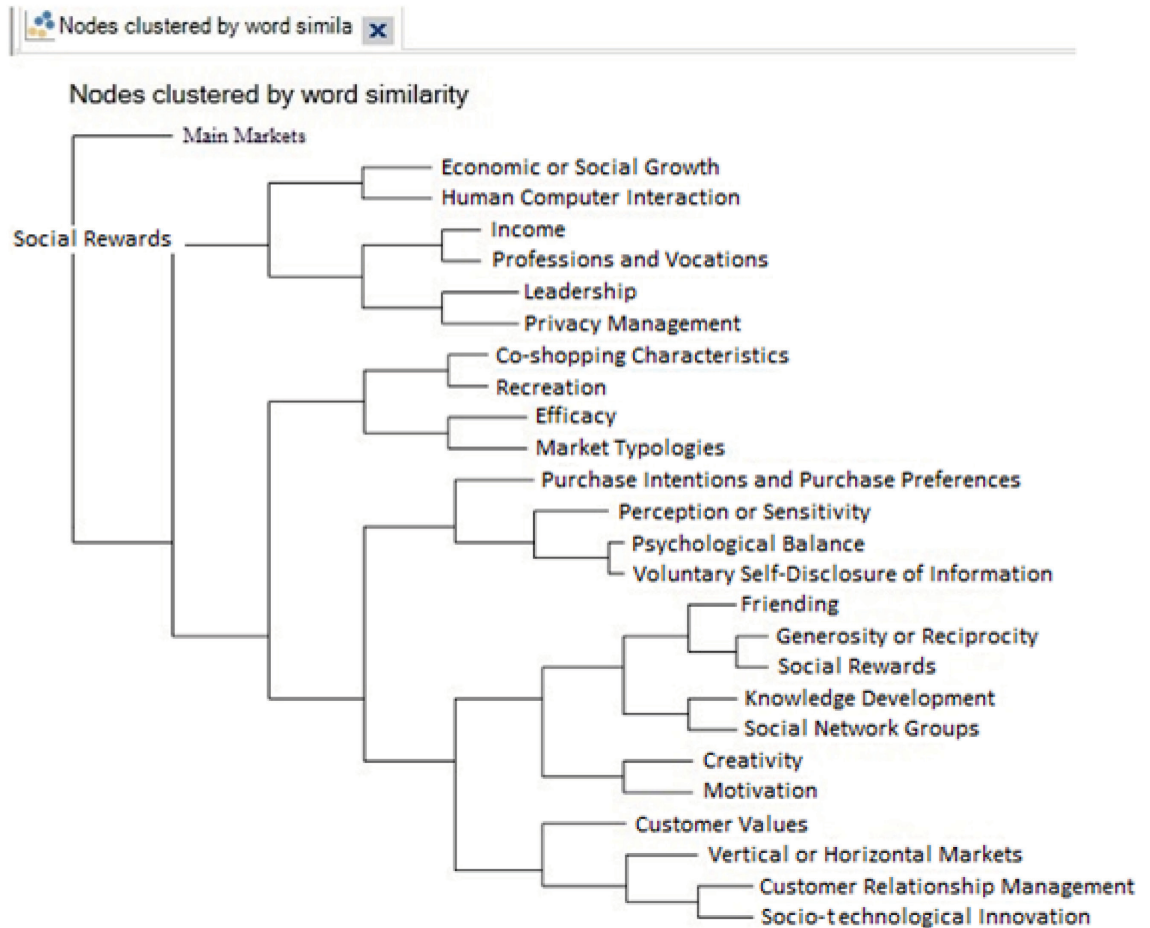
Interactions, referrals and recreational *social networks* facilitate interpersonal shopping. Further, net neutrality, sociability, and product and service networks across geographies and *time zones* result in significant creativity and innovation. This has led to resourceful knowledge networks facilitating improved learning (Chan and Li 2010). Better designs in the case of IT, *social networks* and the Internet, along with the vigilance of citizen journalists, have improved customer interactions in *electronic commerce* (Harwood and Gary 2010; Nambisan and Watt 2011; Kerrigan and Graham 2010; Oh and Teo 2010; Stephen and Toubia 2010). Professional and vocational networks represent market needs and, when integrated with popular product and service networks, have promoted enthusiasm and creativity. This multiplicity of knowledge management, efficacy and sociability in networks has informed socio-technological innovations (Messinger et al. 2009; Wagner and Majchrzak 2007). This has further allowed for collaborative IT management projects aimed at overcoming a range of problems and challenges faced by today's society (Gray et al. 2011; Hsu and Lin 2008; Antin and Earp 2010; Au et al. 2009).



**Figure 21.** NVivo 10 qualitative analysis: nodes clustered by coding similarity between customers and establishments

Figure 21 depicts how the systematic literature review associated the measures of *value co-creation* between customers and establishments. Social network groups are associated with *social rewards*, while *socio-technological innovation* is associated with the needs of industries. Professions and vocations of customers are associated with the need to document and archive content, whereas customer values and co-shopping are closely associated with each other. *Customer creativity* complements CRM and *economic and social growth* is associated with *customer efficacy*. Friending on the Internet and the rewards of reciprocity and generosity complement each other. *Human-computer interactions* provide a source of income for the customer. Knowledge management is associated with leadership and significant markets complement *market typologies*. Motivation and

perception and sensitivity are closely associated, as are privacy management and psychological balance. *Purchase intentions and preferences* are associated with recreation.



**Figure 22.** NVivo 10 qualitative analysis: nodes clustered by word similarity from measures between customers and establishments

Figure 22 visualizes the text analysis facilitated by NVivo 10, which associates measures of *value co-creation* between customers and establishments. *Economic and social growth* in the age of the Internet is facilitated by *human-computer interaction*. Customers' ability to generate income on the Internet is associated with their *professions and vocations*. *Privacy management* complements *leadership*. *Recreation* is an activity associated with *co-shopping*, while *customer efficacy* is associated with *market typologies*. *Purchase intentions and preferences* are facilitated by documented or archived content and associated with *perception and sensitivity* and the need for *psychological balance*. *Social rewards* and *generosity and reciprocity* facilitate *friending* on the Internet. *Social network groups* are associated with *knowledge management*, while *motivation*

complements *creativity*. *Customer values* are facilitated by *socio-technological innovation* and CRM, which are associated with industries.

Figure 23 presents a sociogram depicting the interactivity of *value co-creation* measures between customers and establishments. *Professions and vocations* supported on the Internet are associated with *privacy measures*, industries, *customer values* and *socio-technological innovation*. *Customer values* on the Internet provide information on their *perceptions and sensitivities*. This further allows customers to document and archive their experiences. This encourages firms to facilitate CRM. *Customer values* are also associated with the *social rewards* of interacting on the Internet. These, along with *recreational network* needs, facilitate *co-shopping* and the documentation of *customer experiences*. This has resulted in *socio-technological innovation*.





*Customer creativity* has enhanced *knowledge management* in *social network* groups, in turn meeting the needs of *significant markets* and furthering *human-computer interactivity* experiences. From this perspective, *market typologies* on the Internet are facilitated by *social network* groups, *recreational networks*, *socio-technological innovation* and *human-computer interactions*.

### 3.3 Results

The systematic literature review identified the variables, technology facilitators and measures of *value co-creation*. The independent variables that add to *value co-creation* were identified as: *subjectivity, norms; vocations and professions; proficiency; technologies and infrastructure; technology popularity; net neutrality; advocacy, incentives and product and service knowledge. Technology facilitators* were identified as: *authentication; and motivation and networking. Measures of value co-creation*, as identified from the study of the literature, were found to consist of 25 attributes associated with customers and establishments.

Customer attributes were associated with: *customer interactions; knowledge, problem-solving and learning; customer attitude; generosity and reciprocity; customer values and interpretation; customer motivation; customer loyalty and trust; voluntary disclosure of information or customer experiences; customer income and incentives; customer or employee wellness; productivity in networking; customer commitment; customer entertainment; customer knowledge; purchase intentions; customer leadership; customer innovation; customer efficacy; and customer intentions and preferences. Establishment attributes* were associated with: *co-shopping, market knowledge; software as a service or cloud services; CRM and advertising; promotion and business strategy; and social networks.*

The analysis, synthesis and consolidation of the research, along with the mapping of the associates of *value co-creation*, i.e., (1) variables (2) technology facilitators and (3) measures of *value co-creation*, provided a means to integrate, derive and study them. The link exploration study, found in Appendix B, further explains the research. *Social, economic and intellectual motivations* were identified as significant enablers of *value co-creation*. The 25 attributes or measures of *value co-creation* identified from the systematic literature review were then classified as *social, economic and intellectual motivation* attributes.

*Intellectual motivation* as an enabler of *value co-creation* consists of attributes such as: *customer innovation; customer efficacy; customer intentions and preference; leadership; customer interactions; and knowledge, problem-*

*solving and learning. Social motivation as an enabler of value co-creation consists of attributes such as: customer attitude; generosity and reciprocity; customer values and interpretation; customer motivation; customer loyalty and trust; voluntary disclosure of information or customer experiences; customer or employee wellness; productivity and networking; customer commitment; customer entertainment; social networks; and co-shopping. Economic motivation as an enabler of value co-creation consists of attributes such as: customer knowledge; purchase intentions; customer income and incentives; market knowledge; software as a service or cloud services; CRM and advertising; and promotion and business strategy. This allowed us to define the hypotheses in Study II in order to identify the attributes of social, economic and intellectual motivation for verification. This is explained and discussed in the next section.*

#### 4 STUDY II: SURVEY STUDY

Study I identified the variables, technology facilitators and measures of value co-creation from the systematic literature review. The link exploration studies found that *social, economic and intellectual motivations* are the enablers of *value co-creation*. A survey-based study was conducted to collect direct data on factors of *social, economic and intellectual motivation* from managers representing different industries in India. These three types of motivation are enablers of *value co-creation*. These were derived from the systematic literature review after carefully analysing, synthesizing and consolidating the measures of *value co-creation* discussed in previous conceptual and empirical studies. The systematic literature review and the link exploration studies table shown in Appendix B eventually led to the identification of *social, economic and intellectual motivations* as the enablers of *value co-creation*. The attributes and measures that constitute *intellectual, social and economic motivation* are listed in Table 3 below, which is associated with the illustrations in Figure 2 and Figure 3.

**Table 3.** Motivations and the 25 attributes of value co-creation measured using the survey questionnaire

Motivation	Attributes
Intellectual motivation	Customer innovation
	Customer efficacy
	Customer intentions and preferences
	Leadership
	Customer interactions
	Knowledge/problem-solving and learning
Social motivation	Customer attitude
	Generosity and reciprocity
	Customer values/interpretation
	Customer motivation
	Customer loyalty and trust
	Voluntary disclosure of information/customer experiences
	Customer and employee wellness
	Productivity in networking
	Customer commitment
	Customer entertainment
	Social network
	Co-shopping
	Economic motivation
Purchase intentions	
Customer income and incentive	
Market knowledge	
Software as a service/cloud services	
CRM	
Advertising/promotion/business strategy/CRM	

In this survey study, managers, while attending the India Manufacturing Show 2017 (30 October-1 November 2017), the Bangalore Tech Summit 2017 (16 November 2017), the EXCON 2017 (India) Construction Equipment Manufacturer Show (12 December 2017), the India Wood Manufacturers Show 2018 (8 March 2018), the UpperCrust Food Industry Show 2018 (2 March 2018), the Professional Beauty Cosmetics Show 2018 (5 March 2018) and the Solar Today Expo-LED India Expo & Battery Expo 2018 (11 April 2018), all held in Bangalore, were interviewed face to face for further analysis of the attributes of *intellectual, social and economic motivation*.



Figure 24. India Manufacturing Show 2017



Figure 25. 3D printed customized products



Figure 26. Bangalore Tech Summit November 2017

Based on the systematic review of the literature, I propose three hypotheses:

H1: Intellectual motivation is associated with *customer innovation, customer efficacy, customer intentions and preferences, leadership, customer interaction and knowledge/problem-solving and learning.*

H2: Social motivation is associated with *customer attitude, generosity and reciprocity, customer values and interpretations, customer motivation, customer loyalty and trust, voluntary disclosure of information on customer experiences, customer or employee wellness, productivity in networking, customer commitment, customer entertainment, social network and co-shopping by referrals and recommendations.*

H3: Economic motivation is associated with *customer knowledge, purchase intentions, customer income and incentives, market knowledge, software as a service and cloud services, CRM, advertising, promotion and business strategy.*

#### 4.1 Methodology, participants and measures

Face-to-face interviews with industry managers were completed in order to collect survey responses. The respondents were briefed about the significance of IT, *social networks* and the Internet in enabling customers to interact with firms in the creation of customized and standardized products and services. Industry examples of how firms had successfully implemented *value co-creation* were discussed and explained to managers. Response data on 25 parameters of *value co-creation*, as shown in Table 3, were collected for the survey. These were derived from an analysis of conceptual and empirical studies during the systematic literature review. The 135 respondents who were directly interviewed included industry managers representing manufacturing, IT, construction equipment, wood manufacturing, food production, cosmetics and the solar equipment industries. The data that were collected provided the basis for a statistical analysis.

#### 4.2 Procedure and analytical plan

For the survey sample of 135 respondents, the industry managers who took part in the face-to-face interviews were requested to complete a questionnaire (see Appendix C). A paper-based version of the survey and an online version on the Survey Monkey platform enabled faster survey completion and data collection. A Lenovo handheld device was used to complete the survey in real time during the face-to-face interviews. Firm and personal details of industry managers were collected to document their area of specialization. A sample size of 135 was arrived

at for the purpose of running *reliability tests*, *factor loadings*, *PCA* and *SEM*. The responses to the survey questionnaire were rated on a seven-point Likert scale, ranging from a low value indicating “totally disagree” to a high value indicating “totally agree”.

For the survey, 25 questions were created, which had to be rephrased and shortened after a series of interviews to make the survey experience less onerous for managers, as well as reduce the timeframe for data collection and increase the sample size of the data collected. Statistical tests were completed on data samples collected from across different industries periodically over a one-month timeframe. This provided the opportunity to make the survey more concise and remove any repetitive questions. This allowed for more interviews to be completed in a shorter timeframe and increased the sample size of the data collected. The data collected from the survey were manually entered into a Microsoft Excel file. After collecting and organizing the data from the 135 industry respondents, the data from the different industry groups were standardized using Z-value calculations in Microsoft Excel, in order to ensure that there was consistency in the data when running the statistical tests without discrepancies. The IBM SPSS, Minitab 18, IBM SPSS AMOS 25 and PAST 3.18 statistical software packages were chosen to run the statistical tests. The Excel file was imported into different statistical packages to complete basic tests on the data and maintain consistency during analysis. Various publications on *reliability tests*, *PCA*, *factor loadings* and *SEM* were consulted in order to allow for the better interpretation of the results during statistical analysis. *Intellectual motivation*, *social motivation* and *economic motivation* among participants were studied individually and evaluated for correlation.

### 4.3 Results

#### Analysis: attributes of intellectual motivation

The Excel file containing the data on the specific attributes of *intellectual motivation* was uploaded into the statistical software for initial analysis. The various attributes of *intellectual motivation* stated in the hypothesis are shown in Table 4. These are *customer innovation*, *customer efficacy*, *customer intention*, *leadership*, *customer interaction* and *knowledge/problem-solving and learning*. Data collected from the survey on the specific attributes of *intellectual motivation* were analysed using the reliability test shown in Tables 4, 5 and 6 in order to evaluate Cronbach’s alpha. An inter-item correlation matrix of the attributes was also generated. Cronbach’s alpha was found to reach 0.7, indicating significant reliability.



*Reliability analysis***Table 4.** Correlation Matrix

	Customer Innovation	Customer Efficacy	Customer Intention	Leadership	Customer Interaction
Customer Efficacy	0.301				
Customer Intention	0.366	0.365			
Leadership	0.164	0.021	0.035		
Customer Interaction	0.357	0.523	0.453	-0.039	
Knowledge / Problem Solving and Learning	-0.011	0.050	0.273	-0.038	0.185

With the data obtained for the different attributes of intellectual motivation stated in the hypothesis, the correlation matrix provides information on the strength of correlation between different variables. This facilitates a preliminary analysis for further statistical testing.

**Table 5.** Item and total statistics

Variable	Total count	Mean	StDev
Customer innovation	93	0.11160	0.80250
Customer efficacy	93	-0.04385	0.85241
Customer intentions or preferences	93	-0.04469	0.84033
Leadership	93	0.45208	0.79386
Customer interaction	93	-0.13870	0.92529
Knowledge/problem-solving and learning	93	-0.22985	0.96788
Total	93	0.10659	2.99993

## Cronbach's alpha

Alpha
0.6000

**Table 6.** Omitted Item Statistics

Omitted Variable	Adj. Total Mean	Adj. Total StDev	Item-Adj.Total Corr	Squared Multiple Corr	Cronbach's Alpha
Customer innovation	-0.0050	2.5937	0.3912	0.2288	0.5335
Customer efficacy	0.1504	2.5303	0.4336	0.3070	0.5133
Customer intentions or preferences	0.1513	2.4657	0.5342	0.3153	0.4700
Leadership	-0.3455	2.8636	0.0373	0.0389	0.6601
Customer interaction	0.2453	2.4103	0.5233	0.3872	0.4660
Knowledge/problem-solving and learning	0.3364	2.6981	0.1499	0.1049	0.6382

*PCA*, *factor analysis* and *SEM* were completed using three different statistical software packages in order to improve the quality of the research and identify the best attributes of *social, economic and intellectual motivation*. Table 7 presents the *factor analysis*. *Factor loading* analysis groups the most suitable sets of attributes for *intellectual motivation*. While this does not need to be conclusive, it supports estimation in the case of other tests such as *PCA* and *SEM*.

#### *Factor analysis*

**Table 7.** Rotated factor loadings and communalities

#### Varimax rotation

Variable	Factor 1	Factor 2	Factor 3	Communality
Customer innovation	0.443	0.006	-0.625	0.587
Customer efficacy	0.622	0.004	-0.057	0.390
Customer intentions or preferences	0.512	-0.278	-0.209	0.383
Leadership	-0.022	0.020	-0.259	0.068
Customer interaction	0.838	-0.118	0.026	0.718
Knowledge/problem-solving and learning	0.102	-0.823	0.078	0.695
Variance	1.5592	0.7696	0.5113	2.8401
Percentage variance	0.260	0.128	0.085	0.473

For the *factor analysis*, *varimax rotation* was selected to observe the rotated factor loadings and the *percentage variance* to account for the observed data on three factor loadings. *Customer innovation* (0.443), *customer efficacy* (0.622), *customer intentions and preferences* (0.512) and *customer interaction* (0.838)

have strong positive loadings on Factor 1 for *intellectual motivation*. The *percentage variance* was observed to be 47.3%, requiring further tests using *PCA*.

#### *Principal component analysis*

**Table 8.** Eigenanalysis of the correlation matrix

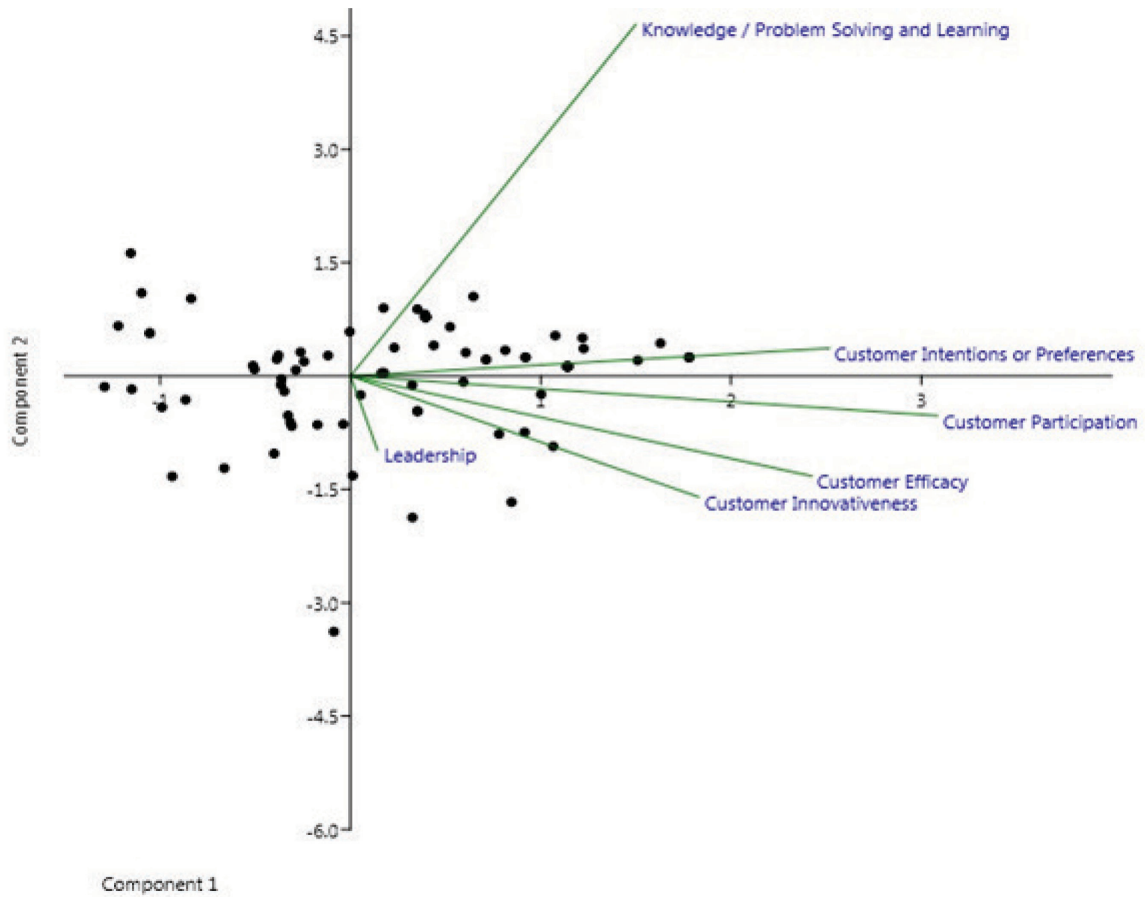
	Comp. 1	Comp. 2	Comp. 3	<b>Comp. 4</b>	Comp. 5	Comp. 6
Eigenvalue	2.2490	1.1334	0.9657	0.6860	0.5231	0.4429
Proportion	0.375	0.189	0.161	0.114	0.087	0.074
Cumulative	0.375	0.564	0.725	<b>0.839</b>	0.926	1.000

The *PCA* was restricted to four components. An *eigenvalue* of 1.0 is desirable. Component 4 accounts for 83.9% of the variation in the data. In Table 9, the variables that correlate the most with the first principal component (PC1) are *customer innovativeness (0.423)*, *customer efficacy (0.483)*, *customer intentions and preferences (0.506)* and *customer interaction (0.535)*. The *eigenvector* values were studied for the different attributes constituting the components. *Eigenvector* values tending towards 0.5 were taken into consideration for further analysis.

In terms of *intellectual motivation*, the statistics from Tables 4 to 9 confirm that *customer interaction*, *customer innovation*, *customer efficacy* and *customer intentions* are significant.

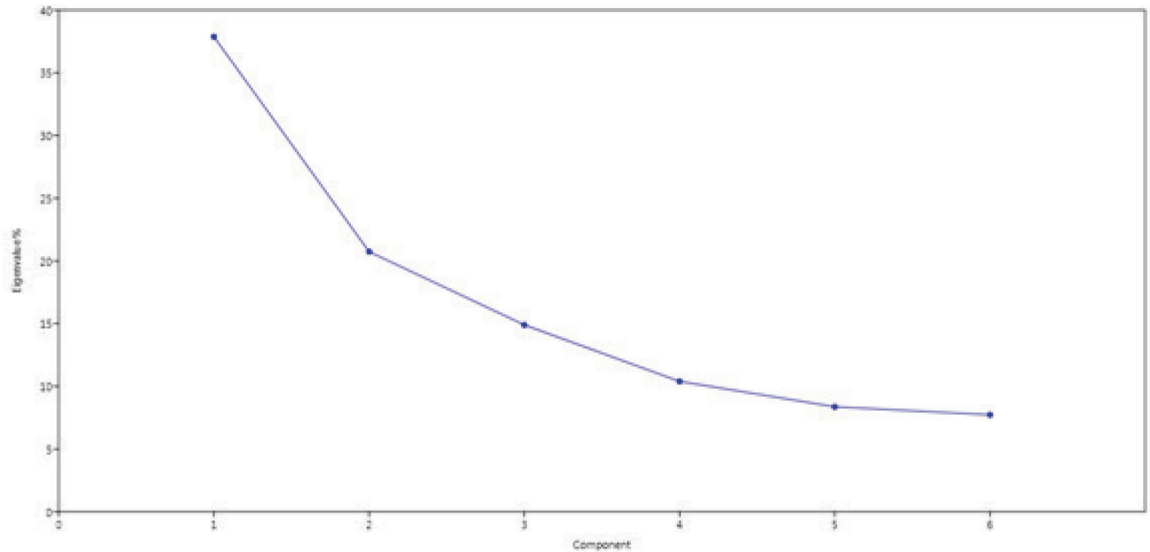
**Table 9.** Eigenvectors

Variable	PC1	PC2	PC3	PC4
Customer innovation	0.423	0.405	0.021	-0.657
Customer efficacy	0.483	0.060	0.322	0.569
Customer intentions or preferences	0.506	-0.119	-0.185	-0.262
Leadership	0.055	0.676	-0.624	0.365
Customer interaction	0.535	-0.106	0.185	0.201
Knowledge/problem-solving and learning	0.204	-0.592	-0.662	0.041



**Figure 27.** PCA for attributes of intellectual motivation among firms using PAST 3.18 statistical software

The above figure displays the clustering of sample data for the different attributes of intellectual motivation as measured across firms. Customer intentions and preferences along with customer innovation for value co-creation show more clustering of data.



**Figure 28.** Scree plot of PCA for the attributes of intellectual motivation based on sample data from firms

Figure 28 presents a scree plot visualizing the PCA in a graph of eigenvalues versus components. An eigenvalue of 1.0 is desirable, while Component 1 is an ideal fit.

#### Analysis: attributes of social motivation

A reliability test, as shown in Tables 10, 11 and 12, using IBM SPSS and Minitab software was completed to identify the attributes of *social motivation*. The various attributes of *social motivation* selected for hypothesis testing are *customer attitude, generosity and reciprocity, customer values, customer motivation, customer loyalty, voluntary disclosure of information/customer experiences, customer and employee wellness, and productivity*. An Excel file with the sample data on the attributes of *social motivation* was uploaded into the statistical software for reliability testing. A *Cronbach's alpha* value of 0.6951 was obtained, which is closer to 0.7. This indicates a good model fit. Further tests were required. An *inter-item correlation matrix* was generated and evaluated. *Factor analysis, principal component analysis* and *structural equation modelling* were performed using IBM SPSS, Minitab and IBM AMOS software.

**Table 10.** Correlation Matrix

	Customer Attitude	Generosity and Reciprocity	Customer Values	Customer Motivation
Generosity or Reciprocity	0.490			
Customer Values	0.045	0.059		
Customer Motivation	0.173	0.126	0.492	
Customer Loyalty	0.194	0.337	0.172	0.184
Voluntary Disclosure of Information / Customer Experiences	-0.014	-0.092	0.154	0.224
Customer or Employee Wellness	0.242	0.263	-0.011	0.002
Productivity through Networking	-0.129	-0.088	0.011	0.082
Customer Commitment	0.159	0.053	0.461	0.478
Customer Entertainment	0.278	0.110	0.134	0.228
Social Network	0.178	0.086	0.103	0.232
Co-shopping	0.281	0.083	-0.007	0.084

Table 10 continued				
	Customer loyalty	Voluntary disclosure of information/ customer experiences	Customer or employee wellness	Productivity through networking
Voluntary disclosure of information/ customer experience	-0.109			
Customer or employee wellness	0.122	0.092		
Productivity through networking	-0.061	0.296	0.038	
Customer commitment	0.178	0.262	0.182	0.211
Customer entertainment	0.099	0.125	0.297	0.018
Social network	0.069	0.236	0.049	0.439
Co-shopping	0.200	-0.067	0.176	0.091
	Customer commitment	Customer entertainment	Social network	
Customer entertainment	0.340			
Social network	0.357	0.356		
Co-shopping	0.189	0.415	0.303	

**Table 11.** Items and total statistics

Variable	Mean	StDev
Customer attitude	0.30107	0.76186
Generosity or reciprocity	0.42354	0.81857
Customer values/interpretation	-0.16188	0.94943
Customer motivation	-0.05320	0.81529
Customer loyalty/trust	0.19978	0.78825
Voluntary Disclosure of Information / Customer Experience	-0.26973	1.07867
Customer or Employee Wellness	0.20504	0.79546
Productivity through Networking	-0.05652	0.82850
Customer Commitment	-0.10208	0.86829
Customer Entertainment	0.12366	0.87799
Social Network	0.05108	0.81542
Co-shopping	0.31445	0.80614
Total	0.97520	4.91387

## Cronbach's alpha

Alpha
0.6951

The value of Cronbach's alpha is tending towards the desired value of 0.7. Further testing on the sample data was completed using *factor analysis* to verify which attributes constitute *social motivation*. The *factor analysis* shown in Table 13 provides information on the factor grouping of the most suitable attributes of *social motivation*. In the *factor analysis*, it was observed that, for the *rotated factor loadings*, the *varimax rotation* produced a low *percentage variance* value of 47.0% for a four-factor loading. *Customer values and interpretations (0.723)*, *customer motivation (0.674)* and *customer commitment (0.641)* have large positive loadings on Factor 1, meaning that this factor suitably describes *social motivation*. The model was retained for a further *PCA*.



**Table 12.** Omitted Item Statistics

Omitted Variable	Adj. Total Mean	Adj. Total StDev	Item-Adj.Total Corr	Squared Multiple Corr	Cronbach's Alpha
Customer Attitude	0.6741	4.6028	0.3393	0.3520	0.6753
Generosity or Reciprocity	0.5517	4.6536	0.2389	0.3466	0.6891
Customer Values / Interpretation	1.1371	4.5407	0.3047	0.3362	0.6807
Customer Motivation	1.0284	4.4913	0.4519	0.3654	0.6585
Customer Loyalty / Trust	0.7754	4.6639	0.2412	0.1929	0.6884
Voluntary Disclosure of Information / Customer Experiences	1.2449	4.5751	0.2078	0.2039	0.7008
Customer or Employee Wellness	0.7702	4.6447	0.2625	0.2053	0.6856
Productivity through Networking	1.0317	4.6977	0.1787	0.3060	0.6976
Customer Commitment	1.0773	4.3692	0.5671	0.4270	0.6387
Customer Entertainment	0.8515	4.4570	0.4485	0.3486	0.6576
Social Network	0.9241	4.4836	0.4621	0.3893	0.6570
Co-shopping	0.6607	4.6051	0.3083	0.2833	0.6793

*Factor analysis***Table 13.** Rotated factor loadings and communalities: varimax rotation

Variable	Factor 1	Factor 2	Factor 3	Factor 4	Communality
Customer attitude	0.071	0.486	-0.369	-0.097	0.387
Generosity or reciprocity	-0.010	1.000	-0.010	-0.012	1.000
Customer values/interpretation	0.723	0.066	0.049	0.004	0.530
Customer motivation	0.674	0.133	-0.100	0.092	0.490
Customer loyalty/trust	0.183	0.337	-0.119	-0.048	0.163
Voluntary disclosure of information/ customer experiences	0.265	-0.086	-0.044	0.318	0.181
Customer or employee wellness	-0.001	0.260	-0.308	0.050	0.165
Productivity through networking	0.012	-0.077	-0.006	0.910	0.835
Customer commitment	0.641	0.059	-0.294	0.228	0.553
Customer entertainment	0.214	0.106	-0.674	0.030	0.512
Social network	0.186	0.090	-0.406	0.486	0.444
Co-shopping	0.001	0.078	-0.605	0.091	0.380
Percentage variance	0.131	0.123	0.111	0.104	0.470

A PCA for hypothesis testing of the attributes of *social motivation* was completed with the same data. The values are presented in Tables 14-15.

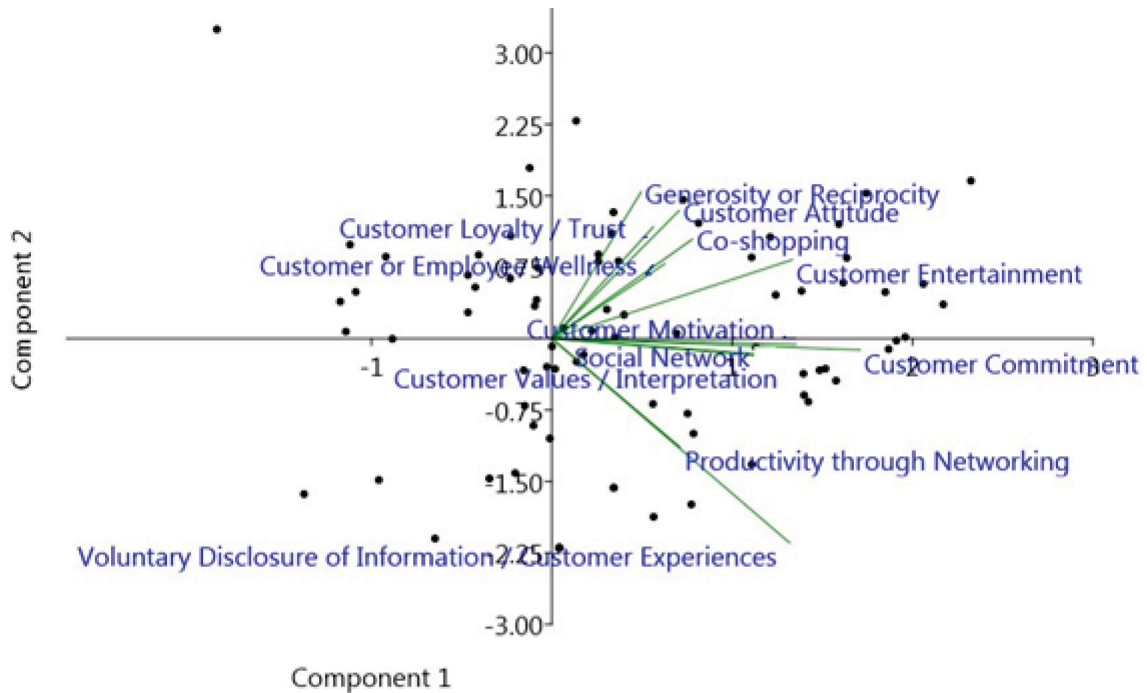
*Principal component analysis***Table 14.** Eigenanalysis of the correlation matrix

	Comp. 1	Comp. 2	Comp. 3	Comp. 4	Comp. 5
Eigenvalue	2.9536	1.8771	1.4513	1.0299	0.9790
Proportion	0.246	0.156	0.121	0.086	0.082
Cumulative	0.246	0.403	0.524	0.609	0.691

**Table 15.** Eigenvectors

Variable	PC1	PC2	PC3	PC4
Customer Attitude	0.288	0.403	0.037	0.178
Generosity or Reciprocity	0.214	0.445	-0.104	0.391
Customer Values / Interpretation	0.279	-0.190	-0.527	-0.088
Customer Motivation	0.357	-0.170	-0.397	-0.052
Customer Loyalty / Trust	0.220	0.288	-0.233	-0.137
Voluntary Disclosure of Information / Customer Experiences	0.184	-0.394	0.072	0.487
Customer or Employee Wellness	0.218	0.236	0.216	0.452
Productivity through Networking	0.154	-0.396	0.355	0.166
Customer Commitment	0.419	-0.211	-0.162	-0.044
Customer Entertainment	0.368	0.080	0.235	-0.220
Social Network	0.350	-0.202	0.337	-0.096
Co-shopping	0.281	0.181	0.355	-0.508

In the *eigenvalue* analysis, it was observed that the first component accounts for 24.6% of the total variance. Five components accounted for 69.1% of the total variance. The variables that correlated the most with the first component (PC1) were *customer motivation* (0.357), *customer commitment* (0.419), *customer entertainment* (0.368) and *social network* (0.350). The variables that correlated the most with the second principal component (PC2) were *customer attitude* (0.403) and *generosity or reciprocity* (0.445). The variables that correlated the most with the third principal component (PC3) were *productivity through networking* (0.355), *social network* (0.337) and *co-shopping* (0.355). The variables that correlated the most with the fourth principal component (PC4) were *generosity or reciprocity* (0.391), *voluntary disclosure of information or customer experiences* (0.487) and *customer or employee wellness* (0.452). As these results were inconclusive, *SEM* was later performed to substantiate them.



**Figure 29.** PCA of sample data on attributes of social motivation among firms

Figure 29 shows that the clustering of data for the attributes of social motivation is spread out. SEM in statistics offers us a more reliable methodology to identify the specific attributes of social motivation that firms find suitable when implementing value co-creation.

#### Analysis: attributes of economic motivation

The selected attributes of *economic motivation* were *customer knowledge, purchase intentions, customer income and incentives, market knowledge, software as a service and cloud services, CRM and advertising, and promotion and business strategy*. A reliability test, as shown in Tables 16 and 17, based on an attribute analysis for *economic motivation*, arrived at the desired value for *Cronbach's alpha* of 0.7, rounded up to the nearest decimal place. The value of *Cronbach's alpha* for all the attributes was within the range of 0.6 to 0.7. The statistical study required further analysis in order to evaluate the model fit, involving *factor loading* and *PCA*.

*Reliability statistics***Table 16.** Correlation matrix

	Customer knowledge	Purchase intentions	Customer income	Market knowledge
Purchase intentions	-0.134			
Customer Income	0.090	0.368		
Market knowledge	0.326	0.100	0.075	
Software as a service/cloud services	0.078	0.004	-0.057	0.168
CRM	0.201	0.125	0.237	0.242
Advertising/promotion/business strategy/CRM	0.306	0.076	0.179	0.587
		Software as a service/cloud services	CRM	
CRM		0.418		
Advertising/promotion/business strategy/CRM		0.165		0.458

## Cronbach's alpha

Alpha
0.6329

**Table 17.** Omitted item statistics

Omitted variable	Adj. total mean	Adj. total StDev	Item-adj. total corr.	Squared multiple corr.	Cronbach's alpha
Customer knowledge	-0.2030	3.2936	0.2636	0.1741	0.6241
Purchase intentions	-0.6468	3.4959	0.1391	0.1846	0.6511
Customer income and incentive	-0.5645	3.4013	0.2479	0.2110	0.6235
Market knowledge	-0.1987	3.0902	0.4535	0.3893	0.5566
Software as a service/ cloud services	-0.5027	3.4074	0.2399	0.2100	0.6257
CRM	-0.2304	3.0263	0.5024	0.3743	0.5366
Advertising/ promotion/business strategy/CRM	-0.3488	3.1284	0.5743	0.4636	0.5256

The *factor analysis* shown in Table 18 provides information on the factor grouping of the most suitable attributes of *economic motivation*. It was observed that, for the *rotated factor loadings*, the *varimax rotation* produced a low *percentage variance* value of 59.5% for a four-factor loading. *Customer knowledge* (0.407), *market knowledge* (0.882), *advertising, promotion and business strategy* (0.651) have large positive loadings on Factor 1, meaning that this factor suitably describes *economic motivation*.

**Table 18.** Rotated Factor Loadings and Communalities

Variable	Factor 1	Factor 2	Factor 3	Factor 4	Communality
Customer Knowledge	0.407	0.070	-0.181	0.129	0.220
Purchase Intentions	-0.019	0.040	0.918	0.293	0.931
Customer Income and Incentive	0.106	0.007	0.221	0.569	0.384
Market Knowledge	0.882	0.103	0.154	-0.096	0.822
Software as a Service / Cloud Services	0.110	0.496	0.029	-0.139	0.278
CRM	0.213	0.900	-0.018	0.372	0.995
Advertising / Promotion / Business Strategy / CRM	0.651	0.274	0.021	0.196	0.537
Variance	1.4368	1.1483	0.9500	0.6314	4.166
Percentage Variance	0.205	0.164	0.136	0.090	0.595

*Principal component analysis***Table 19.** Eigenanalysis of the Correlation Matrix

	PC1	PC2	PC3	PC4	PC5	PC6	PC7
Eigenvalue	2.3082	1.3657	1.0908	0.8063	0.6213	0.4805	0.3271
Proportion	0.330	0.195	0.156	0.115	0.089	0.069	0.047
Cumulative	0.330	0.525	0.681	0.796	0.885	0.953	1.000

Table 19 presents the *PCA* with the *eigenvalues* for the different components. An *eigenvalue* of 1.0 is desirable. In the *eigenvalue* analysis, it was observed that the first component accounted for 33.0% of the total variance. Five components accounted for 88.5% of the total variance.

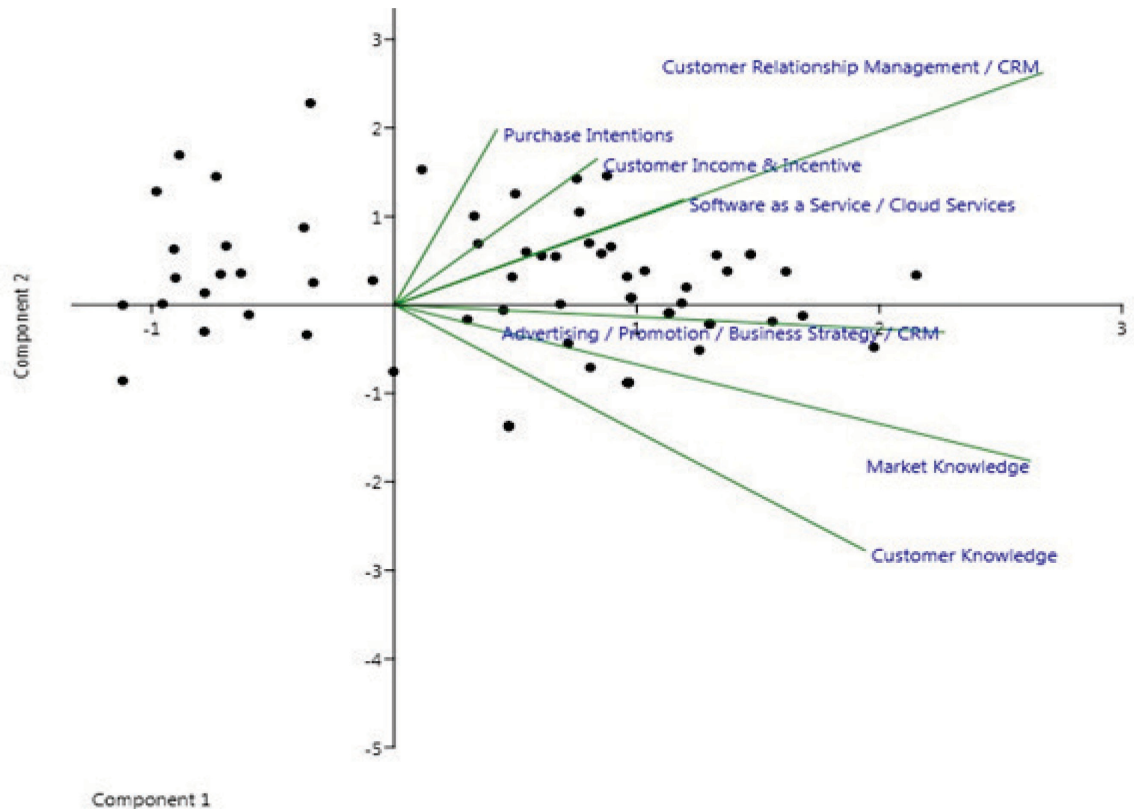
**Table 20.** Eigenvectors

Variable	PC1	PC2	PC3	PC4
Customer knowledge	0.333	-0.306	-0.407	0.542
Purchase intentions	0.146	0.684	0.063	-0.315
Customer income and incentive	0.237	0.609	-0.159	0.464
Market knowledge	0.471	-0.141	-0.293	-0.509
Software as a service/cloud services	0.289	-0.199	0.725	0.020
CRM	0.473	0.046	0.401	0.261
Advertising/promotion/business strategy	0.532	-0.075	-0.183	-0.252

In Table 20, the first component (PC1) can be seen as the most favourable with attributes such as *customer knowledge (0.33)*, *market knowledge (0.471)*, *CRM (0.473)*, and *advertising, promotion and business strategy (0.532)*.

Figure 30 below was generated using PAST 3.18 statistical software in order to test the hypothesis for the attributes of *economic motivation*, which firms find suitable when implementing value co-creation.





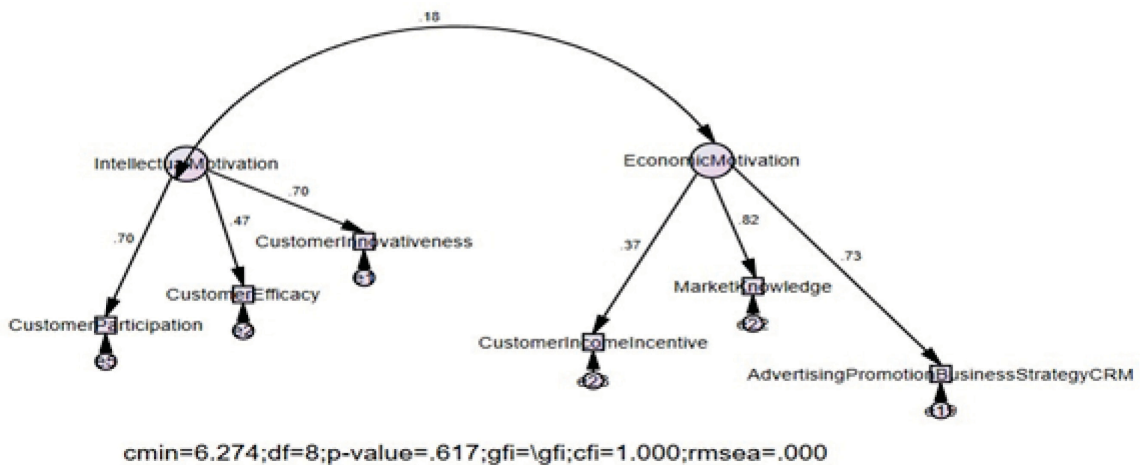
**Figure 30.** PCA of attributes of economic motivation among firms from sample data

#### Intellectual motivation versus economic motivation

*SEM* can be performed in IBM AMOS software by drawing the dimensions, attributes and error controls and associating them using connector arrows. The resulting Excel file with the sample data is then imported into IBM AMOS 25 in order to complete the model. Statistical testing is then run during the analysis and the results are studied in order to reach conclusions and evaluate the hypothesis. The circular nodes in Figure 31 represent the *intellectual and economic motivations* selected for the hypothesis testing. The attributes for the different types of motivation are shown in square boxes along with the strength of correlations. To substantiate the research, *SEM* was carried out to facilitate a more sophisticated statistical analysis of the correlation between standardized estimates and information regarding the *chi-square values*, *comparative fit index (cfi)* and *root-mean-square error (rmsea)* estimates for a given set of attributes of *social, economic and intellectual motivations*. The ideal model fit was arrived at after careful consideration of the attributes and an evaluation of the *correlation*

estimates, chi-square values, p-value, cfi and rmsea value. The generated chi-square value indicated a low error.

A correlation analysis of the attributes of *intellectual motivation* and *economic motivation* was completed using SEM. The attributes showing a correlation approaching 0.5 and above were retained, while the other attributes were eliminated. Figure 31 shows the most suitable attributes for *intellectual* and *economic motivation*. The observed *cfi value* was found to be 1.000, which is above the ideal *cfi value* of 0.9 and an *rmsea value* of 0.000, indicating a low error and thus a model fit. The *regression weights* were observed from the generated data on the standard estimates, and it was observed that the *p-value* or significance for most of the attributes was around 0.06, slightly higher than the desired significance value or *p-value* of 0.05 and below. The model was retained due to the model fit indicated by a low *rmsea value* and a greater *cfi value* of 1.000. The attributes with a very low correlation value were eliminated, while the others were retained in the model. Eventually, the most suitable attributes were retained.



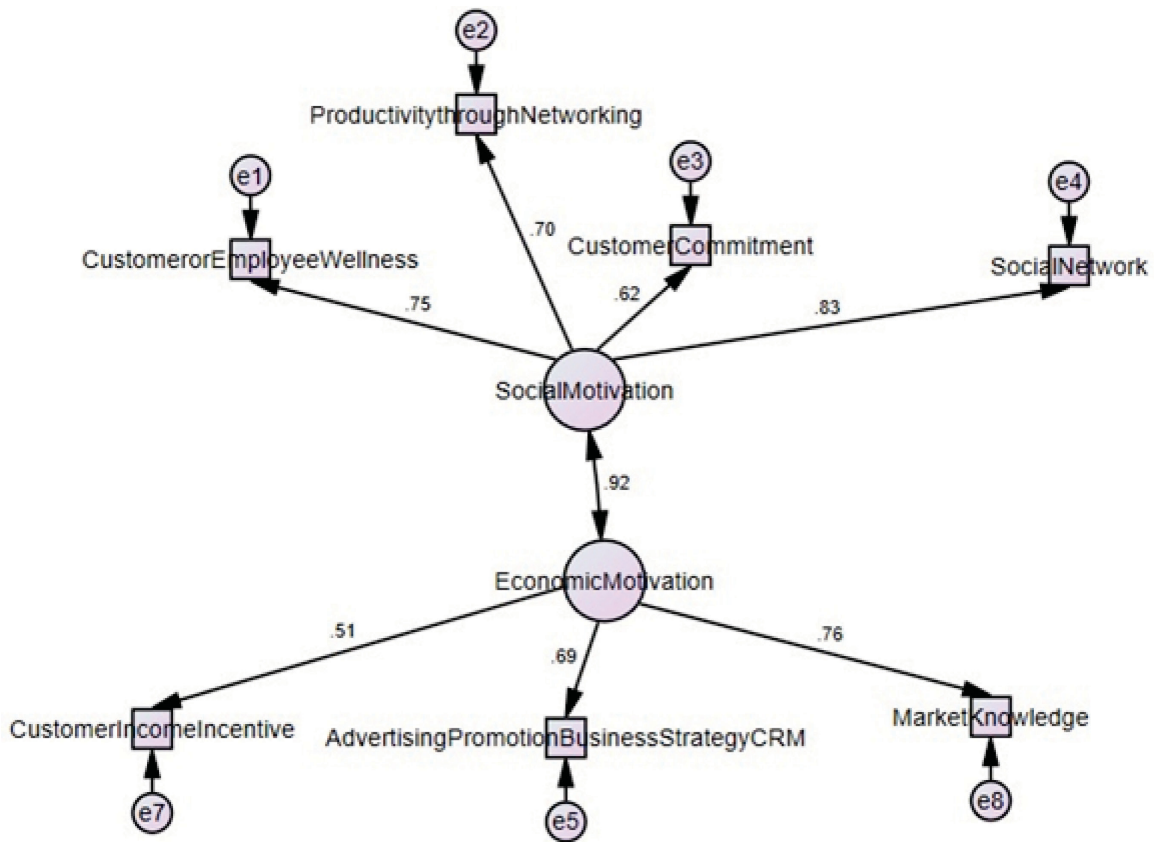
**Figure 31.** SEM model of intellectual motivation versus economic motivation

**Table 21.** Regression Weights

Regression Weights: (Group number 1 – Default model)						
		Estimate	S.E.	C.R.	P	Label
Customer Innovativeness	< ---- Intellectual Motivation	1.000				
Customer Efficacy	< ---- Intellectual Motivation	.456	.246	1.853	0.064	par_1
Customer Participation	< ---- Intellectual Motivation	.889	.473	1.880	.060	par_2
Advertising / Promotion / Business Strategy / CRM	< ---- Economic Motivation	1.000				
Customer Income Incentive	< ---- Economic Motivation	.601	.356	1.685	.092	par_3
Market Knowledge	< ---- Economic Motivation	1.239	.675	1.837	.066	par_5
Table 21 continued						
Standardized Regression Weights: (Group number 1 – Default model)						
		Estimate				
Customer Innovativeness	< ---- Intellectual Motivation	.695				
Customer Efficacy	< ---- Intellectual Motivation	.467				
Customer Participation	< ---- Intellectual Motivation	0.704				
Advertising / Promotion / Business Strategy / CRM	< ---- Economic Motivation	.727				
Customer Income Incentive	< ---- Economic Motivation	.367				
Market Knowledge	< ---- Economic Motivation	.818				

The model in Figure 31 clearly shows that *intellectual motivation* is constituted of the attributes of *customer interaction*, *customer efficacy* and *customer innovation*. *Economic motivation* comprises the attributes of *customer income and incentives*, *market knowledge* and *advertising*, and *promotion and business strategy*. From the interviews with managers, it was observed that, in terms of awareness regarding *value co-creation*, some of the attributes analysed were more suited to certain business practices. This is verified by the data. Other attributes of *value co-creation* that were ignored by managers during the interviews but mentioned in the survey require further consideration, as many empirical and conceptual studies in the systematic literature review consider them to be significant. Similarly, SEM was performed in order to study the interactions between *social and economic motivation*. This is shown in Figure 32.

## Social motivation versus economic motivation



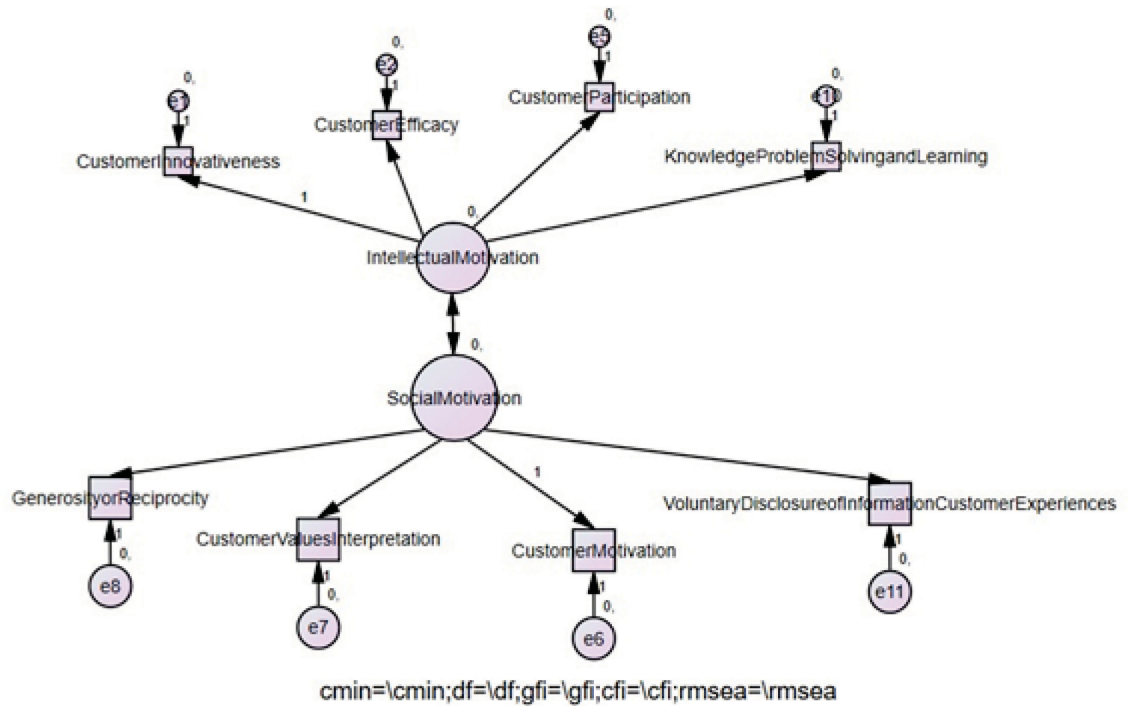
$cmin=18.502;df=13;p\text{-value}=.139;gfi=.922;rmsea=.081$

**Figure 32.** SEM of social motivation versus economic motivation

*SEM* visualizes the attributes that are suitable for the model fit. The above model was created after a trial-and-error selection of attributes and after evaluating the correlation estimates, i.e., the *chi-square value*, *p-value*, *cfi* and *rmsea value*. The illustration above demonstrates that *social motivation* comprises attributes such as *customer or employee wellness*, *productivity in networking*, *customer commitment* and *social networks*. *Economic motivation* is made up of attributes such as *customer income and incentives*, *advertising, promotion and business strategy* and *market knowledge*. The *chi-square*, *cfi* and *rmsea* values were generated. The model indicates that there is a suitable fit based on a low *chi-square value*, a *cfi value greater than 0.9* and a low *rmsea value* of 0.081. Observing the significance of the *p-value* for the variables and attributes provides additional information on the associated fit. The *maximum likelihood estimates* project the *regression weights* to be below a *p-value* of 0.05. Figure 32 indicates that the variables are strongly associated with the *structural equation model* in the case of

*social motivation* and *economic motivation*. Further, *social motivation* and *economic motivation* are strongly correlated.

### Intellectual motivation versus social motivation



**Figure 33.** SEM for intellectual motivation versus social motivation

The interactivity between *intellectual motivation* and *social motivation* is shown in Figure 33. The SEM shows that, in an interaction involving *intellectual motivation versus social motivation*, the most suitable motivation attributes for *intellectual motivation* comprise *customer innovation*, *customer efficacy*, *customer interaction* and *knowledge, problem-solving and learning*. *Social motivation*, meanwhile, is constituted of *generosity or reciprocity*, *customer values or interpretation*, *customer motivation* and *voluntary disclosure of information or customer experience*.

**Table 22.** Maximum Likelihood Estimates

Regression Weights: (Group number 1 – Default model)							
			Estimate	S.E.	C.R.	P	Label
Customer Employee Wellness	< ---- Social Motivation		1.000				
Productivity through Networking	< ---- Social Motivation		.855	.232	3.693	***	
Customer Commitment	< ---- Social Motivation		.884	.273	3.241	.001	
Social Network	< ---- Social Motivation		1.384	.320	4.328	***	
Advertising / Promotion / Business Strategy / CRM	< ---- Economic Motivation		1.000				
Customer Income and Incentive	< ---- Economic Motivation		.868	.351	2.474	0.013	
Market Knowledge	< ---- Economic Motivation		1.203	.339	3.548	***	
<i>Table 22 continued</i>							
Standardized Regression Weights (Group Number 1 – Default Model)							
			Estimate				
Customer Employee Wellness	< ---- Social Motivation		.746				
Productivity through Networking	< ---- Social Motivation		.698				
Customer Commitment	< ---- Social Motivation		.620				
Social Network	< ---- Social Motivation		.829				
Advertising / Promotion / Business Strategy / CRM	< ---- Economic Motivation		.692				
Customer Income and Incentive	< ---- Economic Motivation		.505				
Market Knowledge	< ---- Economic Motivation		.757				

*Factor analysis involving rotated factor loadings, with a varimax rotation, was performed. A four-factor loading was found suitable and accounted for a low percentage variance of 59.5% for the observed data. Customer knowledge (0.407), market knowledge (0.882) and advertising, promotion and business strategy (0.651) had large positive loadings on Factor 1. Software as a service/cloud services (0.496) and CRM (0.900) had large positive loadings on Factor 2. Purchase intentions (0.918) had a large positive loading on Factor 3. Customer income and incentive (0.569) and CRM (0.372) had large positive loadings on factor 4. Further analysis was completed using PCA in order to evaluate the eigenvalue and eigenvectors. Four principal components were found*

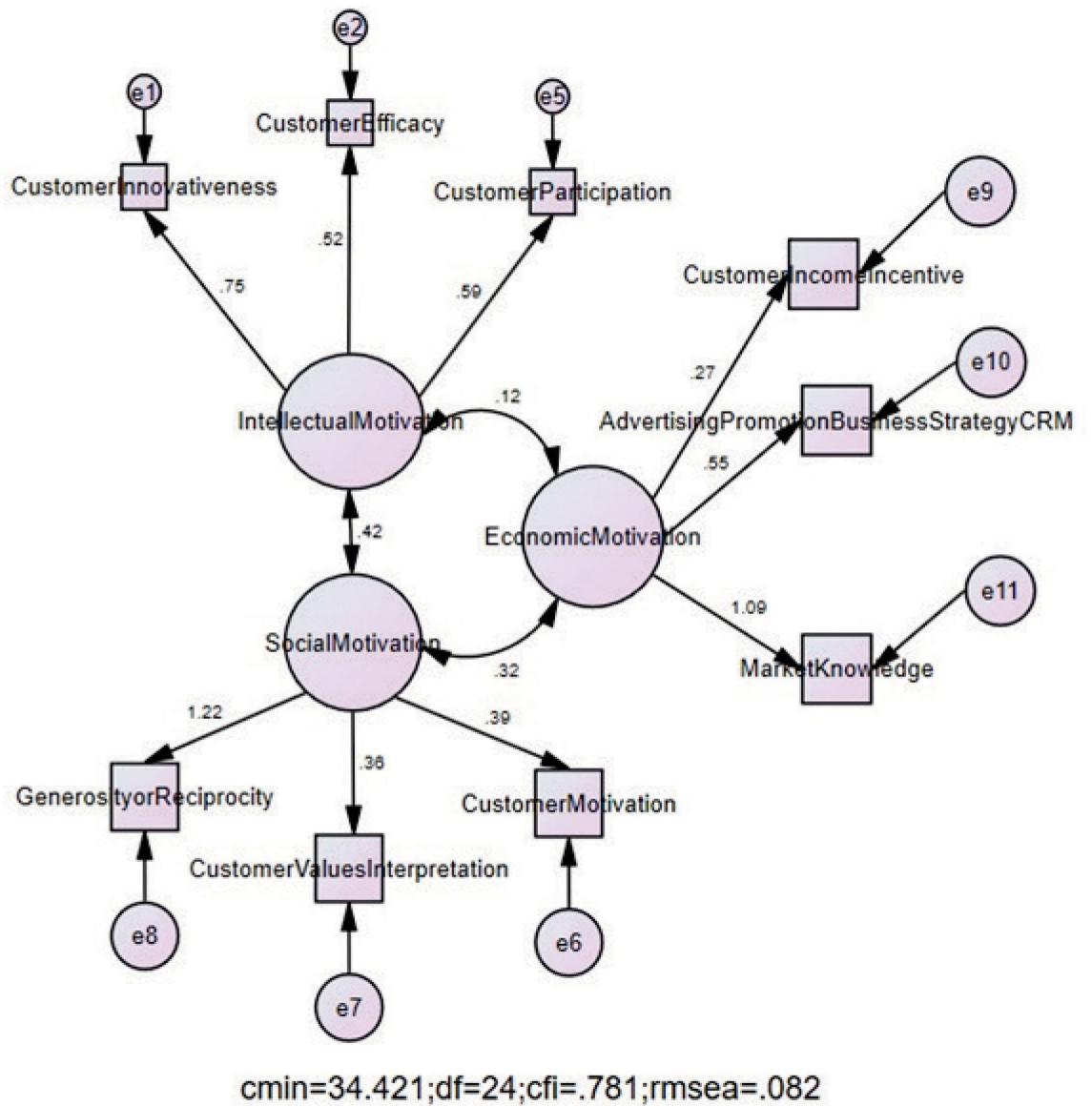
suitable for analysis. The four-component analysis accounted for 79.6% of total variance. The variables that correlated the most with the first principal component (PC1) were *customer knowledge* (0.333), *market knowledge* (0.471), *software as a service/cloud services* (0.289), *crm* (0.473) and *advertising, promotion and business strategy* (0.532). The variables that correlated the most with the second principal component (PC2) were *purchase intentions* (0.684) and *customer income and incentive* (0.609). The variables that correlated most with the third principal component (PC3) were *software as a service/cloud services* (0.725) and *CRM* (0.401). The variables that correlated the most with the fourth principal component (PC4) were *customer knowledge* (0.542) and *customer income and incentive* (0.464). SEM was performed in order to study the correlation between *social motivation* and *economic motivation*. After eliminating the attributes that showed low correlation, an evaluation was made using the obtained *chi-square estimates*, *p-value*, *cfi* and *rmsea values* for the correct model fit. After obtaining the standard estimates and *regression weights*, the *p-values* were found to be in the range of 0.06 to 0.05. There appeared to be a good fit for *intellectual, social and economic motivation*.

By observing the *structural equation models* and identifying the correct fit of attributes, statistical analysis provides managers with the most suitable attributes for implementing *value co-creation* within the firm. However, the other attributes initially considered for *intellectual, social and economic motivation* cannot be ignored as businesses are unaware of how to go about implementing *value co-creation* for the respective industry. This provides and substantiates the attributes of *social, economic and intellectual motivation* suitable for better innovation in products and services. This is further explained in Section 4.4 of the results summary. A total of 25 performance measures for *social, economic and intellectual motivation* was identified during the systematic literature review and used in the questionnaire for the survey of industry managers. Out of these, the attributes ignored by managers were identified as follows: *customer attitudes* towards products and services, *customer knowledge*, *customer entertainment*, *co-shopping*, *customer loyalty and trust*, *customer and employee wellness*, *software as a service* and *leadership* of the customer. This is directly relevant to sharing and circular economies on the *Internet*, such as peer-to-peer sharing and collaborative and on-demand economies, where customers are expecting affordability and the personalization of products and services.

### Intellectual motivation versus social motivation versus economic motivation

An attempt was made to interrelate *intellectual motivation*, *social motivation* and *economic motivation* using a common *structural equation model*. Evaluations of the *correlation value* offer reasonable promise as the *chi-square value*, *cfi*, *p-value* and *rmsea values* were found to approach the desired model fit requirements, as displayed in Figure 34. The theories on motivation applicable to *value co-creation* and associated with the above-mentioned choices are goal theory, expectancy theory, and innovations and equity theory (Mitchell 1982), which vary from one firm to another due to the expectations of the firm. The different scenarios of applying *value co-creation* and how it is facilitated across IT, *social networks* and the Internet are explained in Table 24 of Section 5.





**Figure 34.** SEM for social motivation versus intellectual motivation versus economic motivation

**Table 23.** Maximum Likelihood Estimates

Regression Weights (Group Number 1 - Default Model)						
		Estimate	S.E.	C.R.	P	Label
Customer Innovativeness	< ---- Intellectual Motivation	1.000				
Customer Efficacy	< ---- Intellectual Motivation	.456	.246	1.853	.064	par_1
Customer Participation	< ---- Intellectual Motivation	.889	.473	1.880	0.060	par_2
Advertising / Promotion / Business Strategy / CRM	< ---- Economic Motivation	1.000				
Customer Income and Incentive	< ---- Economic Motivation	.601	.356	1.685	.092	par_3
Market Knowledge	< ---- Economic Motivation	1.239	.675	1.837	.066	par_5

Regression Weights: (Group number 1 – Default model)						
		Estimate	S.E.	C.R.	P	Label
Customer Employee Wellness	< ---- Social Motivation	1.000				
Productivity through Networking	< ---- Social Motivation	.855	.232	3.693	***	
Customer Commitment	< ---- Social Motivation	.884	.273	3.241	.001	
Social Network	< ---- Social Motivation	1.384	.320	4.328	***	
Advertising / Promotion / Business Strategy / CRM	< ---- Economic Motivation	1.000				
Customer Income and Incentive	< ---- Economic Motivation	.868	.351	2.474	0.013	
Market Knowledge	< ---- Economic Motivation	1.203	.339	3.548	***	

continued		
Standardized Regression Weights (Group Number 1 – Default Model)		
		Estimate
Customer Employee Wellness	< ---- Social Motivation	.746
Productivity through Networking	< ---- Social Motivation	.698
Customer Commitment	< ---- Social Motivation	.620
Social Network	< ---- Social Motivation	.829
Advertising / Promotion / Business Strategy / CRM	< ---- Economic Motivation	.692
Customer Income and Incentive	< ---- Economic Motivation	.505
Market Knowledge	< ---- Economic Motivation	.757

An evaluation of *value co-creation* within IT, *social networks* and the Internet in Study I determined the values added by people and the extent of convenience, sociability and technology. In terms of *social, economic and intellectual motivation* and its value addition to manager productivity, industry is supported by: (1) creativity and innovation; (2) resourcefulness of infrastructure; (3) proficiency; and (4) equity. Specifically, the SEM in Figures 31 to 34 verifies that *customer innovativeness, customer interactions and customer efficacy*, along with proficiency and *productivity through networking, knowledge, problem-solving and learning*, are associated with the *intellectual motivation* that is required for creativity and innovation. In terms of product and service personalization, customers are increasingly creating their own needs with the firm for that experience (Prahalad and Ramaswamy 2004). The resourcefulness of infrastructure prompts the *economic motivation for customer income and incentives, advertising, promotion, business strategy and CRM* and the development and management of *market knowledge*. Interaction based on *equity* across *social networks, mobile networks* and the *Internet* is made possible by the *social motivation* from attributes such as *generosity or reciprocity, customer values and comprehension, customer experiences and customer motivation*. This substantiates and adds to the DART (dialogue, access, risk assessment and transparency) system, which necessitates interactivity, authentication, firm- and customer-centric proprietary, non-proprietary risk assessment, and clarity in product and service personalization that is critical to *value co-creation* (Prahalad and Ramaswamy 2004). This is explained further in Section 5.1 on managerial implications. The objectives of *value co-creation* for industry managers need to take into consideration specifics such as: *human-computer interactions; product or service knowledge management; product concept effectiveness; information policy and social benefit; and secure access, efficacy and value creation* (Gopalan and Kohtamäki 2017) for product and service innovation. This provides for better *product lifecycle management*.

Manufacturers such as *Nike* have incorporated these *value co-creation* attributes of product management into their NIKEiD *electronic commerce* website, enabling customers to co-design products in real time before purchasing. Mobile applications such as *Flipboard*, based on social technologies, have enabled Internet customers to read, gather magazines, and then curate and share their experiences. Lego, a firm that makes building blocks for children and adults alike to create toys, has established the Digital Designer website, which allows customers to create and share their designs. *Kraft Foods* has been able to successfully involve customers on the Internet in co-creating 48 South Beach diet brands, bringing the firm a sales revenue of \$100 million within half a year. These are a few examples of *value co-creation* implemented by firms.

#### 4.4 Results summary

*Factor loading, PCA and SEM* helped us to identify the attributes of *social, economic and intellectual motivation*. This was made possible by the statistical analysis of sample data consisting of 135 industry respondents.

##### Intellectual motivation

*Factor analysis, PCA and SEM* identified suitable attributes for *intellectual motivation*. *Customer innovation, customer efficacy, customer intentions and preferences, customer interaction and knowledge, problem-solving and learning* were found to have large positive loadings as attributes of *intellectual motivation*. *SEM* facilitated a more sophisticated statistical analysis and verified the above-mentioned attributes of *intellectual motivation*.

##### Social motivation

*Factor analysis* identified suitable attributes for *social motivation*, namely, *customer values and interpretations, customer motivation and customer commitment*. *PCA* identified that *social motivation* consists of attributes such as *customer motivation, customer commitment, customer entertainment and social networks*. *SEM* confirmed that *social motivation* comprises attributes such as *customer or employee wellness, customer commitment, social networks, generosity or reciprocity, customer values and interpretation, customer motivation and voluntary disclosure of information or customer experiences*.

### Economic motivation

*Factor analysis* identified suitable attributes for *economic motivation*, namely, *customer knowledge, market knowledge, advertising, promotion and business strategy*, which were found to have large positive loadings as attributes of *economic motivation*. *PCA* identified that *economic motivation* consists of attributes such as *customer knowledge, market knowledge, CRM and advertising, promotion and business strategy*. *SEM* verified that *economic motivation* consists of attributes such as *customer income and incentives, advertising, promotion, business strategy, CRM and market knowledge*. Thus, the statistics based on industry data confirmed that *economic motivation* consists of attributes such as *customer income and incentives, customer knowledge, market knowledge, advertising, promotion, business strategy and CRM*.

### Intellectual motivation versus economic motivation

In a statistical analysis using *SEM*, as shown in Figure 31, it was verified that interactions between *intellectual motivation* and *economic motivation* involves specific attributes as enablers of *value co-creation* for firms. *Intellectual motivation* consists of attributes such as *customer interactions, customer efficacy and customer innovation*. *Economic motivation* consists of attributes such as *customer income and incentives, market knowledge and advertising, promotion, business strategy and CRM*.

### Social motivation versus economic motivation

In a statistical analysis using *SEM*, as shown in Figure 32, we verified that interactions between *social motivation* and *economic motivation* involve specific attributes as enablers of *value co-creation* for firms. *Social motivation* consists of attributes such as *customer or employee wellness, customer commitment and social networks*. *Economic motivation* consists of specific attributes such as *customer income and incentives; advertising, promotion, business strategy and CRM, and market knowledge*.

### Intellectual motivation versus social motivation

In a statistical analysis using *SEM*, as shown in Figure 33, we verified that interactions between *intellectual motivation* and *social motivation* involve specific attributes as enablers of *value co-creation* for firms. *Intellectual motivation* consists of attributes such as *customer innovation, customer efficacy,*

*customer interaction and knowledge, problem-solving and learning. Social motivation consists of attributes such as generosity or reciprocity, customer values and interpretation, customer motivation and voluntary disclosure of information or customer experiences.*

#### Intellectual motivation versus social motivation versus economic motivation

In a statistical analysis using SEM, as shown in Figure 34, we verified that interactions between *intellectual, social and economic motivation* involve specific attributes as enablers of *value co-creation* for firms. *Intellectual motivation* consists of attributes such as *customer innovation, customer efficacy and customer interaction*. *Economic motivation* consists of attributes such as *customer income and incentives; advertising, promotion, business strategy and CRM and market knowledge*. *Social motivation* consists of attributes such as *generosity and reciprocity, customer values, interpretation and customer motivation*.

## 5 DISCUSSIONS

This research involves two studies. Study I is an integrative literature review focusing on the variables, technology facilitators, measures and controls of *value co-creation*. This first study was completed by mapping and linking the conclusions from the qualitative and quantitative literature. Further, a qualitative analysis was completed using NVivo qualitative analysis software. The important conclusion from the first study is that *intellectual, social and economic motivation* during interaction across *mobile networks, social networks* and the *Internet* facilitates *value co-creation*. The literature on *value co-creation* suggests that innovation in products and services is a direct result of *social, economic and intellectual motivation*. It was identified in the course of the systematic literature review that interactions across *social networks, mobile networks* and the *Internet* add to sociability, economic value creation and development of the intellect. This finding is also supported by a previous study (Ramaswamy 2011). The variables, technology facilitators, controls and measures are discussed in detail as follows: variables of *value co-creation*; processes of *value co-creation*; controls of *value co-creation*; associations between variables and technology facilitators; *value co-creation* between customers and establishments. The managerial section provides aggregated information on the facilitators of *value co-creation* across different scenarios. First, it specifically describes the relevance of *value co-creation* to management disciplines, such as: *advertising, business research and decision support; electronic commerce, information management and information systems; and psychology, marketing and strategic management*. Further, an analysis of the systematic literature review, using NVivo qualitative analysis software, discussed, in detail, the relevance of IT, *social networks* and the Internet in facilitating *value co-creation*. It specifically explores the sociability of customer interactions and localization, product and service knowledge management, authentication and efficacy, information policy and customer decision-making. The research undertaken for the above-mentioned sections significantly contributes to the topic of *value co-creation*. Using the findings from this research, researchers may explore and work towards new studies.

Various attributes of the variables, technology facilitators and measures of *value co-creation* are derived. These have not been thoroughly applied and implemented across different management disciplines requiring further research. The three different types of motivation were associated with 25 outcomes of *value co-creation* identified and derived from the literature review. The NVivo qualitative analysis of the existing literature has resulted in new findings. Alliances between IT-based *open innovation, socio-technological innovation* and industry need to create value and are interrelated. Customer-added capital is generated by

interaction in socio-technological innovation and associated with CRM. From this perspective, customer efficacy is facilitated by co-shopping, market typologies, socio-technological innovation, degree of customization, service model management and customer-added capital.

Some of the relevant new literature on *value co-creation* (Dennis et al. 2017) has discussed the contribution made by multiple *electronic commerce* channels to the wellness and shopping needs of disabled customers who generate significant revenue for retailers. The IOT is also changing the way retailers do business. *Ease of use*, superior functionality, aesthetics, a growing clientele and customer ratings have been shown to add to *value co-creation* in retailing that uses IOT (Balaji and Roy 2017). In *electronic commerce* associated with luxury brands, processes of sociability, *market typologies*, content, creativity and *service convenience* evaluate the quality of luxury brands (Quach and Thaichon 2017; Pentina et al. 2018). In the literature on brand resurrection, *perceived brand superiority*, nostalgia, functional excellence and *values of ownership* associated with defunct brands and facilitated by the use of *social networks* have added to *value co-creation* (Davari et al. 2017).

In *new product management projects* that involve inviting and sourcing crowds in order to improve and transform designs beyond that of ideation, *perceived usability*, *reliability* and *technical complexity* were identified as associated with the decision to crowdsourced design (Allen et al. 2018; Yuna and Chandler 2018). In all the above areas of application, practitioners have given a lot of significance to using and implementing *value co-creation* concepts when making improvements in products and services. Meanwhile, in Study I, the research based on the systematic review of literature published on *value co-creation* specifically identified three types of motivation, namely, *social*, *economic* and *intellectual motivation*, which are critical to the implementation of *value co-creation*. Study I emphasizes that adopting the above classification is expected to enhance the effectiveness of implementing *value co-creation* concepts. Further, Study II specifically revealed the attributes that constitute these three types of motivation as practised by managers.

IT, *social networks* and the Internet across networks have become facilitators in enhancing interaction between customers (i.e., people, businesses and governments) for *value creation*. When *value creation* involves the ability and motivation of customers and the business to interact directly in creating products and services, the activity is termed as *value co-creation*. It involves knowledge management on a mutual basis, as well as the addition of value to the interaction of customers. This requires a sophisticated IT infrastructure encompassing an



environment comprising people, businesses and governments. Its objectives are clarity, access, discussion and reflexivity. Overall, it involves interaction predicated on *social, intellectual and economic motivation*.

For people, knowledge management in interaction provides measures on values, creativity and efficacy. Interaction across networks facilitates sociability along with generosity or reciprocity across geographies. Incentives and quests for innovation in projects across networks have attracted leaders and other publics with a motivation that is both intrinsic and extrinsic in terms of creativity and innovation. Psychologically, perception and learning within networks improve vigilance and wellness. The interaction within networks and responses to purchases indicate economics, markets and norms. Further, recreation and incentives of sociability in networks promote vocations and professions.

IT, *social networks* and the Internet provide an opportunity to apply the theory of *value co-creation* with a focus on *social, economic and intellectual motivation* between people, businesses and governments. This provides an infrastructure for researching a theory on motivation, which supports participants, and allows for perspectives on theory, both pure and applied. Reiterating the theory regarding motivation, as explained in the previous section, motivation is concerned with action and interaction, while knowledge and proficiencies are motivational for intellectual decision-making. Motivation is not directly performance or behaviour in itself, and studies have emphasized that psychology, behaviour and performance are all different phenomena, which affect the analysis, interpretation and application of what is being studied (Mitchell 1982).

Rather, motivation is about choices that are voluntarily controlled by intellect or interaction that is perceived, convenient and experienced. An evaluation of *value co-creation* within IT, *social networks* and the Internet was necessary to determine the added value that is associated with people and the extent of voluntary control facilitated by proficiency, sociability and technology. The mechanism that affects behaviour, ability and motivation is associated with: (1) creativity and innovativeness, (2) resourcefulness of infrastructure, (3) proficiency and (4) equity. The theories associated with the above-mentioned choices are goal theory, expectancy theory, and innovations and equity theory. The benefits and challenges connected with routines that facilitate *value co-creation* across IT, *social networks* and the Internet were discussed, in turn associating the interaction of customers (i.e., businesses, people and governments) during management processes within a co-creation system. Socio-technological systems enable *value systems* across networks. For businesses that innovate, emphasis on design is increasingly a part of improving proficiency and efficiency within

businesses (c.f. Dell’Era and Verganti 2009). Competitions in design, sponsored and facilitated by businesses on the Internet, have invited and sought designs from designers and customers, resulting in an increase in the quality of designs being submitted (Füller et al. 2011).

The significant role played by *value co-creation* is to facilitate the integrative management of customers (businesses, people and government) for inclusive, creative and intellectual interactions in order to improve quality of life and adhere to quality and standards. In the case of healthcare services, improved quality of life is enabled by access to better technology-enabled innovation. The business and innovation environment needs to focus on improving quality management across business practices for boosting entrepreneurship and facilitating the ease of doing business. Along with these requirements, the environment needs to promote basic and advanced technologies, markets and venture capital with proficient labour for innovation. In this regard, the challenges of open access and regulation in the digital economy have impacted on the significance of net neutrality (c.f. Rogerson 2011).

Its main concerns are linked with traffic management, facilitation and regulation of interaction within networks, clarity, non-discrimination and discrepancies associated with pricing, and compliance with the quality of services provided and assured by the service provider. Collaborative and creative software management projects on the Internet have facilitated problem-solving. In businesses and establishments, the integration and functioning of services in IT, *social networks* and the Internet across Web 2.0 allow for knowledge creation and information management for product and service innovation. This improves when the information management of businesses integrates business practices with customer knowledge in *social networks*. For example, professions and vocations integrated with product and service networks have facilitated knowledge management, customer efficacy and referral-based shopping. The intention to interact in *social networks* is due to incentives, credibility and sociability. In blogs, *social networks* affiliated with professions and vocations have encouraged authorship, celebrities and readership in delivering product and service endorsement. Wikis have also facilitated collaborative knowledge management for the archiving of knowledge.

Further, attributes of information management, service convenience and ease of learning incorporated into the principles of designs in IT, *social networks* and the Internet have improved interactivity across *social networks*. Interactions between citizen journalists and news media organizations across the Internet have added

economic and social value effectively and generated additional revenue from advertisements.

In business, *electronic commerce* has facilitated product and service knowledge management for customers, both existing and new, in providing service convenience that is cost-effective, ecological and user-friendly. Economically, this generates significant revenue across geographies, cultures and themes. Integrating customer routines in both physical and virtual infrastructures in *electronic commerce* must take into consideration quality of information, information on transactions, provision of information and facilitation of purchases to enhance service convenience. On popular *electronic commerce* websites, the equity produced by *net neutrality*, in turn providing limitless customer access to sellers, results in cost savings and significant revenue generation for the business. Quality of interactions within *electronic commerce* facilitates customer decision-making during purchases and loyalty towards products and services. Businesses grow when *electronic commerce* adheres to norms and equity standards and integrates dynamic customer interactions. In this regard, one of the challenges is concerned with privacy management and enforcement of regulations. The costs and risks associated with networks have invariably compromised the usefulness, ease of use and likeability of *social networks* and *electronic commerce*. Employees of some firms using *social networks* in offices for rhetorical communications have even found it to be no more social, open and participative than traditional modes of communication. Awareness and knowledge management have resulted in smarter technologies.

In terms of leadership, collaborative IT management projects have provided the opportunity to identify leadership traits, communication styles and efficacy requirements of interactions with better information management. Further, businesses and establishments have facilitated quests for creativity and innovation in projects across networks by attracting intellectuals with motivation. Crowdsourced problem-solving challenges and the success of incentives in attracting intellectuals with ideal intrinsic and extrinsic motivation from across the world have resulted in significant industry investments in research and management.

The analysis using NVivo 10 qualitative software highlighted new research directions. These are associated with the variables, technology facilitators and measures of *value co-creation* for product and service innovation from a novel perspective. In the logistics industry, knowledge networks improve businesses when facilitated by industry investments in logistics budget allocations. Product and service knowledge management can be mutually associated with industry

services that facilitate *electronic commerce*. This results in network-added capital emerging from interaction themes, with strategy becoming integral to the creation of social capital. Meanwhile, knowledge management in networks has led to emerging leadership sought by businesses to overcome problem-solving challenges.

For the specific theme of alliances between businesses for IT-based *open innovation*, socio-technological innovation supplements industry investments. Commercial markets and market typologies are interrelated. Further, co-creating IT value between businesses facilitates co-shopping and investments between businesses and customers for commonly used and mutually useful technologies. In addition, in *social networks*, customers' attributes and their co-shopping traits are closely associated.

CRM is required when customer-added capital is created. Customer efficacy in *electronic commerce* is enhanced when facilitated by co-shopping in referrals, better product and service portfolio management, socio-technological innovation, customizable products and services, service model structures and customer-added capital. Study II is a survey that focuses on establishing the relevance of three types of motivation, namely, *social, economic and intellectual motivation*, to industry practitioners. A survey questionnaire was prepared to collect data from industry managers on 25 outcome attributes of *value co-creation* derived from the systematic literature review, as completed in Study I. Three individual hypotheses were stated and developed by specifying and associating the 25 outcome attributes of *value co-creation* to *social, economic and intellectual motivation*. Managers were interviewed from the manufacturing, IT, construction equipment, wood manufacturing, food, cosmetics, wellness and solar equipment industry to collect data on the relevance and use of *mobile networks, social networks* and the Internet in the context of their businesses. The data collected were statistically analysed using IBM SPSS 25, Minitab 17/18, IBM SPSS AMOS 25 and PAST 3.18 software to verify the hypotheses.

The following conclusions relating to the hypotheses were derived, based on Study II. First, the interaction between *intellectual motivation* and *economic motivation* demonstrated by *SEM* was studied. *Intellectual motivation* is enabled by *customer interaction, customer efficacy* and *customer innovation*, while *economic motivation* is enabled by *customer income and incentives, market knowledge* and *advertising, promotion, business strategy* and *CRM*.

In the interaction between *social motivation* and *economic motivation*, it was observed in the course of *SEM* that *social motivation* is constituted of attributes such as *customer or employee wellness, productivity in networking, customer*

*commitment and social networks. Meanwhile, economic motivation is constituted of attributes such as customer income and incentive; advertising, promotion, business strategy, CRM and market knowledge.*

In the interaction between *intellectual motivation* and *social motivation* developed via SEM, it was observed that *intellectual motivation* is constituted of *customer innovation, customer efficacy, customer interaction and knowledge, problem-solving and learning*. Meanwhile, *social motivation* is constituted of *generosity or reciprocity, customer values or interpretation, customer motivation, and voluntary disclosure of information or customer experiences*.

From a holistic view of the interaction between *intellectual motivation, social motivation* and *economic motivation*, SEM showed that *intellectual motivation* is constituted of *customer innovation, customer efficacy and customer interaction*. *Social motivation* is constituted of attributes such as *generosity or reciprocity, customer values or interpretation, and customer motivation*. *Economic motivation* is constituted of attributes such as *advertising, promotion, business strategy, CRM and market knowledge*. The other remaining attributes of the 25 outcomes of *value co-creation* were not given importance by managers in the survey. These attributes are *customer intentions and preferences, customer leadership, customer attitude, customer loyalty and trust, customer entertainment, co-shopping, customer knowledge, purchase intentions, and software as a service and cloud services*, as verified by the statistical study. This indicates that the potential of *value co-creation* is not fully utilized.

Recently published research papers on *value co-creation*, as discussed previously in this section, have confirmed the attributes that constitute *social, economic and intellectual motivation*, as derived in Study I. This finding is verified by the statistical analysis completed in Study II. Recently published literature on *value co-creation* was found to be closely associated with either one of the three types of motivation derived in Study I. However, they only focus on *social, economic and intellectual motivation* at an individual level.

In Study II, part of the research demonstrates, by applying SEM, how cohesively these motivations interact between themselves. As reported earlier in this section, however, Study II reveals that, in practice, the remaining attributes of the 25 outcomes of *value co-creation* have been ignored by managers who completed the survey. Further, the ignored attributes have been discussed in briefly in the recently published literature on *value co-creation*. Managers are only now realizing how these attributes could improve the implementation of *value co-creation* for the firm. Overall, the study completed using NVivo 10 resulted in the identification of the variables, technology facilitators, control variables and

measures of *value co-creation*, which are useful for managers as well as researchers and academics in various disciplines. These have not been previously studied, despite offering a comprehensive list of needs in value systems for customers (i.e., businesses, civic and government).

## 5.1 Managerial implications

Integrating and mapping the variables, technology facilitators, controls and measures of *value co-creation* helped in associating them with customers and establishments (see Appendix B). NVivo 10 qualitative software was used to extend the analysis of the systematic literature review. This resulted in better organizing and associating the numerous variables, technology facilitators, measures and controls. This opened up opportunities for exploring various themes for product and service innovation. Comprehensive *value co-creation* measures for customers and establishments were then associated with top-ranked ABS level 3 and level 4 journals in order to provide better clarity when writing this section on managerial implications.

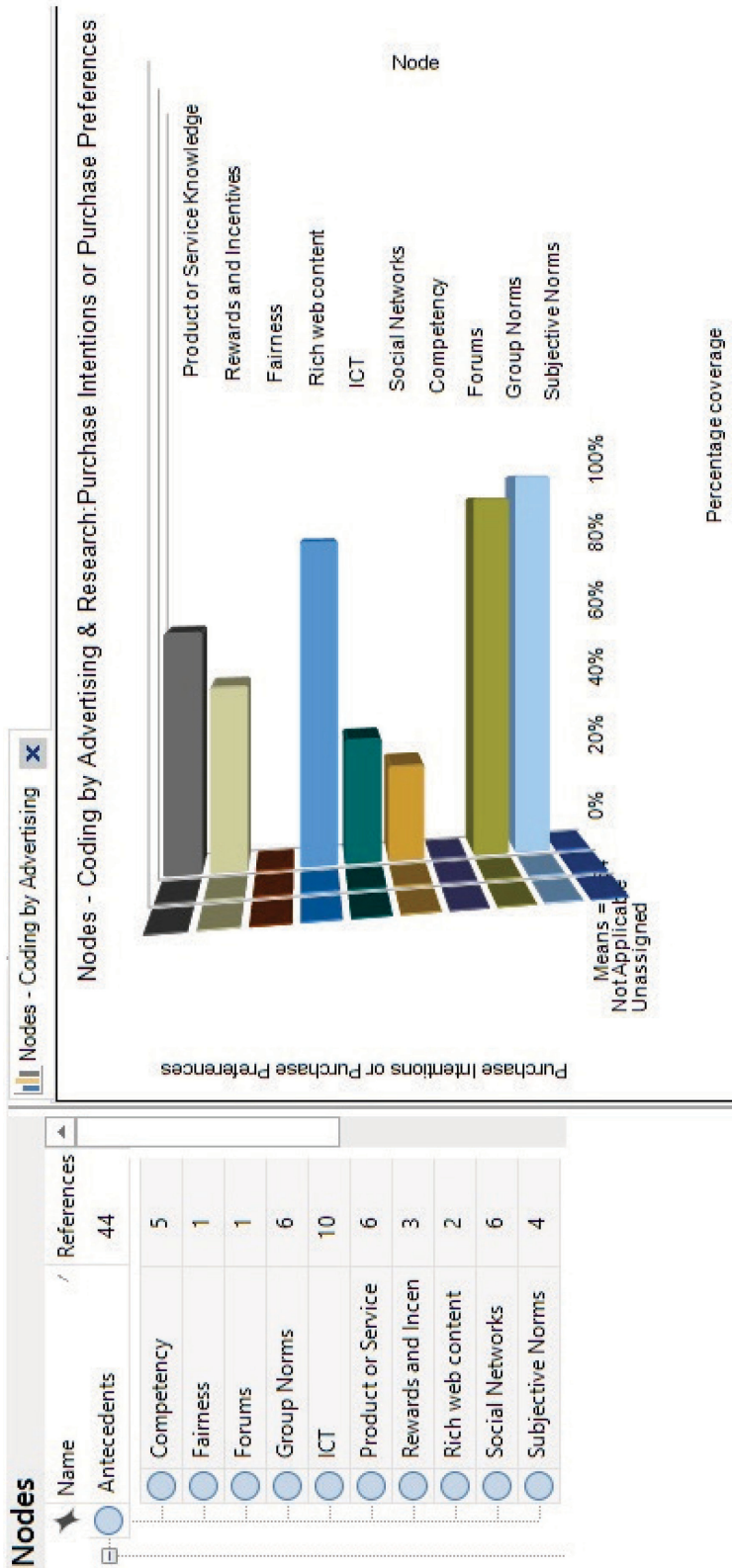
The measures of *value co-creation* for *information management* emphasize innovation, efficacy and privacy along with interactions for product and service knowledge management. *Business research* journals have discussed customer interactions, purchases, entertainment, referrals and values. Journals in the *psychology and marketing* fields have given significance to professions and vocations, wellness and *social networks*, entertainment and shopping referrals. Measures on *value co-creation* by people from the perspective of *decision support systems* and *advertising and marketing* are associated with motivations towards purchases, product and service knowledge, values, entertainment and shopping referrals. Discussions in *electronic commerce* journals have focused on *social networks*. (See the linkage exploration studies in Appendix B).

*Information systems* journals have focused on knowledge management for products and services. Journals in the fields of *marketing and advertising*, *decision support systems* and *business research* have examined how implementing *value co-creation* benefits customer support. They have also discussed the benefits of sociability in *social networks*, product and service networks, advertising and *information management*. Traditional management considers different interpretations for *value co-creation* across disciplines. For example, co-creation of value is associated with the disciplines of *marketing* and *research and development*. The co-creation of interpretation is associated with *psychology and sociology*. *Value co-creation*, being subjective, is associated with

*business research*. In businesses and establishments, efficacy, innovation and leadership in transitions are associated with routines that link disciplines (Roser et al. 2009). The management implications for research are discussed further in subsequent sections.

#### 5.1.1 Advertising, business research and decision support

Equity, IT, and product and service knowledge in networks have facilitated socio-technological innovations. This potential for *value creation* has been realized by businesses and establishments, which have provided incentives on projects and attracted intellectuals with the required disciplinary proficiency and the ideal intrinsic and extrinsic motivational mindset for creativity and innovation. Recreation, professions and vocations directly facilitate socio-technological innovation, *social networks*, and economic and social growth. Dynamic markets require significant information management and customer support to facilitate economic and social growth. Product and service knowledge, resourcefulness and *social networks* improve the interactions, reciprocity and sociability among customers in networks. Subjectivity in purchases across *electronic commerce* is associated with values such as culture, knowledge and markets. Purchases and recreation, along with product and service knowledge management in popular *social networks*, have prompted shopping referrals.



**Figure 35.** NVivo 10 qualitative analysis: associating purchase intentions or purchase preferences with advertising and research



Figure 35 above is a histogram associating the *purchase intentions and preferences* of customers on the Internet with the independent variables that impact on *value co-creation*. *Product and service knowledge, rewards and incentives, rich Web content, ICT, social networks, forums* and *group norms* are significantly associated with the *purchase intentions and preferences* of customers. These claims are based on the discussion and analysis completed during the systematic literature review.

#### 5.1.2 Electronic commerce, information management and information systems

Subjectivity, norms, IT, *social networks* and the Internet encourage discussions on vocations and professions. This provides measures on economic and social growth, markets, IT innovations, *social networks*, the Internet and popular markets. Equity, incentives and resourcefulness across networks, along with sociability, enable creativity, efficacy and privacy management during reciprocity and support vocations and professions. Proficiency and knowledge across disciplines and resourcefulness during interactions substantially add value to market portfolios, fostering innovations in IT, *social networks* and the Internet for economic and social growth.

#### 5.1.3 Psychology, marketing and strategic management

Equity, product and service knowledge, and incentives encourage socio-technological innovations. They further lead to interactions, discursiveness and wellness along with the values added from networking, reciprocity and recreation. For businesses, this has resulted in shopping referrals and better information management for easy decision-making. Effective ICT have facilitated proficiency and knowledge in order to enhance customer values, creativity and efficacy. This has led to knowledge management, leadership management and motivation. Interactions of customers in terms of values, recreation and incentives for sociability have been critical to professions and vocations. As for benefits, *value system* networks facilitate customers (i.e., businesses, people and government) with *information management* for better decision-making, economic and social growth, and market management. This provides management with measures on the values added from socio-technological innovation for realizing the needs of industry.

Customers are increasingly adding to the *value co-creation* of businesses. Businesses have begun to source and integrate customers in networks for

knowledge management and make improvements in products and services. Businesses in this regard are bringing together customer knowledge in defining and creating value. Improvements in IT, *social networks* and the Internet are providing a role for customers in the co-creation of products and services. Customers today are aware of the usefulness of IT, *social networks* and the Internet in connecting their lives through multitasking, sociability and improved productivity.

*McKinsey Quarterly's* November 2011 report notes that firms are increasingly making use of social technologies to extend their proficiency for value realization and utilization (Bughin et al. 2011). Numerous factors affect networked customers during human-computer interactions, although the advantages have not been clearly classified in terms of economic or social value. There have been difficulties in studying and identifying the variables, motivations and values added from *value co-creation*. Establishments have added value when their businesses and services have successfully integrated Web 2.0 with the interactivity of networked customers (i.e., people, businesses and governments) for knowledge management and new product management projects. The need for efficacy during interactions across networks implicates a multiplicity of perspectives, namely, from information management, decision support systems, advertising, psychology and marketing, electronic commerce, business research and strategy.

#### 5.1.4 Information technology, social networks, the internet and the facilitation of customers

While using IT, *social networks* and the Internet across networks, the capacity for authentication and temporal co-ordination during interactions and collaborations improves routines and participant efficacy in new product management (Schlosser et al. 2006; Huang et al. 2007; Füller et al. 2009). For example, in the case of wikis, successful knowledge management collaborations are directly associated with custodianship and responsibilities, themes, moderators, qualifiers, information management and coordination (Wagner and Majchrzak 2006). In *electronic commerce* that supports physical and virtual infrastructures, *information management*, incentives and savings results in customer purchases that significantly improve *service convenience* and *customer loyalty* (Oh and Teo 2010). Socio-technological innovations for *electronic commerce* are beneficial when they incorporate the geographies, cultures and themes (Messinger et al. 2009) of local markets. Today, people are increasingly utilizing location-based services facilitated by IT, *social networks* and the Internet for referencing, participating and socializing (Gordon and Silva 2011: 59). For example, geographical information systems and other platforms have provided these kinds

of services. *Social networks* emerge as groups during interactive knowledge management while profiles evolve during the referencing of values. However, the extent of interaction depends on net neutrality, the value of knowledge networks (Dholakia et al. 2003) and the extent of network localization.

#### 5.1.5 Interaction, communication and localization

Interaction of customers in networks has enabled sociability, knowledge management and expansion of markets. Localization of networks and customer interactions has resulted in creativity and innovation in IT, *social networks* and the Internet (Gordon and Silva 2011). This has also resulted in product and service knowledge management (Trusov et al. 2009) across geographies by encouraging and providing incentives for the discipline of marketing to invest in networks for markets, cultures and themes. In *electronic commerce*, the facilitation of instant messaging, resourcefulness and interactions by IT, *social networks* and the Internet empowers customers and enhances productivity for both them and business (Song and Zinkhan 2008). Marketplaces in networks are affected by two attributes of interaction, namely, the authentication and responsiveness of IT, *social networks* and the Internet (Hoffman and Novak 1997). The content and vividness of interaction in IT, *social networks* and the Internet are directly associated with their responsiveness. The ability of telecommunications to facilitate simultaneous customer interactions across geographically dispersed locations within *electronic commerce* offers a significant distinction from traditional marketing paradigms (Ozuem et al. 2006).

The resourcefulness and quality of information available on the Internet have enhanced customer efficacy to a significant degree (Healey 2011). Hence, efficacy satisfies customers in terms of needs, decision-making and knowledge management. For example, when landlines were put out of operation during the 2010 earthquake in New Zealand, the effectiveness of *social media* created significant awareness and support among citizens (Dabner 2012). By enabling real-world experiences within IT, customers perceive them as realistic and the medium as interactive, especially for those who perceive its usefulness. Another popular example is the customer use of geographical information systems for location-based information and services (Gordon and Silva 2011: 31), such as maps that are informative for learning more about cities, locations and services.

Further, the cultures, subjectivity and living standards of customers in *social networks* also help them evaluate the sociability and usefulness of product and service networks (Shen et al. 2010; Nambisan and Watt 2011). The popularity of IT and the incentives and savings to use networks make it relevant for businesses,

establishments and services to explore opportunities and collaborate with customers. This is relevant because people around the world personally utilize IT, *social networks* and the Internet for working at home and in offices or other locations to organize themselves via emails, mobile phones or webpages (Hine 2005: 1; Höflich and Kircher 2010) in the interests of productivity, sociability and work-life balance.

#### 5.1.6 Interaction in information technology, social networks and the internet for co-creation

*Social networks* and localization provide measures for managers by facilitating customers into product and service knowledge management. IT, *social networks* and the Internet now allow customers to interact in the design of products. *Social networks* that are symbolic or ideological enable collaborative interactions in terms of cultures, geographies and themes, in turn helping to improve product and service knowledge (Hine 2005: 93). These networks benefit from net neutrality, cultures and customer interactions when IT supports *information management*, *service convenience* and *ease of doing business*.

#### 5.1.7 Product or service knowledge management

The requirements for using Web 2.0 services for knowledge management can vary, based on business infrastructure, establishments, and product and service markets. Therefore, it is necessary for businesses to integrate customers into product and service knowledge management in order to organize both external and internal knowledge (Shang et al. 2011). Avatars and customers' ability to personalize profiles on the Internet lead to creativity, innovation and sociability (Kohler et al. 2011). Avatars on the Internet promote sociability and interactions when designs in IT, *social networks* and the Internet incorporate attributes that support *information management*, *service convenience* and *ease of use* (Hung and Li 2007). Collaborative IT projects, which invite and engage with intellectuals from an audience that is unknown and unrestricted, has been found to extract the intrinsic and extrinsic motivation required for problem-solving challenges (Frey et al. 2011). Past research has also suggested that businesses are able to calibrate CRM during product and service knowledge management in *social networks* (Hamilton and Hower 2010).

#### 5.1.8 Networked locality

Customer interactions in *social networks* facilitate purchases, cultures and value creation (Kim et al. 2008). Netbanking services offer *service convenience* to new customers along with *information management*, a fact that improves business performance (Köhler et al. 2011). Interactive graphics in gaming and customer enthusiasm in *social networks* have contributed to geographies, cultures and themes. The attributes of networks associated with products and services create value when they are linked with geographies, efficacy needs and markets.

Purchases in markets are not affected by advertisements on the Internet but by cultures, needs and subjectivity. Studies on interaction demonstrate that mobility and freedom within IT, *social networks* and the Internet improve its effectiveness. Networks facilitating the expansion of markets, creativity and improvements in design within IT, *social networks* and the Internet provide for sociability, further adding to the growth of the economy and enabling free markets.

#### 5.1.9 Product concept effectiveness

Product and service networks directed at customers add value to businesses and have become extensions for firms seeking to integrate customers into the co-creation of products and services. Networks supported by businesses help define and market products and services in *electronic commerce*. They resolve queries and support small and medium-sized business expansion. Product and service networks that are customer-oriented are increasingly being appreciated for their service convenience and product and service knowledge management (Nambisan and Watt 2011). Thus, networks support responses during the launch of products and services across networks for improvements.

The success of networks associated with products or services depends on attributes such as equity, sociability and values. These further add value to the efficiency of systems on the Internet during knowledge management, interaction and consensus. Businesses enhance the wellness of employees by facilitating sociability, interaction and knowledge management across networks. In terms of marketing, the advertisements and behavioural economics integrated into *social networks* associated with products and services generate additional revenue for businesses (Moran and Gossieaux 2010).

With increases in customer efficacy, it has become obvious and lucrative for businesses to opt for *electronic commerce* in a global economy. For retailing firms operating in electronic commerce, networks create economic value when the

navigation within socio-technological innovation integrates product promotion, pricing and transactional processes in an orderly way (Oh and Teo 2010). This increases the effectiveness of human-computer interactions. *Electronic commerce* and retailing have added value to customers because of the integration of logistics and channelling of shippable products enabled by a combination of routines for retrieving information, in turn facilitating purchases and services that result in convenience for customers across networks.

#### 5.1.10 Information technology, social networks and the internet as technology facilitators

In the case of simulated auctions on the Internet, messaging and interaction within IT, *social networks* and the Internet during bidding sessions leads to an increase in the presence of bidders, who are more responsiveness and effective at bidding (Rafaeli and Noy 2002). Hence, infrastructures and services for knowledge management within Web 2.0, when integrated, can significantly generate revenue and sociability. With the management and transformation of infrastructure and services for IT, *social networks* and the Internet in Web 2.0, knowledge management networks supporting customers and businesses have created substantial value. This has resulted in opportunities for implementing behavioural economics, product and service management, and market growth.

Customer awareness and discussions regarding privacy concerns on *social networks* have led to the call for improved collaborative privacy management (Squicciarini et al. 2010). Privacy and authentication in networks improve membership, loyalty and credibility for businesses. Further, knowledge management networks enhance customer awareness and quests for sourcing customer creativity on collaborative innovation projects.

#### 5.1.11 Authentication, efficacy and value creation

Hyperconnected sellers in *electronic commerce* have created considerable economic value by providing customers with access to a significant number of shops across networks (Stephen and Toubia 2010). *Electronic commerce* has demonstrated that the centrality of sellers and shops is absent from networks and effectiveness of *net neutrality* in connecting sellers in marketplaces facilitates business. In addition, studies have emphasized that successful Web 2.0 implementation is contingent on better *information management* routines during business, civic and social interactions due to the sensitivity of infrastructures to transitions. Interaction and customer vigilance in networks improve efficacy and

product and service knowledge management, which add value to businesses and establishments. Hence, it is necessary for businesses to interact with customers in networks during the co-creation of innovation and new product design. For example, collaborative knowledge repositories such as wikis have demonstrated that authentication and interaction in networks improve the quality of knowledge creation and aggregation (Wagner and Majchrzak 2007). Further, this study emphasizes that effective knowledge management, during interactions and collaborations using IT, *social networks* and the Internet, depends on incentives, custodianship, prioritization, productivity and management of members.

#### 5.1.12 Information policy and sociability

*Social networks* are increasingly facilitating debate and discussions around policy (Agarwal et al. 2008). In the case of expanding of small and medium-sized businesses, the management of infrastructures in Web 2.0 and the opportunities for customer collaboration for value creation across *social networks* have presented a number of challenges for policymakers. This is due to the lack of clarity about the nature and boundaries of the firm (Bell and Loane 2010). On today's Internet, one of the objectives of business policy is to ensure that existing technology infrastructures are able to transition to newer and better business infrastructures supported, among others, by Web 2.0. Due to the variation in the use of networks among businesses and establishments for collaboration, policymaking adds value by reducing deficiencies in finances or labour for markets.

Thus, new technology infrastructures, such as *electronic commerce*, require the maintenance of large volumes of data during transactions, storage, print and distribution of content. Policy management in this regard for businesses would not only need to take objectives related to both commercialization and patents into consideration (Valck et al. 2009), but also privacy management across networks (Squicciarini et al. 2011). Further, customer motivation and the effectiveness to perform routines in knowledge networks add value to knowledge management and knowledge aggregation (Huang et al. 2007) from the perspective of better policy formulation. Learning about products and services in networks and the sociability of interactions improve customer knowledge and promote creativity and innovation. As such, IT, *social networks* and the Internet need to incorporate *information management*, *service convenience* and ease of use for customers (Hung and Li 2007). The credibility of discussions adds further value to cohesiveness, vigilance and stability in interactions.

### 5.1.13 Customer decision-making

Creativity and innovation in *social networks*, when sourced by customers, have facilitated interaction, aesthetics and efficacy, resulting in more effective communications (Lechner and Hummel 2002). Customer authorship and documentation in *social networks* reflect opinions, needs and life management (Lee et al. 2008). People perceive the Internet as an environment for personal freedom and discussion with a certain degree of anonymity (Hine 2005:14).

Research has shown that, in collaborative interactions such as Wikipedia, the creation and aggregation of knowledge distinctly add to knowledge management (Ransbotham and Kane 2011). Aggregation of knowledge requires stability in interaction across networks for effective knowledge management. Further, improvements in IT, *social networks*, while the Internet facilitates increased interactions in networks leading to better knowledge management. Networks enabling product and service evaluations improve the knowledge and efficacy of customers (i.e., people, businesses and governments).

Customer awareness and sociability in product and service networks have enabled interactive knowledge management (Riegner 2007). Customers in *social networks* have demonstrated advocacy regarding products and services and are likely to market them more effectively. Table 24 is based on conclusions derived from the literature on *value co-creation*. Further, Figures 36 to 43 explain directly how facilitators of value co-creation listed in Table 24 pose managerial implications for industry.

**Table 24.** Different facilitators of value co-creation (analysis based on evaluation of the literature)

Facilitators	Examples	Measures of economic, social and intellectual value co-creation across networks		
	Learning systems and research	Purchases / trade / sales	Management of knowledge	Values added by the customer, co-development
	Customer protection / accountability			
	Leadership			
	Strategic advantage			
	Innovation / entrepreneurship/ business practices and human resources			
	Business growth / initial public offering			



	Marketing			
	Knowledge management, management of routines facilitating businesses, co-development, values added by the customer	Logistic complementarity	Shopping from referrals; Subjectivity during purchases	Social networking, quality of information
<b>Facilitators</b>	<b>Examples</b>	<b>Measures of economic, social and intellectual value co-creation across networks</b>		
Growing membership, interaction / routines, systems of payment, costs of transaction, affordability	Logistical complementarity	Business portfolio, dynamic networks	Infrastructures in IT, <i>social networks</i> and the Internet for support, value of collaborations (budget allocation), technology localization	Corporate practices
Growing membership, interaction / routines	Co-shopping, subjectivity in purchases		Logistical complementarity	Dynamic networks, social networking
Growing membership	Social networking	Market value, market characteristics (geography, cultures, themes)		Dynamic networks
Timelines, geographies, temporality in co-ordination, interaction / routines, growing membership, qualifiers, networking, markets (geography, cultures, themes)	Growth/dynamic networks	Quality of information, popular markets	Service provision/ convenience	Governance/ custodianship
Popularity of markets (environment, proficiency, sociability, services, knowledge)	Membership/ growth/dynamic networks	Popular markets	Markets (geographies, cultures, themes)	Quality of information, service convenience, value of collaborations (budget allocation)
Authentication, services for customers / management of information	Service facilitation /convenience	Integrated channels and resources	<i>Electronic commerce</i>	Complementarities of portfolios
Promotional information, product and pricing information, transaction information	Information quality			

IT, *social networks* and the Internet offer an opportunity for businesses to directly integrate the customer into projects for creating and improving products and services. Sponsors would therefore need to invest in utilizing ICT to facilitate collaborations for interaction, temporal co-ordination and creativity (Kohler et al. 2011). This would require designs for IT, *social networks* and the Internet incorporating knowledge of telecommunications, instrumentation, psychology and behavioural economics (Nambisan and Watt 2011). Studies support the fact that collaborative IT projects have successfully attracted intellectuals with the required level of proficiency to work on problem-solving challenges.

*Social networks* have enabled sociability and interaction, which have improved products and services, due to interactivity supported by perceived familiarity, similarity and intellect (Shen et al. 2010). Product and service networks that retain membership and interactivity during knowledge management, creativity and innovation facilitate sociability among members and promote shopping referrals (Chan and Li 2010). For example, in *social networks* such as blogs, the credibility of writers and the knowledge management and sociability between authors and customers have promoted membership and efficacy (Colliander and Dahlén 2011). Blogs are popular due to their informality in promoting professions and vocations, creativity and authorship (Huang et al. 2007); and, along with other popular *social networks*, they provide opportunities for implementing behavioural economics. Advances in Web 2.0, socio-technological innovations and collaborative IT management projects have led to the rapid expansion of small and medium-sized businesses, in turn creating economic and social value.

Small and medium-sized businesses using Web 2.0 infrastructures are now able to leverage the internal and external knowledge of markets (Bell and Loane 2010). Further, the opportunity for networked value, cost-effectiveness and creativity provides firms with the logistical advantage of co-creating business logic and multichannel product procurement (Rai et al. 2012). *Social networks* have added value to businesses in managing product and service knowledge by continuously and iteratively evolving and customizing products in consultation with customers (Harwood and Gary 2010). Interaction of customers in popular *social networks* associated with products and services has facilitated efficacy and references for customers decision-making (Valck et al. 2009).

Collaborative IT projects have sourced intellectuals with the required intrinsic and extrinsic motivation and proficiency for substantial creativity and innovation (Frey et al. 2011). Research has verified that, in professional service firms, employees' proficiency in creating and aggregating knowledge improves innovation for businesses (Gray et al. 2011). This supports employees in recombining their

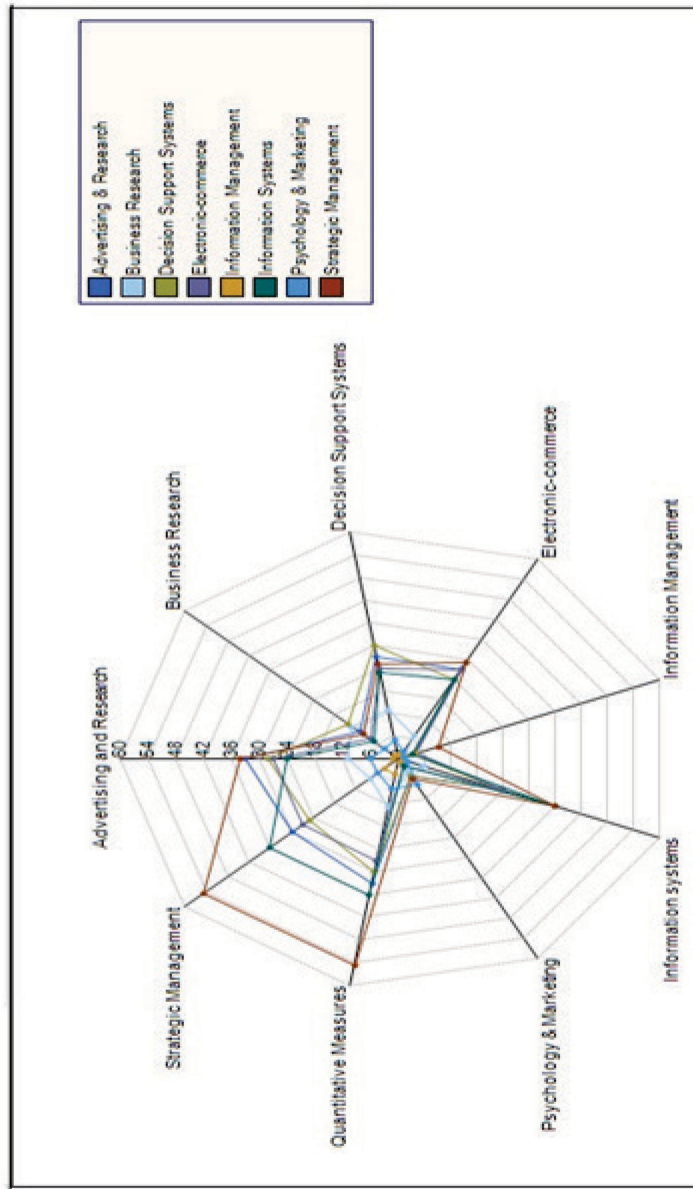
knowledge and applying an set of considerations to complement creativity in firms. Effectiveness during project learning within IT depends on the ease of interactions, sourcing of knowledge and stability in membership for creativity and teaching (Au et al. 2009).

In *social networks* associated with products and services, the interaction of customers directly adds to resourcefulness, knowledge management and reflexivity (Hung and Li 2007). The extent of interaction and reciprocity across networks adds value to marketing in terms of effectively managing product and service knowledge and providing customers with excellence in services (Moran and Gossieaux 2010). *Electronic commerce* generates considerable economic value when sellers are connected and accessible across networks. As the centrality of shops in networks is absent, this allows for sellers to be connected across networks, making them more accessible to customers browsing the Internet (Stephen and Toubia 2010). Further, small and medium-sized businesses' integration with Web 2.0 enhances their capabilities and proficiency in markets (Bell and Loane 2010). The economics of *social networks* highlights the effective collaboration facilitated by sociability, creativity and efficacy (Lechner and Hummel 2002). In *electronic commerce*, the design of IT, information management and convenient payment systems economize and provide mobility, sociability and service convenience for the customer.

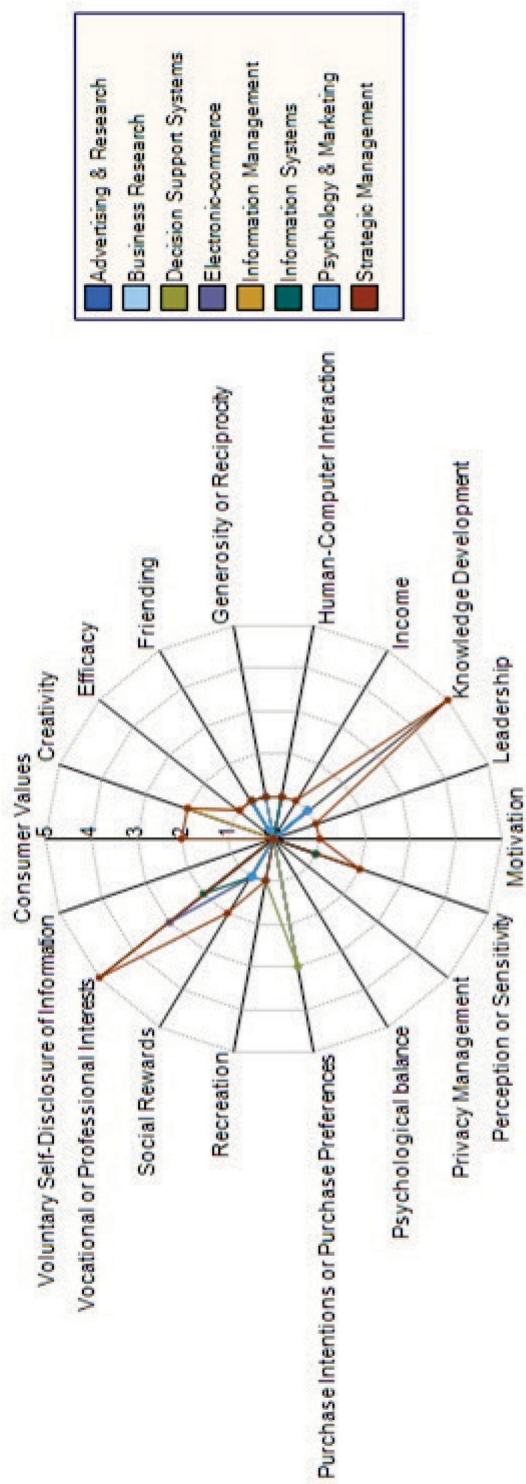
In addition, studies demonstrate that, in Web 2.0, dynamic network interactions and user-generated content have led to enhanced product and service knowledge management, in turn providing considerable support to customer decision-making (Riegner 2007). Studies have discussed that *value co-creation* can be categorized and visualized in terms of four quadrants, namely: (1) customer-led innovation, (2) producer-led innovation, (3) standardized innovation and (4) personalized innovation. These are associated with mass collaboration, mass customization, mass production and co-production for personalization (Roser et al. 2009).

Thus, firms' decisions during *value co-creation* depend on either customer facilitation (i.e., co-production or personalization and mass collaboration) or producer facilitation (i.e., standardization, mass customization) and may be evaluated using a co-creation matrix (Roser et al. 2009). The different facilitators of *value co-creation* described in Table 21 were further extended in the form of a comprehensive study using NVivo qualitative analysis software, which organized the variables, technology facilitators, control variables and measures of *value co-creation*.

Various attributes for the variables, technology facilitators and measures of *value co-creation* were derived from the systematic literature review. These have not been thoroughly applied and implemented across different management disciplines. This would require further research. Figures 36 to 43 illustrate the analysis of this study and emphasize its relevance in applying *value co-creation* across research and industrial best practices. Figure 36 illustrates the extent of *value co-creation* studies completed in the context of various management research disciplines and their relevance. The extent of *value co-creation* studies is colour-coded in the diagram. An analysis of the systematic literature review in NVivo 10 indicated that the content of *strategic management* research and quantitative studies on *value co-creation* is significant in comparison to discussions on *value co-creation* within the management research disciplines of *advertising and research, decision support systems, information systems* and *electronic commerce* on an individual basis.



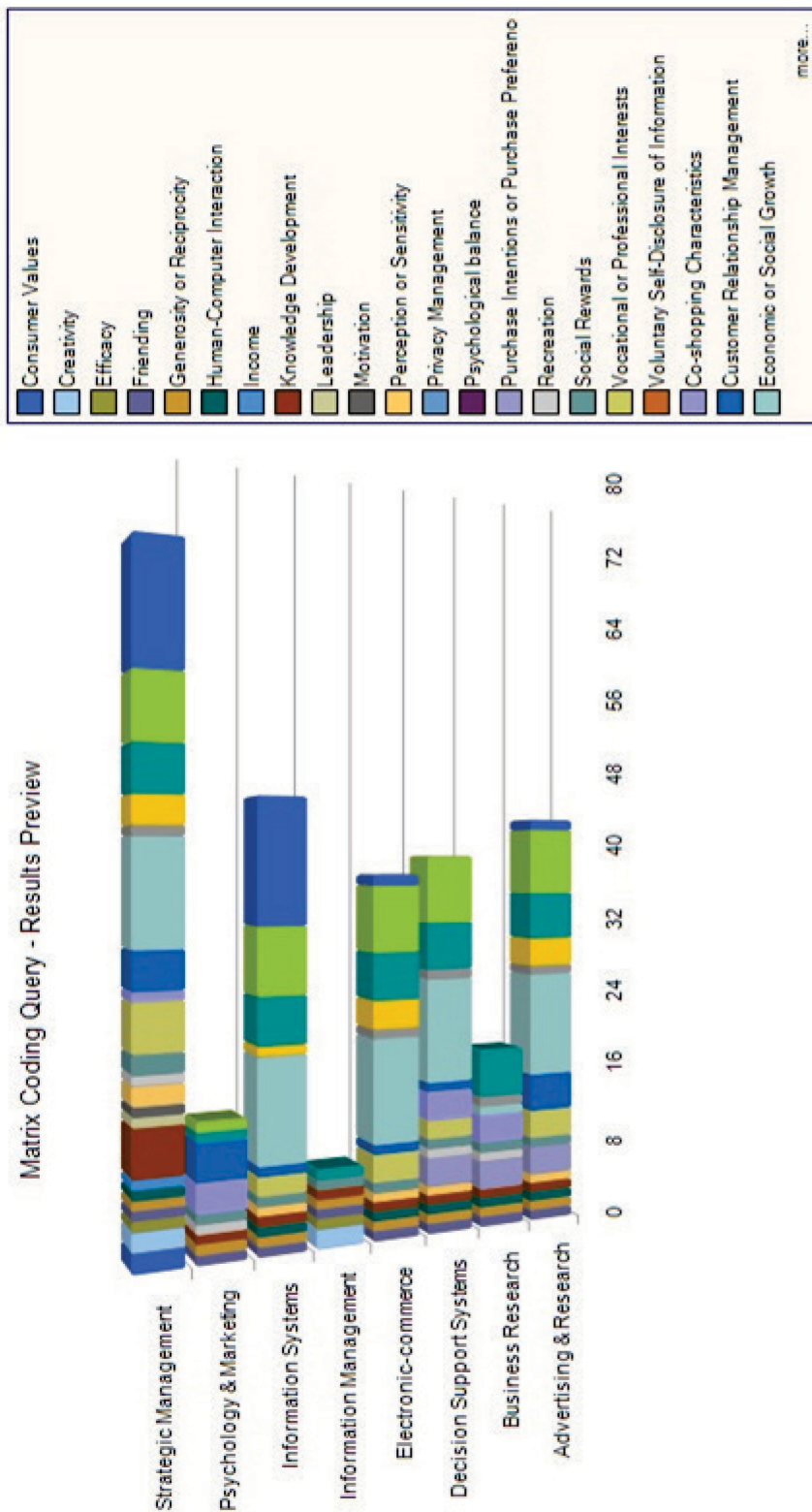
**Figure 36.** NVivo 10 qualitative analysis: extent of value co-creation research across management disciplines



**Figure 37.** NVivo 10 qualitative analysis: research on value co-creation across different management disciplines

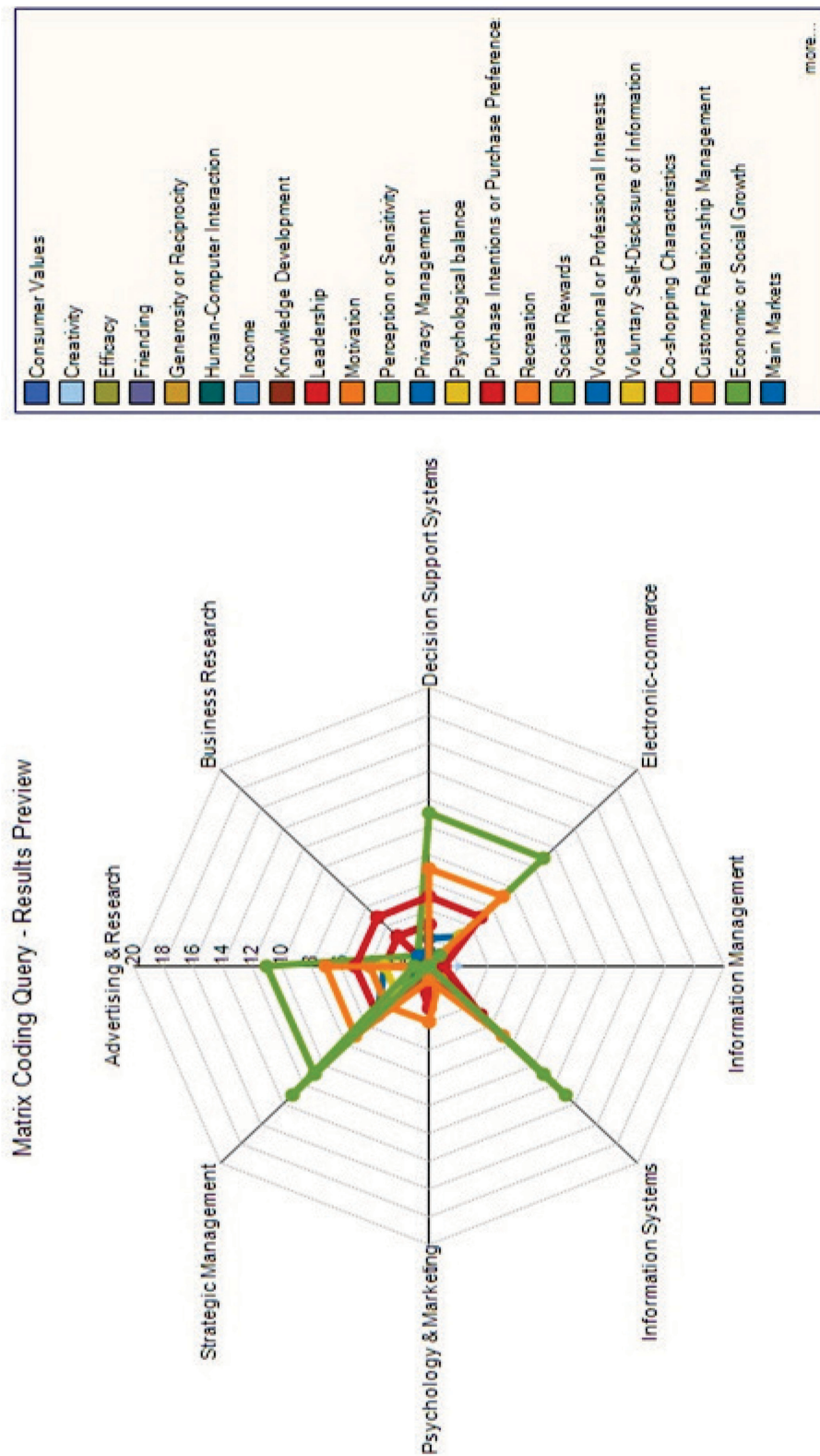
Figure 37 illustrates how the different measures of value co-creation associated with customers are relevant to different management research disciplines. The facilitation of professions and vocations on the Internet, knowledge management, creativity, customer values, recreational networks, social rewards, friending, generosity and reciprocity, perception and sensitivity, motivation, leadership and human-computer interactions are relevant to strategic management. Knowledge management, friending, generosity and reciprocity, and social rewards are moderately relevant to psychology and marketing. The facilitation of professions and vocations on the Internet are also relevant to advertising and research. Purchase intentions and preferences are relevant to decision support systems.

Figure 38 below was generated in NVivo 10 and displays a histogram of the various management research disciplines and the stacking of the different measures of value co-creation relevant to customers and establishments. The size of the box and colour indicate the specific attribute or measure of value co-creation and the significance of the analysis with respect to a specific management discipline. The height of the column stacks indicates the significance of the research associated with a specific management discipline. During the systematic literature review, and from the NVivo 10 analysis of the measures of value co-creation, it is inferred that most of these value co-creation measures are significantly relevant to strategic management. This is followed by the disciplines of information systems, electronic commerce, decision support systems, and advertising and research. The other relevant management research disciplines are psychology and marketing, information management and business research.



**Figure 38.** NVivo 10 qualitative analysis: outcome attributes of value co-creation researched across management disciplines

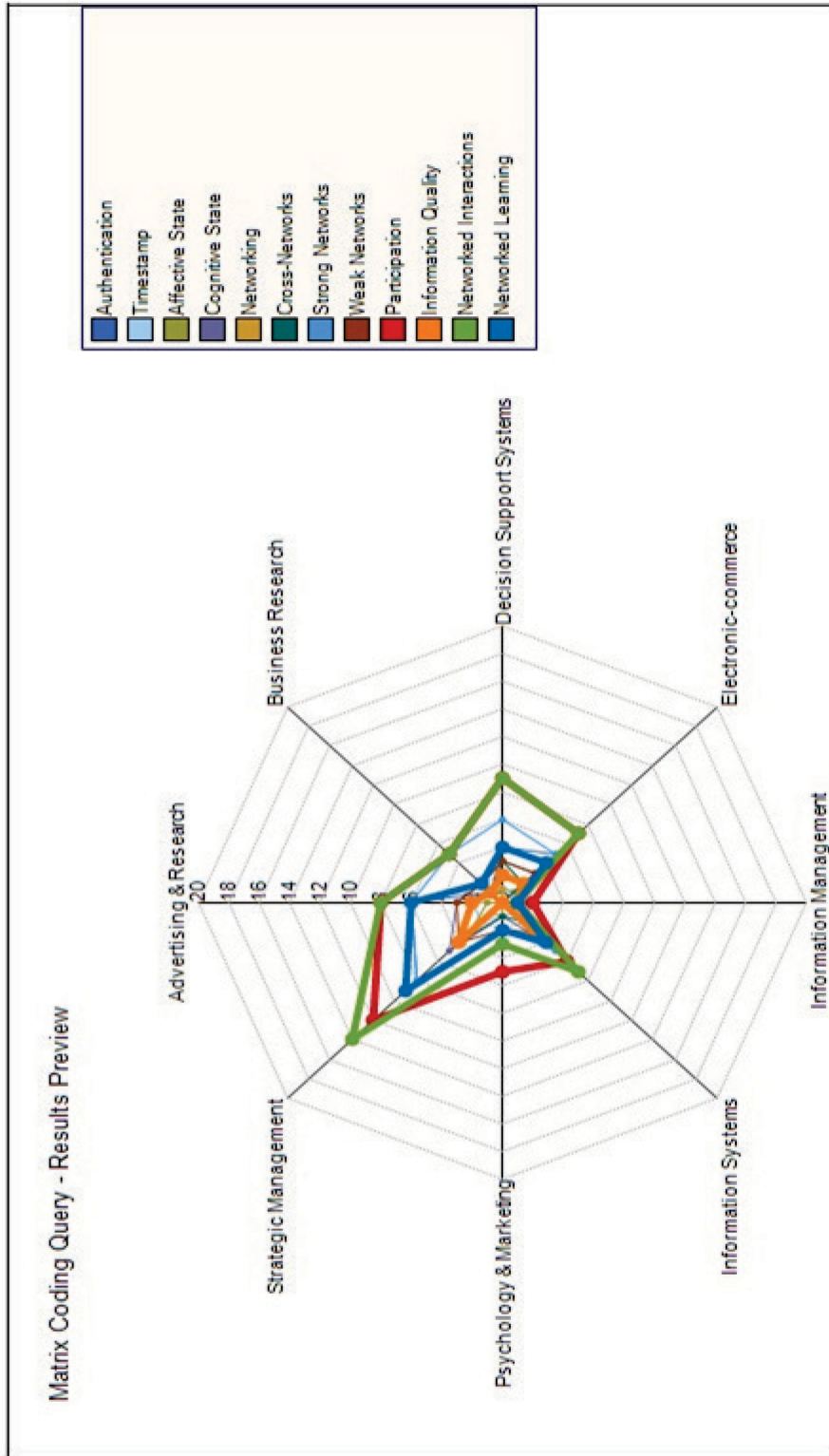




**Figure 39.** NVivo 10 qualitative analysis: outcome attributes of value co-creation referenced within management disciplines

Figure 39 also highlights the scale of research on value co-creation facilitated by different management disciplines. The green line signifies that strategic management, information systems, electronic commerce, decision support systems and advertising and research have, to a great extent, researched measures such as perception and sensitivity, social rewards, and economic and social growth. The orange lines indicate that these management disciplines have moderately researched attributes such as motivation, recreation and CRM. The red lines indicate other studies relevant to these disciplines, which have considered leadership, purchase intentions and preferences, and co-shopping. There are limited studies on privacy management, facilitation of professions and vocations on the Internet and significant markets.

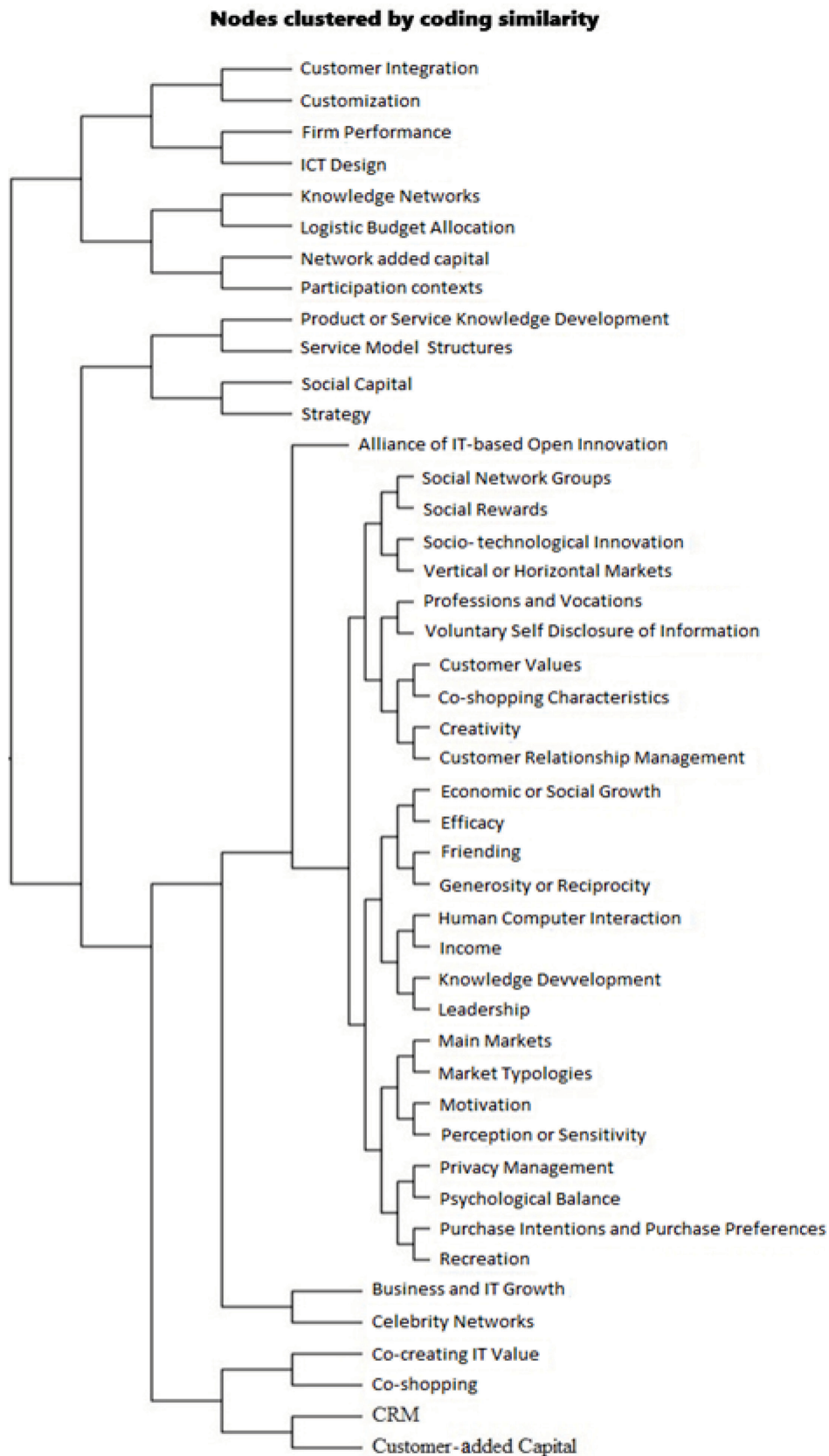
Figure 40 illustrates the extent of technology facilitators and the relevance to different management disciplines. The green line indicates the extent of studies on networked interactions that are relevant across different management disciplines. Similarly, the blue line indicates the extent of studies on networked learning. The orange line indicates the extent of research on information quality.



**Figure 40.** NVivo 10 qualitative analysis: research on technology facilitators of value co-creation across management disciplines

The questionnaire survey completed for Study II and the data collected have statistically verified the specific attributes of social, economic and intellectual motivation as enablers of value co-creation. Intellectual motivation is enabled by customer interaction, customer efficacy, knowledge, problem-solving and learning, and customer innovation. Economic motivation is enabled by customer income and incentives, market knowledge and advertising, promotion, business strategy and CRM. Social motivation is constituted of attributes such as customer or employee wellness, productivity in networking, customer commitment and social networks, generosity or reciprocity, customer values or interpretation, customer motivation and voluntary disclosure of information or customer experiences. Other attributes such as customer intentions and preferences, customer leadership, customer attitude, customer loyalty and trust, customer entertainment, co-shopping, customer knowledge, purchase intentions, and software as a service and cloud services were not given importance by managers who completed the survey in this study. This indicates that the potential of value co-creation has not been fully utilized.

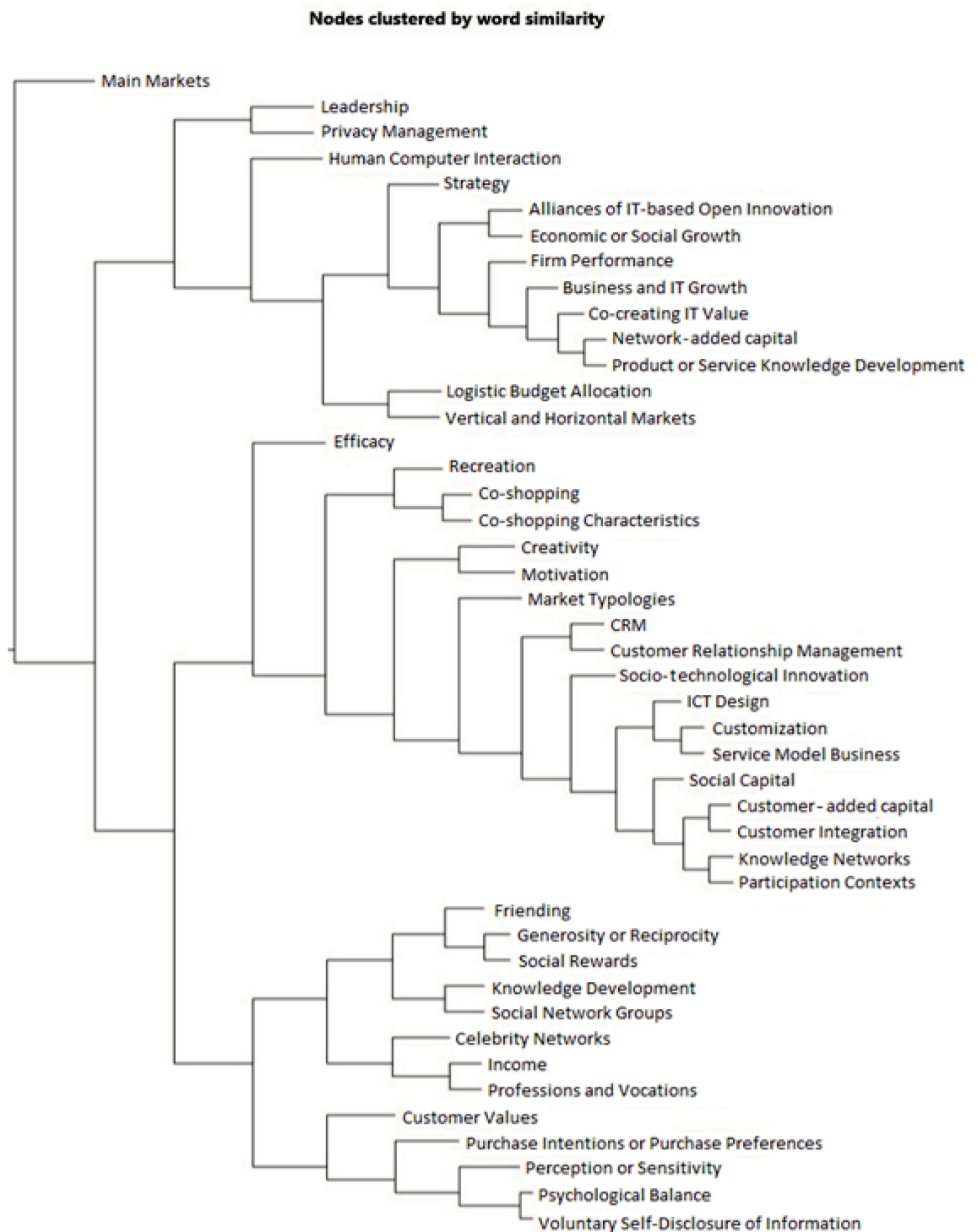
Figure 41, on the next page, visualizes deep learning for *value co-creation* as created in NVivo 10. Analysis during the systematic literature review and studies in NVivo 10 have identified comprehensive measures relevant to the implementation of *value co-creation*. *Customer integration* complements the customization of products and services. *Firm performance* for the Internet is complemented by ICT. *Knowledge networks* in this regard require *logistics budget allocation*. *Network-added capital* becomes relevant for different interaction themes. *Service model management* is relevant to the management of *product and service knowledge*, while *social capital* complements strategy needs.



**Figure 41.** NVivo 10 qualitative analysis: deep learning on value co-creators

*Alliances of IT-based open innovation* are supported and facilitated by various factors. *Social network groups* offer *social rewards*. In this regard, *socio-technological innovation* also satisfies the needs of industries. *Professions and vocations* supported on the Internet allow for the customer documentation and archiving of content. These are associated with *customer values* that further complement attributes such as *co-shopping*. This has in turn facilitated creativity and CRM. The *economic and social growth* of industries is facilitated by *customer efficacy*. *Friending* and the rewards of *generosity and reciprocity* have also added to business. *Human-computer interactions* have become a source of income for the customer. From this perspective, ICT have facilitated *knowledge management* and *customer leadership*. This is additionally relevant to *market typologies* and *significant markets*. The motivation to interact on the Internet is associated with *perception and sensitivity*. This is relevant to attributes such as *privacy management* and *psychological balance*. *Electronic commerce* is facilitated when these are taken into consideration in order to account for *purchase intentions and preferences*, as well as *recreation* needs. *Business and IT growth* is also complemented by *celebrity networks* that *co-create IT value* and encourage *co-shopping*. This is especially relevant to CRM and *customer-added capital*.

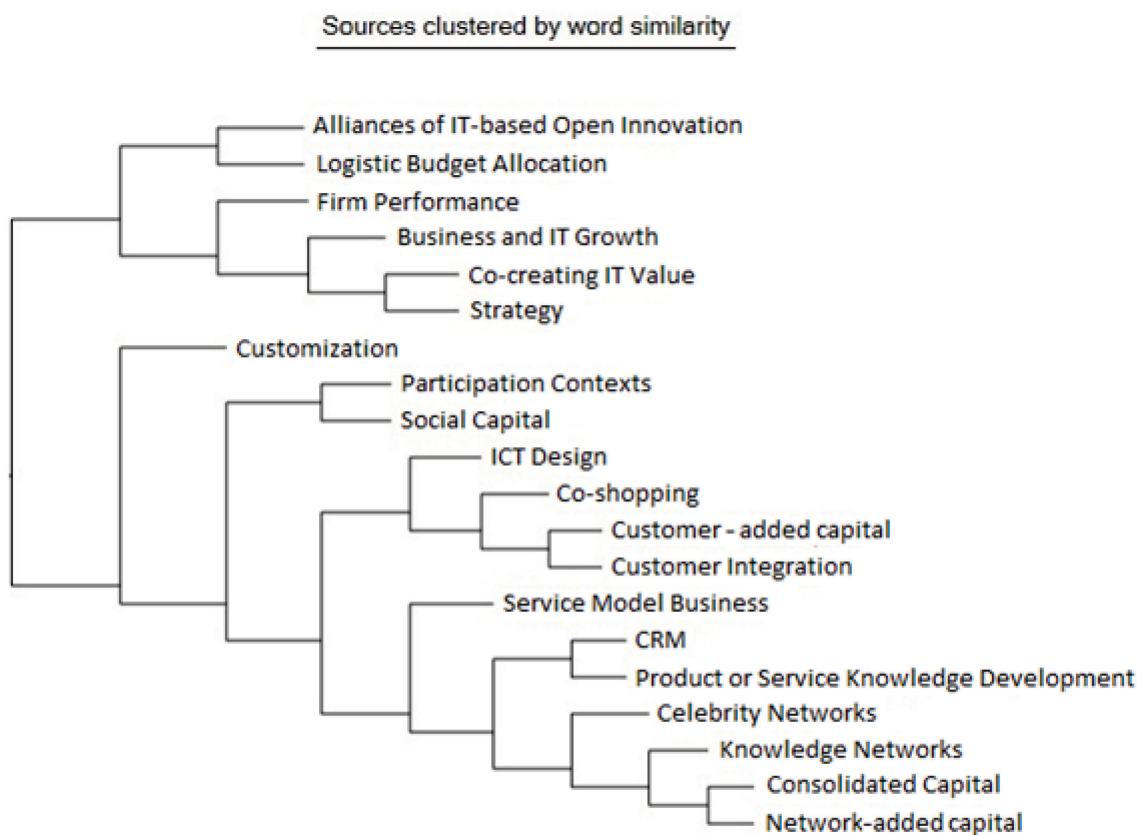
Figure 42, on the next page, provides an illustration of the extensive text analysis completed in NVivo 10 for the systematic literature review undertaken in Study I, showing the relevance of significant markets. In this regard, it is inferred that privacy management complements leadership. Human-computer interaction requirements for satisfying IT needs also take into account the strategy needs of alliances of IT-based open innovation, economic and social growth, firm performance, business and IT growth, and the co-creation of IT value. The latter is facilitated by both network-added capital and product and service knowledge management. Logistics budget allocation and industry needs also complement the strategy needs of implementing IT.



**Figure 42.** NVivo 10 qualitative analysis: nodes clustered by word similarity

Complementing the attributes of customers, such as their leadership, privacy management and human-computer interactions, are qualities such as customer efficacy. This is facilitated on the Internet by activities such as recreation, co-

shopping, creativity and motivation, market typologies, CRM and socio-technological innovation. This is further facilitated by ICT design, which incorporates customization and service model management. Complementing this is social capital, as facilitated by customer-added capital, customer integration, knowledge networks and interaction themes. Other attributes complementing customer efficacy are friending and social rewards such as generosity and reciprocity, celebrity networks, and sources of income and support for professions and vocations. Further, customer values are associated with purchase intentions and preferences, perception and sensitivity, psychological balance and documenting and archiving of content.



**Figure 43.** NVivo 10 qualitative analysis: deep learning on value co-creators

Figure 43 displays the various themes and studies on value co-creation, as explored in the systematic literature review. This is of relevance to the provision of customer interactions with the firm in standardizing and customizing products and services. Alliances of IT-based open innovation are complemented by logistics budget allocation. Firm performance depends on the strategy and co-creation of IT value for business and IT growth. Customizing products and services needs to take into account the requirements of social capital. This is facilitated by socio-technological innovation that incorporates the needs of co-shopping, customer-added capital



and customer integration. Service model management would need to consider CRM for managing product and service knowledge. This may be complemented by celebrity networks supported by knowledge networks and network-added capital.

## 5.2 Theoretical implications

The theoretical contribution of this research is that the systematic literature review identified the variables, technology facilitators and measures of *value co-creation* across the Internet, mobile and *social networks*. The identified variables were *subjectivity, norms, vocations and professions, proficiency, technologies and infrastructure, technology popularity, net neutrality, advocacy, incentives, and product and service knowledge*. The *technology facilitators* were identified as *authentication, networking and interaction*. The *control variables* were identified as *dynamic networks, customer awareness, transaction cost economics, technology transformations, governance, complementarities, network logistics, timelines, IT project management, clientele, IT capabilities, knowledge capital and knowledge management networks, informatics and role definitions*.

The measures of *value co-creation* were identified for both customers and establishments, consisting of 25 attributes of *value co-creation*. The attributes associated with customers are *customer interactions, knowledge, problem-solving and learning, customer attitude, generosity and reciprocity, customer values and interpretation, customer motivation, customer loyalty and trust, voluntary disclosure of information and customer experiences, customer income and incentives, customer and employee wellness, productivity in networking, customer commitment, customer entertainment, customer knowledge, purchase intentions, customer leadership, customer innovation, customer efficacy, and customer intentions and preferences*. Those associated with establishments are *co-shopping, market knowledge, software as a service and cloud services, CRM, advertising, promotion and business strategy, and social networks*.

An analysis explains how the identified variables are associated each other. *Proficiency* and *subjective norms* complement the functioning of *forums* on the Internet. Forums are complemented by *rich Web content, fairness, rewards and incentives, ICT, product and service networks, social networks and group norms*. An analysis of the *technology facilitators* of *value co-creation* associates *authentication, networking and interaction*. These are complemented by *strong and weak networks, cross networks, networked interactions and networked learning*, along with *information quality and timestamps*.

The *technology facilitators of value co-creation* associate *networked interaction, networked learning, networked participation* and *network infrastructure* with the *control variables* of *technology transformation* and *socio-technological innovation*, as well as *variables* such as *product and service knowledge, group norms* and the *growth of social networks*. The *authentication, ownership* and *information quality* attributes of *technology facilitators* are associated with *transaction cost economics, market typologies, significant markets, social networks, co-shopping, CRM* and *market verticals and horizontals*.

*Control variables* are associated with the *variables* and *measures of value co-creation*. *Complementarities, customer awareness* and *networked value* are associated with *human-computer interactions, perception and sensitivity*, and *economic and social growth*. *Role definitions* and *customized profiles* complement *customer efficacy* during *human-computer interactions*. The *strategic management* discipline is interested in *complementarities, customer awareness* and *networked value* to a significant extent, whereas the discipline of *psychology and marketing* is associated with *role definition*. From this perspective, the ability of customers to personalize profiles on the Internet has resulted in the self-archiving of *customer experiences* along with *product and service knowledge management*.

The *measures of value co-creation* are associated with how *customer income and incentives* on the Internet complement *vocations and professions*. *Sociability* on the Internet has facilitated *friending*, resulting in *generosity or reciprocity* and *social rewards*. *Customer values* complement *customer purchase intentions and preferences* due to the increased *customer awareness* regarding *perception and sensitivity, psychological balance* and *customer experiences*. *Customer purchase intentions and preferences* are complemented by *product and service knowledge, rich Web content, forums and group norms*. *Customer creativity* on the Internet has benefited from *knowledge management* and *motivation* and is complemented by *customer efficacy* and *recreation*. In turn, *human-computer interactions* complement the facilitation of *customer leadership* and *privacy management*.

In terms of the distribution of research on the *measures of value co-creation* across the disciplines, *strategic management* and *electronic commerce* have considered *professions and vocations, knowledge management, customer values, creativity* and *perception and sensitivity*. The *decision support systems* discipline is interested in *purchase intentions and preferences*. *Psychology and marketing* have explored *social rewards, friending* and *knowledge management*. The disciplines of *strategic management, information systems, electronic commerce, decision support systems* and *advertising and research* have consistently

discussed *customer perception and sensitivity, social rewards, economic or social growth, motivation, recreation, CRM, purchase intentions and purchase preferences, professions and vocations, and co-shopping* during interaction routines linked to *value co-creation*. In terms of the *technology facilitators of value co-creation*, the disciplines of *strategic management, information systems, electronic commerce, decision support systems, business research and advertising and research* all agreed on the significance of *networked interactions, participations, networked learning, information quality, timestamps and the technological infrastructure of networks*.

Different contexts are discussed in terms of applying *value co-creation*. *Customer integration* is facilitated by the ability of customers to personalize and customize their profiles for interactions on the Internet. Similarly, ICT design also complements *firm performance*. In terms of investments, *logistics budget allocation* complements *knowledge networks*. *Networked-added capital* meets the needs of different interaction themes, whereas *strategy* is integral to *social capital*. The management of *product and service knowledge* is facilitated by *service model management*.

The significant contribution of this research, in terms of the systematic literature review, along with the link exploration studies presented in Appendix B, is in identifying that *intellectual, social and economic motivation* during interactions across the Internet, *mobile networks* and *social networks* has facilitated *value co-creation* in companies. Twenty-five attributes associated with the *measures of value co-creation* were identified from the systematic literature review. These were classified and grouped into *social, economic and intellectual motivations*. *Intellectual motivation* was identified to be associated with *customer innovation, customer efficacy, customer intentions and preferences, leadership, customer interactions and knowledge, problem-solving and learning*. *Social motivation* was associated with *customer attitude, generosity and reciprocity, customer values and interpretation, customer motivation, customer loyalty and trust, voluntary disclosure of information and customer experiences, customer and employee wellness, productivity in networking, customer commitment, customer entertainment, social networks and co-shopping*. *Economic motivation* was associated with *customer knowledge, purchase intentions, customer income and incentives, market knowledge, software as a service and cloud services, CRM, and advertising, promotion and business strategy*. This was the basis for the statistical analysis in Study II, which considered the hypotheses and evaluated the 25 attributes of *social, economic and intellectual motivation for value co-creation* using sample data. A text analysis of the variables, technology facilitators and measures of *value co-creation* from the systematic literature review, along with

the link exploration studies, using NVivo 10 qualitative analysis software, provided other theoretical explanations of relevance for research and industry.

There are numerous facilitators of *value co-creation* discussed in literature, which explain how *value co-creation* can be implemented to meet the specific needs of different industries and the associations with *social, economic and intellectual motivation*. In the context of (1) *learning systems and research*, (2) *customer protection and accountability*, (3) *leadership*, (4) *strategic advantage*, (5) *innovation*, (6) *entrepreneurship*, (7) *business practices and human resources*, (8) *business growth*, and (9) *initial public offerings and marketing*, the measures of *value co-creation* are associated with *purchases, trade and sales*, as well as *knowledge management, customer-added capital and co-development*. These are directly reflected in the requirements of *logistic complementarities, co-shopping referrals, subjectivity, social networks and information quality*.

*Technology facilitators* of ICT that provide for *growing membership, interaction routines, payment systems, transaction costs and affordability* directly add value to *logistic complementarities, business portfolio needs, dynamic networks, IT Infrastructures, social networks, budget allocations, technology localization and corporate practices*. In the context of the growing membership of *social networks*, the measures of *value co-creation* are associated with *market value, market attributes* such as *geography, cultures and themes*, and *dynamic networks*. Thus, *technology facilitators* should take into consideration *timeline requirements, geographies, temporal co-ordination in time zones, interaction routines, growing membership, qualifiers* and the *networking needs* of different *market typologies*. The measures of *value co-creation* should also consider *information quality, popular markets, service provision and convenience, governance and custodianship*. In the context of *popular markets, environments, proficiency needs, sociability, services and knowledge impact on memberships, growth markets and dynamic networks*. In turn, *authentication services and management of information* enabled by *service facilitation and service convenience* allow for *integrated shopping networks* and resources required for *electronic commerce*. In the context of *electronic commerce*, the *promotional information of products and services, pricing and transactions*, along with *information quality*, improves firm performance and *service convenience* for the customer.

*Alliances of IT-based open innovation* work on the basis of measures of *value co-creation* grouped into sets of considerations. The first consideration set addresses the complementarities of *social network groups and social rewards, socio-technological innovation and vertical and horizontal markets, professions and*

*vocations and customer experiences, customer values and co-shopping, and creativity and CRM. The second consideration set addresses the complementarities of economic or social growth and customer efficacy, friending, generosity and reciprocity, human-computer interactions and customer income and incentives, knowledge management and leadership. The third consideration set addresses the complementarities of significant markets and market typologies, motivation and perception and sensitivity, privacy management and psychological balance, purchase intentions and preferences, and recreation. Other significant contributions to value co-creation from this perspective are identified as business and IT growth, celebrity networks, co-creating IT value, co-shopping, CRM and customer-added capital.*

*Significant markets benefit from leadership and privacy management, human-computer interactions, strategy and customer efficacy. Leadership complements privacy management. Human-computer interactions during the use of ICT in significant markets complement strategy, logistic budget allocation, and vertical and horizontal markets. Strategy from this perspective takes into consideration alliances of IT-based open innovation, economic and social growth, firm performance, business and IT growth, co-creating IT value, network-added capital and management of product and service knowledge.*

*Customer efficacy, as mentioned above, is facilitated by recreation, co-shopping, creativity and motivation, market typologies, CRM, socio-technological innovation and service model management, which in turn facilitate customized profiles and ICT design. It is also enabled by social capital emerging from customer-added capital, customer integration, knowledge networks and interaction themes. The subjectivity of customer interactions from this perspective benefits from friending, generosity and reciprocity, social rewards, knowledge management, social networks, celebrity networks, income and incentives, vocations and professions, customer values, purchase intentions and preferences, perception and sensitivity, psychological balance and customer experiences.*

*In terms of subjectivity, customizing the requirements of customers and establishments during value co-creation benefits from interaction themes, social capital, ICT design, co-shopping, customer-added capital, customer integration, service model management, CRM, product and service knowledge management, celebrity networks, knowledge networks, consolidated capital as well as network-added capital. In terms of technology facilitators in information management for value co-creation, customer efficacy is facilitated by information quality, service convenience, authentication, networked learning and networked interactions.*

The systematic literature review, link exploration studies of the literature and the qualitative analysis of the *value co-creation* literature provided for an extensive discussion on the required variables, technology facilitators and measures for improving innovation in products and services.

The use of a *sociogram* enabled the visualization of the associations between measures of *value co-creation* in customers and establishments. The significant benefits of *value co-creation* identified are: *knowledge management; professions and vocations; perception and sensitivity; customer experiences; privacy management; CRM; customer values; creativity; significant markets; social networks; growth of vertical and horizontal markets; recreation; social rewards; socio-technological innovation; market typologies; economic and social growth; co-shopping; customer efficacy; and generosity and reciprocity.*

*Value co-creation* studies across the disciplines have contributed more to research focused on *strategic management*, followed by *information systems, advertising and research, electronic commerce and decision support systems*, with limited studies in the disciplines of *business research, psychology and marketing and information management*. *Value co-creation* research has recently focused on the IOT and the relevance of social media to sellers, retailers and consumer interactions (Balaji and Roy 2017), and to the creation of new products (Allen et al. 2018; Kim and Slotegraaf 2016), as well as its effectiveness in advertising and customer-produced brand imaging (Pentina et al. 2018; Davari et al. 2017; Presi et al. 2016) and the ethics associated with data analytics (Lawlor et al. 2016). Some quantitative studies have also analysed marketplaces in networks, as well as the efficacy and knowledge of customers and electronic commerce (Dennis et al. 2017).

Much of the research on *value co-creation* has examined the interaction of customers in a world that is physical, while mostly neglecting the utilization of *mobile networks, social networks* and the *Internet*, except in the case of marketing journals that have significantly researched this topic. The existing theory on *co-creation* across other management disciplines of research is limited. The research that is available on *value co-creation* has mainly focused on conceptual and empirical studies, rather than on integrative studies that identify the enablers of *value co-creation* and how they can be implemented in industry. For example, some works on *value co-creation* have discussed the significance of developing a taxonomy for innovations in *mobile commerce* to increase efficacy on the part of the customer and *co-creation*, based on the history of patents in software application programming (Khansa et al. 2012), as well as on the classifications of *co-creation* theory and practice (Zwass 2010). Research within the strategy discipline has focused on employee and organizational opinions about the

usefulness of Enterprise 2.0 (Denyer et al. 2011). Other papers have focused on the strategizing and sourcing of intellectuals for open innovation projects (Frey et al. 2011). Research on strategy has also examined how emerging leadership is identified in virtual collaboration projects (Sutanto et al. 2011) and the significance of strategies for business model management in the field of electronic commerce (Wirtz et al. 2010).

Overall, empirical research and theoretical work about co-creation remain limited in terms of the topic's relevance to *social networks*, *mobile networks* and the *Internet*; thus, further study and integration are required. Further, the integration of widely dispersed research published in journals in the disciplines of information systems, information management, marketing and strategy is necessary to manage, identify and evaluate the status of research across disciplines, as well as to derive themes and emerging theories on the subject of *value co-creation*. There is little research on the enablers of *value co-creation* and what their role is. There are also limitations in the most topical research on integrative theories to the discussion on the enablers of value co-creation.

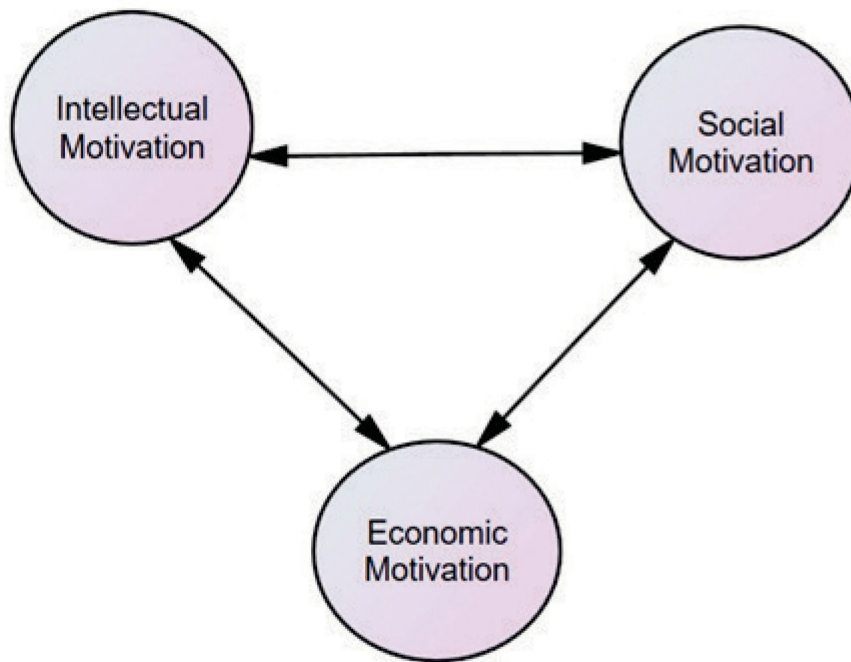
### 5.2.1 Theorizing the dynamics of value co-creation

IT, *social networks* and the Internet allow for the *value co-creation* theory to be applied with a focus on *social, economic and intellectual motivation* among people, businesses and government. This provides the necessary infrastructure for researching motivation theory. In terms of customer interactions, value addition comes from improvements in productivity, knowledge and proficiency. Motivation is not directly performance or behaviour in itself, while studies have deliberated that it is based on psychology, behaviour and performance (Mitchell 1982).

Motivation to use technologies for value addition is rather a service convenience with the ability and the freedom to control what is perceived, easily comprehended and experienced. An evaluation of *value co-creation* within IT, *social networks* and the Internet requires us to determine what adds to the creation of economic and social value. Through technology, (1) creativity and innovation, (2) resourcefulness of infrastructure, (3) proficiency and (4) equity for *value co-creation* are derived.

Based on the literature review, the attributes of *social, economic and intellectual motivation* were identified, with 25 parameters or attributes of *value co-creation* determining the measures. These are listed in Table 3. These attributes are explained in relevance to the study. Hypotheses were then defined on what constitutes *social, economic and intellectual motivation*. Data collected via face-

to-face interviews with industry managers using a survey informed a statistical study on how the three types of motivation are associated with each other.



**Figure 44.** Associating intellectual, social and economic motivation

#### Intellectual motivation

Customer *innovation* is a measure of the extent of customer creativity involved in using IT, *social networks* and the Internet when standardizing and customizing products and services. *Customer efficacy* is the proficiency and ability to learn and associate knowledge with the commercial attributes of products and services. *Customer intentions and preferences* in relation to markets are associated with the knowledge learned from the use of technology infrastructures for improving products and services. Collaborative IT management projects have helped identify the *leadership* attributes required for problem-solving challenges. *Customer interaction* is used as a measure of the extent to which customers are integrated in IT and *social networks* and on the Internet in order to improve the efficiency and effectiveness of markets. *Knowledge, problem-solving and learning* are measures of the extent of *customer interaction* in the improvement of product and service innovation, both directly and indirectly facilitated by the firm.



### Social motivation

*Customer attitudes* towards business practices and learning in the case of products and services transform businesses by enhancing efficiency, effectiveness and productivity. *Generosity and reciprocity* during interactions in the use of IT, *social networks* and the Internet adds value to businesses and customers. This results in better *CRM*, which in turn improves knowledge management for product and service innovation. *Customer values and interpretation* regarding products and services are transformed and validated along with the knowledge generated on the Internet. *Customer motivation* in *social networks* and on the Internet adds value to the management of product and service innovations. Firms are able to leverage *customer loyalty and trust* across *social networks*. This leads to the prioritization of investments in product and service innovations. *Customer experiences* facilitated by *voluntary disclosure of information* regarding products and services on the Internet and *social networks* enhance businesses' knowledge in improving their value propositions.

*Customer and employee wellness* has improved productivity through the use of *social networks*, the Internet and IT. This measure presents firms with opportunities to improve work practices in order to enhance *customer and employee wellness*. Another view is that *productivity in networking* is improved by means of technological facilitation between businesses and customers. The Internet and *social networks* also provide firms with knowledge about *customer commitment* towards products and services. *Customer entertainment* on the Internet has also improved productivity at work, due to a better work-life balance and supported better advertising and marketing for the firm. This has further enhanced *co-shopping* referrals and recommendations, in turn creating the required economic and social value. In broader terms, *social networks* have added to the creation of social groups relevant to a firm's business. Some firms have even gone further by integrating customer interactions to create and improve products and services.

### Economic motivation

*Customer knowledge* in relation to a better work-life balance, efficacy, and product and service awareness is enhanced and enabled by the use of IT, *social networks* and the Internet. *Purchase intentions* from customers on the Internet and from *social networks* regarding products and services provide businesses with knowledge about markets and economies. Firms promoting incentives and discounts can now provide customers with new sources of income and benefits. With business data, firms are also able to visualize the clientele of markets and

economies. This allows them to make decisions about standardizing and customizing product and service innovations, as well as ways to integrate customers into creating and improving products and services. Telecommunications infrastructures have become extensions of the firm. *Software as a service* and *cloud services* have become extensions of the firm. Indeed, firms currently recognize that investments in such services improve business productivity and create value for the customer. This being said, the infrastructure for *CRM* enabled by telecommunications facilitates better interactions between businesses and customers. This has made firms rethink their *advertising, promotion and business strategies* for better CRM.

### 5.2.2 Networks, telecommunications and value co-creation

The World Wide Web, *social networks*, mobile networks and IT have enabled *value co-creation* between people, businesses and governments.

#### Interpreting the macroscopic nature of social, economic and intellectual motivation

Study II in the previous section identified the intangible measures of *social, economic and intellectual motivation*, which add significant value to the interactions between the customer and the firm in standardizing and customizing product and service innovation. The statistical study undertaken using *reliability tests, factor analysis, PCA* and *SEM*, based on data collected from the survey among managers, was able to specifically identify the attributes of *social, economic and intellectual motivation*. *Intellectual motivation* is constituted of *customer interaction, customer efficacy* and *customer innovation*, which are associated with *economic motivation* attributes such as *customer income and incentives, market knowledge and advertising, promotion, business strategy and CRM*.

On the interrelatedness between *intellectual motivation* and *social motivation*, along with the above-mentioned factors, the ability of customers and businesses to generate *knowledge, problem-solve and learn* has added value from *generosity and reciprocity, customer values and interpretations, customer motivation* and *customer experiences* during interactions between businesses and customers. In terms of interactions involving *social motivation* and *economic motivation*, *SEM* identifies that *customer and employee wellness, productivity in networking, customer networking* and *social networks* are correlated with *customer income and incentive, advertising, promotion, business strategy and CRM*, as well as *market knowledge*. The holistic nature of the structural equation model in Figure

34, as seen in Section 4.3, illustrating the associations between *intellectual motivation, social motivation and economic motivation*, highlights the dynamics between various motivational enablers of *value co-creation*.

### Value systems

A *value system* of a business consists of routines that involve suppliers, buyers and networks. The value system specifies the pricing as well as the inherent and potential sources of its differentiation in enabling business routines. A business or establishment improves itself when product and service pricing allow it to function efficiently in comparison to other businesses with a similar portfolio (Porter 1985). Networks are crucial for business routines and transactions involving suppliers, businesses and buyers. Suppliers are involved in the creation and delivery of goods purchased and sourced to a business, after which the product or service of a business becomes part of the *value system* of the buyer.

The differentiation for a buyer is the business and value of its products. The advantage for a business depends on its profile (i.e., the firm's infrastructure, proficiency and efficiency) and sustenance (i.e., knowledge, market expansions and collaborations) with reference to the value system.

## 5.3 Reliability and validity

The systematic literature review on *value co-creation* provided a theoretical discussion and identified which attributes facilitate *value co-creation*, the performance measures and how they are to be implemented by businesses. A managerial discussion on successful implementation practices of *value co-creation* across different industries determined valuable themes and measures. Further, the extensive nature of the completed qualitative and quantitative studies justified the degree of reliability and validity. Study I comprises a systematic literature review, which identified the variables, technology facilitators and performance measures of *value co-creation*. Out of a total of 286 papers retrieved during the literature search from ABS level 3 and level 4 journals on the subject of *value co-creation*, only 40 papers were identified as relevant to the discussion on the significance of *mobile networks, social networks* and the *Internet* for *value co-creation*. Other recently published literature of relevance was also considered. An extensive study of the content identified during the systematic literature review using NVivo 10 provided a more comprehensive and detailed analysis of the variables, technology facilitators, control variables and performance measures of *value co-creation*, in terms of classifying them and associating them in useful ways,

enabling better interpretation and implementation possibilities for industry. To date, studies on *value co-creation* in relation to *mobile networks*, *social networks* and the *Internet* have not integrated the enablers, contexts and classification of *social*, *economic* and *intellectual motivation* attributes, from among the vast collection of literature that has explored this topic in order to improve innovation in products and services. The exploration, integration and study of the literature from journals and the mapping of the variables, technology facilitators and measures brought the research together. From the comprehensive systematic review of literature and the link exploration studies, as summarized in the table in Appendix B, *social, economic and intellectual motivation* is customer (i.e., people, businesses and government) added capital facilitated by efficient *mobile networks*, *social networks* and the *Internet*, which is a prerequisite for maximizing the value added for innovation.

*Social, economic and intellectual motivation* was further studied by inviting industry managers to complete a survey, which enabled us to collect data from 135 respondents. The questionnaire identified 25 parameters or attributes of *value co-creation* associated with the three different types of motivation, namely, (1) social, (2) economic and (3) intellectual motivation. The questions were formulated based on a qualitative study using a systematic literature review and how *value co-creation* is described and measured. The survey was completed by 135 industry managers from across 7 industries to complete a quantitative study. This sample size and reach ensured that the data was unbiased and also relevant across timelines. The questionnaire was made concise and compact in consultation with the industry respondents being interviewed during the survey to facilitate ease of collecting data and for better comprehending *value co-creation*. This improved the *content-associated validity*, *criterion-associated validity* and the *construct-associated validity* of the questionnaire for relevancy, score validity and effectiveness of surveys (Onwuegbuzie et al., 2007). The expected outcome of the survey depends on the extent to which the researcher is able to internalize the theory being studied and is able to convince and convey the theory to the interview respondent to obtain the relevant scores. This facilitated combining the *descriptive precision* of explaining the questionnaire and the *empirical precision* of the data being collected from the industry survey. The validity of the sample data for research would also need to take into consideration the effectiveness of completing questionnaires simultaneously across sample populations, preserving its predictive validity and its generalizability for a study. During the survey, the *participant enrichment* by combining qualitative and quantitative studies, the *instrument fidelity* such as the use of tablet computers and online surveys for data collection maximized the effectiveness of measurement techniques and also the *significance enhancement* in the use of qualitative and quantitative studies for

better interpretations ensuring superior quality of the sample data for studies. In terms of external validity and content validity of the survey, the research was able to obtain better opinions from the interview of managers. Studies have supported the use of qualitative and quantitative data-analytic techniques, commencing with qualitative studies and then quantitative studies to build upon the qualitative analysis. The results of the qualitative studies of Study I supported quantitative studies in Study II such as the use of reliability statistics, factor analysis, principal component analysis and structural equation modelling. NVivo 10 qualitative analysis software was used to investigate, substantiate and curate the discussions of Study I to create themes associated with the variables, technology facilitators, controls and measures of *value co-creation*. This resulted in better knowledge management using themes; data visualisation using graphs and charts and data transformation with statistical analysis. The culture of countries also plays a role in interpreting the outcomes of the research. This is one of the limitations of the research in terms of generalizing and applying this questionnaire across different cultures. However, the questionnaire used in our survey definitely can be used as a reference for doing similar research work in other countries.

The systematic literature review in Study I identifies 25 performance measures of *value co-creation*. This is relevant to *open innovation*. In terms of *open innovation*, socio-technological innovation, creativity and customer facilitation in ICT has supplemented industry in terms of how social network groups have added social rewards to interactions and also to the successful customization of products and services. Customer documentation and archiving of content through *social networks*, *mobile networks* and the Internet have supported professions and vocations in terms of customer added capital. In electronic commerce it has enhanced co-shopping and facilitated opportunities for CRM. The strategy needs of alliances of IT based *open innovation* are also facilitated by network added capital and product and service knowledge management during the co-creation of IT value between businesses and between businesses and customers. Alliances of IT based *open innovation* has also benefited from the complementarities of economic and social growth, customer efficacy, friending, generosity and reciprocity, human-computer interactions, customer income and incentives, knowledge management and leadership. *Open innovation* with respect to facilitation by *social networks*, *mobile networks* and the Internet add capital from significant markets and market typologies, motivations, social rewards, privacy, commerce, recreation and also from celebrity networks. The dynamism of *social networks*, *mobile networks* and the Internet have significantly added to the productivity required for *value co-creation* and *open innovation* by facilitating distributed innovation management between business networks and maximizing knowledge management for incentive based improvements in products and

services. In summary, *open innovation* is measurable by evaluating idea based sales and revenue facilitated by knowledge archiving and management, brand royalty, crowdsourced projects and rewards and incentives. Our studies indicate that the intensity of *open innovation* in an industry is associated with the growth rate of startups, successful technologies, investment friendly industry regulations, research and development, industry competitiveness and renewable energy.

In terms of theoretical validity, the systematic literature review has identified 25 performance measures of *value co-creation* for development of theory that facilitates a study of the interaction between customers and establishments. The development and study of the variables, technology facilitators, control variables and measures of *value co-creation* during the systematic literature review is an effort in this direction. The link exploring study on the topic of *value co-creation* from across qualitative and quantitative publications provided for identifying a theory linking *social, economic and intellectual motivation* to be facilitators of *value co-creation* and *open innovation*. This had to be verified with a questionnaire facilitated by a survey of industry managers. Further, an analysis of the systematic literature review using NVivo 10 substantiates on how *open innovation* is to be implemented. In terms of *correlation validity*, this study supports, complements and enhances the work of authors who have written on the subject of *value co-creation*. In terms of *convergence validity*, the questionnaire used during the survey serves the objective of linking theory to the industry by educating the manager. In terms of *separation validity*, it is possible to classify *open innovation* based on *producer-led innovation, customer-led innovation, personalized innovation and standardized innovation*. The sufficiency of questions in the survey have taken into consideration better verification, validation and comprehension of *value co-creation* in consultation with the industry respondents. With regards to *context validity*, the studies completed in this research have identified 25 performance measures of *value co-creation*. It also identifies the variables, technology facilitators, controls and measures of *value co-creation*. An extensive study in NVivo 10 has added multidimensionality to the subject of discussion and is significantly relevant to the implementation of *value co-creation*. All the questions were discussed, sampled and edited in consultation with the interviewees.

Hypothesis testing was performed on the survey data collected from the 135 respondents who represented firms from across industry. This data was standardized using Z-value calculations in Microsoft Excel, to avoid discrepancies and to ensure consistency in the data when running the statistical tests. The statistical study was completed using IBM SPSS 25, Minitab 18, IBM SPSS AMOS 25 and PAST 3.18 software. All these activities substantiated the reliability and

validity of the research findings. The findings and discussions from the literature published on *value co-creation* are relevant to implementing *value co-creation* across countries. In the paper on the dynamic capabilities-based entrepreneurial theory of the multinational firm (Teece 2014), the author discusses the significance of how dynamic capabilities and strategy determine firm-level sustained competitive advantage in global environments. The above-mentioned literature also substantiates the claim that market creation and co-creation are both considered entrepreneurial and dynamic concepts, which are necessary functions of the multinational firm. Study I, via a systematic literature review, identified the variables that pre-exist, pre-qualify and enable or disable *value co-creation*. Variables such as subjectivity, norms, proficiency and education, professions and vocations, technologies and infrastructures, technology popularity, net neutrality, advocacy, incentives, and product and service knowledge directly calibrate the performance measures of *value co-creation*. By considering studies from across different disciplines of research and undertaken by various researchers across the globe, we found that the use of technology facilitators is more or less the same across the world.

In Study II, out of the 135 managers interviewed during the survey, it was observed that many of the businesses and services they represented are multinational firms with a significant presence globally. However, Study II when applied to different work cultures across countries would definitely vary in terms of the variables, technology facilitators, control variables and the performance measures of *value co-creation*. *Reliability tests, principal component analysis, factor loadings and structural equation modelling* were completed for the sample data. Percentage variance in the *factor loadings, eigenvalue and eigen vector values* in the *principal component analysis* were considered. Also, the *structural equation modelling* provides an accurate estimate of the attributes that constitute *social, economic and intellectual motivation*. A reliability test in statistics for *intellectual motivation* as a dimension along with the attributes of *customer innovation, customer efficacy, customer intentions and preferences, customer leadership, customer interaction, knowledge / problem solving and learning* yields a Cronbach's alpha value of 0.6. A value equal to 0.7 is desirable. Other statistical tests such as *principal component analysis, factor loadings and structural equation modelling (SEM)* were also completed. Further, a statistical study of the data collected for *intellectual motivation* and its attributes and an analysis using PAST 3.18 software identified that multinational industries have concentrated on attributes such as *customer intentions and preferences* concerning products and services, *customer interaction, customer innovativeness and customer efficacy* in terms of *value co-creation* implementation. However, statistical data indicates

that industry ignores the *knowledge, problem-solving and learning* proficiency of customers.

In terms of *social motivation*, the statistical data demonstrates that industries concentrate on *customer experiences, customer attitudes* towards products and services, *customer loyalty, customer commitment, productivity through networking, customer motivation* and *co-shopping*. A *reliability test* in statistics yields a Cronbach's alpha value of 0.6951 that is tending to 0.7. Other statistical tests such as *principal component analysis, factor loadings* and *structural equation modelling (SEM)* were also completed taking into consideration percentage variation, *eigenvalues* and *eigen vector values, goodness of fit index* and *root mean square error*. In terms of *economic motivation*, the statistical data demonstrates that industries concentrate on *advertising, promotion, business strategy, CRM* and *gaining market knowledge*. *Reliability test* in statistics yields a Cronbach's alpha value of 0.6329 tending to 0.7. The *principal component analysis, factor loadings* and *structural equation modelling (SEM)* were also completed. It is found that for the sample data, the industry ignores attributes such as *customer purchase intentions, customer knowledge*, and the significance of *software as a service* and *cloud-based IT services* for the industry. This study completed in India identifies the variables, technology facilitators, control variables and performance measures of *value co-creation*. It further identifies the attributes of *social, economic and intellectual motivation* that managers confirm have enabled *value co-creation* for the industry in India. This study has attained the rigor required for trustworthiness in terms of credibility, transferability, dependability and confirmability (Morse et al., 2002) of the variables, technology facilitators, control variables and performance measures of *value co-creation* suitable to the work culture and industry needs of different countries. Further, statistics on sample data in Study II identifies the attributes of *social, economic and intellectual motivation* found suitable by industry managers in India for implementing *value co-creation*. Study II if completed using a survey of industry managers in another country would yield a different consideration set of attributes of *social, economic and intellectual motivation* suitable for industry implementation of *value co-creation*.



## 6 CONCLUSIONS

Study I identified the *variables, technology facilitators and measures of value co-creation* from a systematic literature review. The identified *variables* were: *subjectivity, norms, vocations and professions, proficiency, technologies and infrastructure, technology popularity, net neutrality, advocacy, incentives and product and service knowledge*. The *technology facilitators* were identified as: *authentication, networked interactions and networked learning*. Twenty-five *measures of value co-creation* were identified for customers and establishments. *Customer attributes* were identified as: *customer interactions, knowledge, problem-solving and learning, customer attitudes, generosity and reciprocity, customer values and interpretation, customer motivation, customer loyalty and trust, voluntary disclosure of information and customer experiences, customer income and incentives, customer and employee wellness, productivity in networking, customer commitment, customer entertainment, customer knowledge, purchase intentions, customer leadership, customer innovation, customer efficacy, and customer intentions and preferences*. *Establishment attributes* were identified as: *co-shopping, market knowledge, software as a service and cloud services, CRM, advertising, promotion and business strategy, and social networks*. The systematic literature review, along with the link exploration studies, was able to determine that *social, economic and intellectual motivations* are the enablers of *value co-creation*. The 25 attributional measures of *value co-creation* identified from the systematic literature review were associated and grouped in relation to *social, economic and intellectual motivations*.

The statistical analysis in Study II verified that 18 of the 25 *measures of value co-creation* are the most significant and implemented by firms in the manufacturing, IT, construction equipment, wood manufacturing, food production, cosmetics and the solar equipment industries. This was determined by a statistical analysis of sample data derived from 135 industry respondents. *Intellectual motivation* attributes were identified as: *customer innovation, customer efficacy, customer intentions and preferences, customer interaction, knowledge, problem-solving and learning*. *Social motivation* attributes were identified as: *customer entertainment, customer or employee wellness, customer commitment, social networks, generosity or reciprocity, customer values and interpretation, customer motivation and voluntary disclosure of information or customer experiences*. *Economic motivation* attributes were identified as: *customer knowledge, customer income and incentives, market knowledge, CRM, and advertising, promotion and business strategy*. According to the statistical analysis of sample data from the 135 industry respondents, it can be concluded that the

attributes of *customer leadership, customer attitudes towards products and services, customer loyalty and trust, productivity in networking, co-shopping, purchase intentions and software as a service and cloud services* are not that significant and are neglected in *value co-creation* routines. This is because the implementation of these attributes varies across industry in terms of relevance and significance and also depends on the extent of ICT use by businesses and customers.

The various themes about how the *variables, technology facilitators and measures of value co-creation* are associated with each other allow for a better implementation of *value co-creation* by industry. *Subjectivity, proficiency and forums* are significant variables that add to *value co-creation* during interaction routines on the Internet. *Forums* complement *rich Web content, equity, rewards and incentives, ICT, group norms, and product, service and social networks*. The *technology facilitators* are complemented by *authentication, information quality, networked learning, networked interactions, timestamps and telecommunications infrastructures of networks*. The functioning of *dynamic networks* is associated with *customer awareness, transactions cost economics, information quality, authentication and technology transformations*. *Technology transformations* benefit from *governance, complementarities and network logistics* along with *networked interactions, networked participation and telecommunications infrastructures*. *IT, proficiencies, clientele, IT capabilities, knowledge capital, knowledge management networks, informatics and role definitions* emerge over a *timeline* and complement *dynamic networks*. *Controls, variables and measures of value co-creation* are associated with *complementarities, customer awareness, role definition, networked value, transactional networks, informatics, IT capabilities, social networks, knowledge capital, customization of profiles, routines and their ownership*, which complement *human-computer interactions, customer efficacy, customer leadership, economic and social growth, customer experiences, perception and sensitivity, rewards and incentives and design principles of ICT*. These are found to be especially relevant to the disciplines of *strategic management and psychology and marketing*.

In terms of *value co-creation* research, conducting a qualitative analysis in NVivo 10 brought together the systematic literature review and link exploration studies and demonstrated that the discipline of *strategy management* takes the lead in comparison to *information systems, electronic commerce, psychology and marketing, decision support systems, and advertising and research*. The consistencies in discussions are related to *measures of value co-creation* that are associated with *professions and vocations, knowledge management, purchase*

*intentions and purchase preferences, recreation, co-shopping, social rewards, recreation, customer values, economic and social growth, creativity, and perception and sensitivity.* The discussions across these disciplines of research in terms of the significance of *technology facilitators* connect with studies that discuss the relevance of *networked interactions, authentication, networked participation and information quality.* *Significant markets* are associated with *customer leadership, privacy management, human-computer interactivity, strategy, firm performance, customer efficacy, recreation, market typologies, socio-technological innovation, ICT design, social capital, friending, celebrity networks and customer values.*

*Alliances of IT-based open innovation* depend on the following complementarities: *social networks and their rewards; socio-technological innovation and vertical and horizontal markets; vocations and professions and customer experiences; customer values and co-shopping; and creativity and CRM.* Other complementarities include: *economic and social growth and customer efficacy; friending and generosity and reciprocity; human-computer interactivity and income; and knowledge management and leadership.* The following complementarities have added value to *alliances of IT-based open innovation:* *significant markets and market typologies; motivation and perception and sensitivity; privacy management and psychological balance; and purchase intentions and purchase preferences and recreation.* This has enhanced *product and service knowledge management, service model management, social capital and strategy.* *Business and IT growth, celebrity networks, co-creating IT value, co-shopping, CRM and customer-added capital* have also added value to *alliances of IT-based open innovation.*

From this perspective, *significant markets* need to take into account *customer leadership, privacy management, human-computer interactivity, strategy requirements, logistics budget allocations, customer efficacy for recreation, market typologies, socio-technological innovation* and the requirements of *social capital.* This is complemented by *social networks and rewards, knowledge management, celebrity networks, professions and vocations, and customer values and experiences regarding purchase intentions and preferences, based on perception and sensitivity.*

In terms of customer needs, *customizing and standardizing* need to consider *participation themes, social capital, ICT design, co-shopping* based on *customer-added capital, and customer integration.* *Service model management* would need to address *CRM* in the management of *product and service knowledge, celebrity networks* complemented by *knowledge networks, consolidated capital, and*

*network-added capital*. Study I and Study II provide a vast array of information on the variables, technology facilitators, controls and measures of *value co-creation*, as well as explain how they are associated with *social, economic and intellectual motivations* as enablers of *value co-creation*. The depth of the research brings more clarity to how firms can enhance *product life cycle management*. It also suggests that designs for innovative products and services and their evolution are improved by integrating customers with firms in the personalization of products and services. Dynamic capabilities of customers across *social networks, mobile networks* and the *Internet* have added significantly to the productivity of *value co-creation*. Further, *open innovation* helps to distribute innovation processes across intra-organizational networks beyond the firm by enabling and maximizing purposively managed internal and external knowledge between businesses and customers, in turn improving products and services by applying pecuniary and non-pecuniary incentives (Chesbrough and Bogers 2014). Specifically, *open innovation* can be measured by evaluating idea-enabled sales, as facilitated by internal or external knowledge, revenue growth from brand licensing, crowdsourced ideas, as facilitated by rewards and incentives, and the archiving of knowledge (Gopalan and Natarajan 2014). The intensity of *open innovation* in the case of ICT, pharmaceuticals, advanced manufacturing, fast-moving consumer goods, energy and utilities, and business and financial services also depends on the growth rate of start-ups, successful technologies, telecommunications revenues, regulations, products introduced and their affordability, research and development, public-sector investments, industry competitiveness and renewable energy (Gopalan and Natarajan 2015).

## 7 RECOMMENDATIONS FOR FURTHER RESEARCH

The *value system* for industrial management becomes a strategic enabler of cost effectiveness, differentiation and proficiency. The firm's generic *value system* or value network is focused on a business unit or portfolio. With a significant business portfolio, the firm's *value system* should consist of numerous products, buyers, geographies or distribution networks, such as those seen in *electronic commerce*. Hence, the *value system* of a firm is specifically integrated with the *value system* of the respective supplier and buyer. In the example of applying *value systems* within *electronic commerce*, the support activities should consist of the firm's infrastructure, human resources management, technology management and procurement. The significant routines ought to include inbound logistics, operations and outbound logistics, marketing and sales, and the service itself.

Hence, the work within *value systems* of firms distinctly consists of both physical and technological routines. The support and factory routines for products and services should be sensitive to the market margins. The margins determine the difference between the total value of the product and the cost of the routines and transactions that are associated with the product (Porter 1985). The supplier and channel margins are costs borne by the buyer and signify the product and service pricing of the firm. In terms of economics, the value of products or services for a buyer is measured by the price that defines a firm's stature in the market and the number of units it sells. Revenue from an innovation is generated when the product or service is profitable. By creating significant value for the buyer, as a differentiation from other firms, a firm provides for expert advantage. Table 25 highlights research opportunities identified from previous literature on the concept of *value co-creation* for the Internet, *social and mobile networks*, and IT.

**Table 25.** Opportunities for future research on value co-creation across the Internet, mobile and social networks and ICT

Serial no.	Opportunities
1	Compatibility study of variables of <i>value co-creation</i> across popular <i>social networks</i> and <i>service networks</i> . Effect of interactions in networks on the management of product and service knowledge and how it improves interaction experiences for customers (businesses, people and governments).
2	Effectiveness of projects and the level of experience, proficiency and motivation required during collaborations via portals of creativity and innovation across networks to meet the needs of business, civic and social organizations.
3	Interaction, creativity and innovation between businesses and customers in networks and their effectiveness in the creation of economic and social capital. Effectiveness of design principles for information management and interactivity for collaborative technologies, as used in new product creation projects, which involve significant interaction in networks and the relevance to the management of routines for customers (businesses, people and governments).
4	Opportunities to study the needs of knowledge management networks with significant social capital from the perspective of providing information management between businesses and customers. Technology requirements for enhancing national-level interactions between businesses and customers in networks, networked localities and innovation systems. Studies on IT portfolio management and transition of software services firms in emerging markets. Evaluating proficiency and product or service knowledge requirements to leverage popular <i>social networks</i> . Evaluating the logistics industry regarding the effectiveness of IT capability profiles and inter-firm communications on logistic processes that incrementally improve the IT logic between businesses over time.
5	Web infrastructure upgrades and their effects on the transitions to <i>electronic commerce</i> and associated needs.
6	Evaluating opportunities for integrating businesses into popular and dynamic <i>social networks</i> . The differences in the evaluation standards for IT, <i>social networks</i> and the Internet. Industry best practices that generate significant economic or social value. Application modes of co-creation, namely: (1) standards for implementing IT, <i>social networks</i> and the Internet within businesses and objectives of IT, <i>social networks</i> and the Internet, which add to better business performance during implementation of software; (2) customizing business routines via IT, <i>social networks</i> and the Internet; and (3) integration in business-to-business partnership-based implementations facilitated by IT, <i>social networks</i> and the Internet across networks and its success across business portfolios. Future research also needs to study how incorporating attributes, such as <i>customer intentions and preferences</i> , <i>customer leadership</i> , <i>customer knowledge management</i> , <i>problem-solving and learning</i> , <i>customer loyalty and trust</i> , <i>customer experiences</i> , <i>customer or employee wellness</i> , <i>productivity in networking</i> , <i>customer commitment</i> , <i>social networks and co-shopping</i> , adds value to the firm.
7	Factors affecting the markets in <i>electronic commerce</i> across geographies, cultures and themes.

8	Effect of interactions on emerging leadership in <i>social networks</i> .
9	Study of successful project management operationalizing non-proprietary software and its applicability to the management of creativity, innovation and services enabled by IT, <i>social networks</i> and the Internet.
10	Evaluation of collaborative knowledge management projects across networks.
11	The significance of business partnerships to <i>news media</i> organizations facilitating <i>value creation</i> to meet the needs of customers (businesses, citizens and government). Contract variations, incentives and technologies for successful implementation in the logistics industry, and how IT capabilities and IT performance facilitate better information management for businesses.
12	The effectiveness of the creation and aggregation of knowledge in collaborative IT networks and associated benefits. Economic and social value creation in collaborative IT networks and portfolio management in non-logistics business.
13	Reciprocity and values added to co-shopping referrals across <i>social networks</i> .
14	Collaborative problem-solving of challenges and quests to facilitate intellectual creativity and innovation in IT projects, which require multidisciplinary proficiency and intrinsic and extrinsic motivation.
15	Collaborative IT management projects and effective integration of IT, interactivity and advertising into <i>social networks</i> and <i>electronic commerce</i> . An evaluation of the financial performance, viability and feasibility of such projects, as well as the incentives and advertising revenue generated in using <i>social networks</i> and control measures.

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## Appendices

### Appendix A: Figures



**Figure.** Illustration of variables, technology facilitators and measures of value co-creation derived from the systematic literature review that provided for a link exploration shown in Appendix B. (Numbers in boxes indicate mapping of serial number in the working list of literature shown in the appendix)



## Appendix B: Link Exploration Studies

Table: Links exploring studies of literature across journals

Article number	Author details	Theme			Findings
		Customer level	Group level	Firm level	
1	Agarwal, Gupta and Kraut (2008)			AVI-O	Designs for IT, <i>social networks</i> and the Internet create a <i>value system</i> for sociability and support in <i>social networks</i> .
2	Antin and Earp (2010)	AIII-O, PI-O, PII-O			<i>Social networks</i> associated with vocations facilitated by personalizing and sociability. Generosity and facilitation of personalized sociability in <i>social networks</i> are closely associated. Generosity is a norm that is significant in vocations. Motivation in <i>social networks</i> is intrinsic.
3	Au, Carpenter, Chen and Clark (2009)	AIII-O, AVI-O	AIII-O, AVI-O, AV-PIII	AV-O, AVI-O	Moderately sized teams are effective on software projects facilitated by non-proprietary software unlike licensed software. These teams promote effectiveness and adaptive learning. Size of teams, experience and proficiency, portfolio of projects, and capabilities in solving problems on projects facilitating non-proprietary software lead to improvements in team efficiency. Faster learning is facilitated on software projects by involving smaller teams, but the efficiency level varies. Projects involving non-proprietary software are effective in terms of costs and reliability; however, the software costs are excessive. On software projects involving software that is non-proprietary, coordination is effective between professionals both with and without proficiency. The timeline of software projects associated with non-proprietary software is dependent on a proficient workforce and customer services that provide support.
4	Bell and Loane (2010)	AV-PII, AV-O	AV-PII	AV-PII, AV-O	Web 2.0 facilitates <i>open innovation</i> and <i>value co-creation</i> .

5	Chan and Li (2010)	AIV-P11, AV-O, P11-O	AIV-P11, AV-O, AV-P11	AIII-O, AIV, AV-P11	Interaction and sociability in <i>social networks</i> facilitate positive and fun experiences. <i>Social networks</i> that are sociable enhance the interaction between customers. <i>Social networks</i> that facilitate resourcefulness during interaction in the interpersonal sharing of information about products or services have improved reciprocity, but neither facilitate membership nor increase shopping. People value effectiveness and resourcefulness of the Internet and <i>social networks</i> . Interaction regarding vocations and professions within <i>social networks</i> also facilitates efficacy for the customer.
6	Cheung, Lee and Matthew (2010)	AIX-P11	AII-PI, AV, AIII-P11	AII-PI, AV-P11	Interaction in <i>social networks</i> is associated with the incentive of sociability.
7	Colliander and Dahlen (2011)	PI-O	AII-O, P11-O		<i>Social networks</i> such as blogs associated with professions and vocations offer improved interaction between authors and customers, resulting in improved marketing of branded products and services to which authors are affiliated. Authorial reputation and credibility in blogs facilitate customer membership. Blogs are found to be more productive than magazines on the internet and more effective for publicity. Social media, marketing and customers promote sociability. Customers tend to friend other customers on blogs. Marketing in <i>social networks</i> enhance popularity from increased interaction. Interaction between authors and customers resembles marketing. The neutrality and credibility of writers moderate interaction on blogs.
8	Cova and White (2010)		P11-O		<i>Social networks</i> transform members, businesses, society and their communication.
9	de Valck, van Bruggen and Wierenga (2009)	PI-O, AII-O, AIII, AIV, AX-O, P11-O	P11-O	P111-O	<i>Social networks</i> are popular with certain customers such as younger and less educated people. Opinion-seekers greatly depend on networks. Information retrieval by establishments for better products and services is based upon familiar norms. <i>Social networks</i> function, based on the ability of customers to personalize, create, innovate and participate. Efficacy of the customer is subjective within <i>social networks</i> . Innovations in programming for <i>social networks</i> further their use. <i>Social networks</i>

						facilitate knowledge management about products and services and their sociability focuses on <i>value creation</i> . Wikis and portals of knowledge are information repositories and provide support for information processing but <i>social networks</i> work on norms. Knowledge management about products and services and authenticity provide measures on ease of making decisions by customers.
10	Dholakia, Bagozzi and Pearo (2004)			PIII-O		Membership within <i>social networks</i> may differ based on the facilitation of profiles and needs of groups. Smaller networks are formed from larger networks.
11	Kohler, Fueller, Matzler and Stieger (2011)	All-PI, PI-O, AIII, AIV, AV, AX-PII, PI-PII	All-PI, AV, AX-PII, PI-PII		All-PI, AV, AX-PII, PI-PII	Social network experiences resemble real-world experiences and facilitate brainstorming for better product and service knowledge management. Product and service ambassadors support experiences of virtual sociability as well as social facilitation and collaborative problem-solving. Advances in software programming for social and collaborative technologies improve customer experiences.
15	Harwood and Gary (Mar2010)	PI-O, AIII, AIV-O, PII-O				Networks build value and are created out of motivation and reciprocity. Experiences within gaming technologies vary among game developers who prefer to customize and personalize.
16	Hsu and Lin (2008)	AIII, AIV, -PII, AVI-PII, AVII-PII, AX-PII, AVII-O, AII-O, PII-O	AIII, AIV-PII, AVI-PII, AVII-PII, AIX, AX-PII		AIII, AIV-PII, AVI-PII, AVII-PII, AIX, AIX-PII	Blogs are associated with useful information about products and service brands and measure customer satisfaction. Leisure affects psychology. Perceived usefulness of blogs is not associated with customer convenience or altruism, but the archiving of knowledge. The credibility of blogs affects customers' attitudes towards products and services. Motivational factors related to knowledge sharing do not affect participants' attitudes; however, knowledge sharing is motivational to participants on blogs. Sense of belonging and social rewards affect participants. Resourcefulness is relevant. Knowledge sharing on the Internet is enhanced by innovation, usefulness and ease of accessibility to knowledge networks. Rewards for contributions are beneficial.

17	Huang, Shen, Lin and Chang (2007)	AI, AIII, AIX, AX-PII, AV, AVI, AVII-PII,	AI, AIII, AIX, AX-PII, AV, AVI, AVII-PII, PII-O	AI, AIII, AIX, AX-PII, AV, AVI, AVII-PII, PII-O	In <i>social networks</i> such as blogs, IT requires customer service support to manage content for professions and vocations, documentation, knowledge and searches.
18	Hung and Li (2007)	PI-PII	AIII, AV, AVI, AX-PII, PI-PII, PI-O	PI-O, PI-PII	Customer interaction in purposeful learning within networks, associated with products and services, improves better knowledge management. Designs for IT, <i>social networks</i> and the Internet for improved navigability and interaction facilitate effective learning. The credibility of content posted in <i>social networks</i> about products and services improves with interaction. The characteristics of IT, <i>social networks</i> and the Internet, which incorporate qualities that organize information, facilitate learning and are easy to use, enhance interaction and sociability. This further supports better knowledge management regarding products and services, which in turn is controlled during knowledge creation in <i>social networks</i> .
19	Kerrigan and Graham (2010)	AI, AIII, AVI, AVIII, AX-PII, PII-O	AI, AIII, AVI, AVIII, AX-PII, PII-O	AI, AIII, AVI, AVIII, AX-PII, PII-O	<i>Social networks</i> provide efficacy for customers. Citizens have extended the practice of journalism to <i>social networks</i> and become active along with news media organizations. The structure and rigidity of journalism have limited the extent to which citizens can participate in the production of news content. News media organizations generate additional revenue and profit from increased popularity across <i>social networks</i> , along with the digitization of content for periodicals, advertisements and different regions. By projecting themselves as a resource for citizens, news media organizations cultivate popularity and increase publicity across networks.
20	Kim, Choi, Qualls and Han (2008)	AI, AIII, AX-PI, PII, AII-O	AI, AIII, AX-PI, PII		Integrative <i>social networks</i> enhance better knowledge management regarding products and services.
21	Köhler, Rohm, de Ruyter and	AV, AVI, AX-		AV, AVI,	In banks, <i>electronic commerce</i> empowers personnel to support newcomers with information on services that improve the delivery of

	Wetzels (2011)	O			AX-O	content and increase the performance of banks financially.
22	Lechner and Hummel (2002)	AI, AIII, AIV, AV, AVI, AIX, AX-PII, PIII	AI, AIII, AIV, AV, AVI, AIX, AX-PII, PIII, AII-O	AI, AIII, AIV, AV, AVI, AIX, AX-PII, PIII, AII-O	AI, AIII, AIV, AV, AVI, AIX, AX-PII, PIII, AII-O	<i>Social networks</i> are effective and efficient in the facilitation of better knowledge about products and services across networks. New design possibilities for IT, <i>social networks</i> and the Internet have enabled creativity.
23	Lee, Im and Taylor (2008)	AI, AX-O, AIII, AIV-PII, PI-O, PII-O, PIII-O				Professions and vocations, managing work-life balance, better knowledge management regarding products and services, along with the creation and aggregation of knowledge, entertainment and sociability in <i>social networks</i> all provide interaction opportunities for intellectual management. They also further customer freedom.
24	Messinger, Stroulia, Lyons, Bone, Niu, Smirnov and Perelgut (2009)	AI-O, AII, AIII, AIV, AV, AVI, AVII, AX-PI, PII, AX-O, PI-O, PII-O	AIII, AIV, AV, AVI, AX-PI, PII	AIII, AIV-PI, AV, AVI, AVII, AX-O	AIII, AIV-PI, AV, AVI, AVII, AX-O	Graphics for gaming and <i>social networks</i> have improved innovation in IT, as well as the facilitation and incorporation of attributes that are geographic, cultural and thematic. IT, <i>social networks</i> and the Internet depend on purpose/ objective, place/ location, products or services, population/ group size and profits. The popularity of products and services optimizes the success of networks associated with businesses and customers. The integration of customers in the case of IT, <i>social networks</i> and the Internet can be differentiated from their real-world experiences. Product and service purchases in the physical world are not affected by product and service advertisements on the Internet. The majority of participants on the Internet are thrifty and casual with no intention of participating in business. Rather, they participate because they observe and experience customer freedom.
25	Moran and Gossieaux (2010)	AI, AII, AVIII, AX, AIX-O, PII-PIII	AI, AII, AVIII, AVIII, AIX, AX-O, PII-PIII, PIII-O	PII-PIII, PIII-O	PII-PIII, PIII-O	Equity, significance of individualism and values produce successful <i>social networks</i> . In these networks, businesses do not have much control over customer interaction. Businesses profit from marketing within <i>social networks</i> . Corporate practices, information policies and integration of customers who participate across <i>social networks</i> mutually add value.

26	Nambisan and Watt (2011)	AI, AII, AIII, AIV, AV, AVI, AVII, AIX, AX-O	AI, AII, AIII, AIV, AV, AVI, AVII, AIX, AX-O	Perceptions from customers during discussions in <i>social networks</i> about products and services lead to better knowledge management for businesses. Values added during better knowledge management processes in networks regarding products and services are associated with population attributes and proficiency. Interaction of customers using IT, <i>social networks</i> and the Internet improves innovation, attitudes towards products and services, and loyalty for businesses and establishments. Expertise and knowledge regarding products and services in <i>social networks</i> create value. Customers (i.e., people, businesses and governments) who share similar attributes have a tendency to communicate. Sociability in networks is associated with attributes of populations, norms and values. Interaction between customers in networks, which are associated with products and services, leads to value creation for products and businesses.
27	Oh and Teo (2010)	AV, AVI, AVII-PI, PII, PI-PII; PII-O	PII-O, PIII-O	Integrating activities in <i>electronic commerce</i> for the delivery of products and services, by engaging both physical and virtual worlds, creates value for the customer through the offer of convenience. The quality of product and service information provided to customers during purchases in <i>electronic commerce</i> is associated with the integration of information on transactions, labelling, products and pricing. The accessibility of information regarding products and services in <i>electronic commerce</i> and the fulfilment of purchases results in self-service convenience and successful purchases for the customer to a greater extent than what is offered by customer support.
28	Rafaeli and Noy (2002)	AI, AII, AIII, AIV, AV, AIX, AX-PI, PII, PI-O	AI, AII, AIII, AIV, AV, AIX, AX-PI, PII, PI-O	During simulated auctions on the Internet, the performance of competing participants during bidding for products improves with an increase in interaction and the number of competing participants across networks.
29	Ransbotham, Kane and	AIII, AIV, AVI, AVII, AX-PII,	PII-PIII, PIII-O	In networks facilitating better knowledge, stability in interaction across networks is required for successful collaborations.

	Gerald (2011)	PIII, PII-PIII				
30	Riegner (2007)	AI, All, AVI, AVII, AX, PII-O, PI-PII	PII-O	PII-O	PI-PII-O	The infrastructure of networks facilitates interaction between authors and customers on a one-to-one or a one-to-many basis across geographies. Content regarding products and services developed by customers in networks allows for easier decision-making by customers about what is the better choice in the purchase of goods, such as electronics.
31	Shang, Li, Wu, Hou and Oliver (2011)				AV, AVI, AVII, AX-O	Businesses that seek to integrate with <i>social networks</i> improve their services by creating and developing better knowledge. Mapping the services for businesses in Web 2.0 enables knowledge creation, while developing and managing better knowledge for businesses in terms of value that is new, as well as proficiency requirements for businesses in managing and classifying market knowledge, both internal and external.
32	Shen, Huang, Chu and Liao (2010)	AI, All, AVII, AX-PI, PI-PII, PI-O, PII-O, AV-O	AI, All, AVII, AX-PI, PI-PII, AV-O	AI, All, AVII, AX-PI, PI-PII, AV-O	AI, All, AVII, AX-PI, PI-PII, AV-O, PII-O	Principles for designing IT, <i>social networks</i> and the Internet and corporate practices of businesses within <i>social networks</i> have been successful in facilitating social interactions. Loyalty towards <i>social networks</i> is associated with sociability and popularity, while linking this to service becomes valuable for businesses. <i>Social networks</i> have facilitated the quest for knowledge, creativity, innovation and interaction. In <i>electronic commerce</i> , the quality of information makes decision-making easier for the customer in the course of direct purchases. The subjectivity of expertise adds value to <i>social networks</i> , while knowledge is psychologically associated with norms. Bonding between customers within <i>social networks</i> is associated with perceptions of similarity, familiarity and intellect.
33	Squicciarini, Heng Xu and Zhang (2011)	PI, PII-O, AVI, AVII, AX-PI				Acceptability of IT, <i>social networks</i> and the Internet depends on their usefulness, ease of use, likeability and affordability. Customers see value in IT, <i>social networks</i> and the Internet that is collaborative in terms of content management and interaction, provided that privacy is respected.

34	Stephen and Toubia (2010)	PI, PIII-O, AV, AVI, AVII, AX-O		PIII-O	<p>Electronic commerce functions within the economics of sellers connected in networks, depending on the accessibility of sellers within the networks. While ease of access to shops in electronic commerce increases their revenue, this also depends on controls such as an assortment of products, the legacy of the establishment, and proficiency. A shop in a network, which is easier to access, has fewer external links and is remotely located from other shops that are densely connected, generates greater revenue. Product assortment and social interaction in networks create value. Shops cannot simply depend on prominence in a network or on the size of their physical infrastructure.</p>
35	Suh, Kim and Suh (2011)	AI, AVII, AX-O; PI-O			<p>The creation of avatars supports personalization, which enhances interaction in <i>social networks</i> and networks associated with products and services.</p>
36	Wagner and Majchrzak (2007)	AII, AIII, AIV, AVI, AVII, AX-O, PII-O			<p>Public collaborative networks such as wikis and their performance depend on significant custodianship and customer interaction. Principles of design incorporated into IT, <i>social networks</i> and the Internet improve the effectiveness of interactions for developing knowledge during collaborations. Wikis enhance customer interaction, knowledge management, knowledge sharing and non-proprietary software management.</p>
37	Denyer, Parry and Flowers (2011)	AII, AIII, AIV, AV, AVI, AVII, AX-PII		PII-O	<p>Enterprise 2.0 technology used within firms is no more social, open and interactive than traditional communication within businesses.</p>
38	Sutanto, Tan, Battistini and Phang	AI, AIII, AIV, AV, AVI, AX-PI, PII, PI-O, PII-O		PI, PII-O	<p>Interaction within networks depends on the structure of a <i>social network</i>. The structuring and effectiveness of interaction in <i>social networks</i> facilitates leadership. Leaders in <i>social networks</i> promote efficacy among participants.</p>



39	Frey, Lüthje and Haag (2011)	AI, AIII, AIV, AVI, AX-O	PII-O	PII-O	Intrinsic motivation of people with extensive knowledge and domain expertise is associated with substantial problem-solving proficiency in crowdsourcing and broadcast searches in networks that are directed at an unknown and unrestricted audience.
40	Wirtz, Schilke and Ullrich (2010)	AII, AIII, AIV, AV, AVI, AVII, AX-PII, PIII	PIII-O, PII-O	PII-O	The transformation of environments and markets, both physical and virtual, in electronic commerce necessitates the modification and reform of business. Businesses and establishments need to sense and scan the dynamism of the Internet and markets that are evolving. This calls for investing in research and management in order to involve customers in the creation and innovation processes of products and services.

## Appendix C: Questionnaire

Name: \_\_\_\_\_ Company: \_\_\_\_\_  
 Age: \_\_\_\_\_ Designation: \_\_\_\_\_  
 Qualification: \_\_\_\_\_ Email: \_\_\_\_\_

### Questionnaire

This questionnaire is to study the extent of *customer participation using information and communication technologies* as a facilitator in the development and customization of products and services.

On a scale of 1 to 7 how do you rate the following in terms of *customer participation*

1. Does *customer innovativeness* add to product and service development?

Disagree							Agree		
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	
1	2	3	4	5	6	7			

2. How significant is *customer efficacy* (skillfulness/product or service knowledge) during participation in *information and communication technologies* relevant to product or service development?

Disagree							Agree		
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	
1	2	3	4	5	6	7			

3. Do *customer intentions/preferences* change or add to product or service development?

Disagree							Agree		
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	
1	2	3	4	5	6	7			

4. How does *information and communication technologies* alter *customer attitude* towards product and service development?

Disagree							Agree		
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	
1	2	3	4	5	6	7			

5. Is *generosity / reciprocity* during customer participation in *information and communication technologies* in a *business to business (b2b)* or *business to customer (b2c)* environment relevant for product and service development?

Disagree							Agree		
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	
1	2	3	4	5	6	7			

6. Is *information and communication technology* as a facilitator of *leadership* relevant for product and service development?

Disagree							Agree		
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	
1	2	3	4	5	6	7			

7. Does *customer participation in information and communication technologies* significantly and directly facilitate product and service knowledge and development?

Disagree							Agree		
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	
1	2	3	4	5	6	7			

8. To what extent do *customer values* in terms of interpretation regarding products and services add to product and service knowledge development?

Disagree							Agree		
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	
1	2	3	4	5	6	7			

9. Does *customer motivation* add to the product and service development ?

Disagree							Agree
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
1	2	3	4	5	6	7	

10. Does *customer participation in information and communication technologies* facilitate loyalty/trust towards product and service development?

Disagree							Agree
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
1	2	3	4	5	6	7	

11. To what extent does customer gaining benefit in using *information and communication technologies* and *social network* significantly improve their knowledge regarding products and services?

Disagree							Agree
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
1	2	3	4	5	6	7	

12. Does customer's *voluntary disclosure of information* regarding experiences across *social networks* and *information and communication technologies* facilitate firms to improve knowledge in product and service development?

Disagree							Agree
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
1	2	3	4	5	6	7	

13. How significantly does customer or employee participation in *information and communication technologies* such as *social networks* facilitate their *wellness or wellbeing*?

Disagree							Agree
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
1	2	3	4	5	6	7	

14. Does networking using *information and communication technologies* such as *social networks* improve your firm productivity or performance ?

Disagree							Agree
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
1	2	3	4	5	6	7	

15. How significant is solving, knowledge development and learning using *information and communication technologies* improve customer or employee knowledge relevant to your firm's product and service development?

Disagree							Agree
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
1	2	3	4	5	6	7	

16. Do discussions regarding *customer commitment* towards products and services in *information and communication technologies* such as *social networks* add value to a firm's product and service development?

Disagree							Agree
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
1	2	3	4	5	6	7	

17. How significant is customer *purchase intentions* discussed in *social networks* relevant for product and service development?

Disagree							Agree
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
1	2	3	4	5	6	7	

18. Is customer entertainment in their use of *information and communication technologies* and *social networks* relevant to the marketing and advertising of your firm's products and services?

Disagree			Agree			
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
1	2	3	4	5	6	7

19. How significant is *customer participation* in deriving income and incentives in *social networks* valuable to your firm for product and service development?

Disagree			Agree			
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
1	2	3	4	5	6	7

20. Do social groups such as *social networks* add relevance to your firm's product and service development?

Disagree			Agree			
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
1	2	3	4	5	6	7

21. Does market knowledge in *social networks* improve your firm's product and service development?

Disagree			Agree			
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
1	2	3	4	5	6	7

22. How are innovations such as *software as a service* or *cloud services* involving *information and communication technologies* and *social networks* significant to your firm's product and service development?

Disagree			Agree			
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
1	2	3	4	5	6	7

23. Is *customer relationship management* in *information and communication technologies* and *social networks* relevant for product and service development?

Disagree			Agree			
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
1	2	3	4	5	6	7

24. Is *co-shopping* facilitated by the *internet* and *social networks* and *information and communication technologies* relevant to your firm's product and service development?

Disagree			Agree			
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
1	2	3	4	5	6	7

25. Is *information and communication technologies* and *social networks* relevant for advertising, promotion, business strategy and *customer relationship management* of your firm's product and service development?

Disagree			Agree			
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
1	2	3	4	5	6	7