

# Value Co-creation-based Information Management in the Digital Economy

Balaji Gopalan\*

*Assistant Professor, Shri Dharmasthala Manjunatheshwara Institute for Management Development (SDMIMD), Mysuru, India*

---

## ABSTRACT

Personalization and customization of product and service designs involving firms and customers using online design interfaces across the Internet is increasingly being facilitated by brands. Research on the role of information technology and value co-creation across various research disciplines in management has provided learnings on ways to creatively improve products and services by integrating customers and firms in web portals. This paper provides a comprehensive analysis of the specific attributes of value co-creation between customers and firms relevant to business logic, learnings, projects, personalized products and services, social network innovations, brand management and markets across the Internet for the purpose of enhancing information management of value co-creation for industries and research. The paper draws on published research and industry surveys on how value co-creation is growing in the digital economy. An industry survey of managers who use web portals for their business responded to a questionnaire on how various social, economic and intellectual motivation factors of firm-customer interactions result in value co-creation for customers and firms. These motivation factors can lead to improved learning systems for business process improvements and service management for industries, customers and firms and may also be classified.

*Keywords:* Co-creation, Learning systems, Information technology, Digital economy

---

## I . Introduction

Prahalad and Ramaswamy (2003) have focused on how firms have leveraged their locus of competence and in today's digital economy web portals (i.e., firm resources; extended enterprise and networked customers) and integrated customers to

co-create value with the personalization and customization in the designing of products and services. Brands such as Nike, Lego, Ikea, BMW, Eli Lilly to name a few have involved customers to personalize and customize the design of products and services to enhance their value towards customers and the brand. Information technologies (IT) in the digital

---

\*Corresponding Author. E-mail: [balajigopalan@sdmimd.ac.in](mailto:balajigopalan@sdmimd.ac.in)

economy now integrates individuals, businesses and professions to participate actively and creatively in making and improving products and services (Pikkarainen et al., 2019; Romero and Molina, 2011). Businesses globally are now integrating customers into web portals to generate greater sales revenue, increase brand value, improve and make new products and services (Ramaswamy and Ozcan, 2018; Rindfleisch and Im, 2019; Bouncken and Reuschl, 2018). Businesses in the digital economy today are producing and selling a greater range of products and services and seeing growth in subscriptions and customers are co-creating value with the firm (Carroll and Helfert, 2015; Grover and Kohli, 2012; Ketonen-Oksi and Valkokari, 2019). From a digital economy perspective, service is no longer regarded as a transaction or exchange, but rather co-creation of value through business interactions among service users, providers, and other stakeholders including partners, external environments, and brand discussion groups (Nam et al., 2009). Virtual environments are now directly engaging businesses and customers, creators and brands into quality interactions and online events for the design of products and services (Łaszkiewicz, 2018) more effectively from across geographical locations around the world (Uva et al., 2010; Romero and Molina, 2011; Yang et al., 2017; Zomerdijk and Voss, 2010; Schiavone et al., 2020; Dell’Era and Verganti, 2009) that have resulted in entrepreneurship and the creation of start-ups.

### **Research Question**

In terms of studies on value co-creation, the question arises as to whether the analysis, synthesis and application of published research on value co-creation can be classified into various learning systems and how social, economic and intellectual motivation factors can be facilitated online making firm-customer

interactions more creative when they are involved with brands in the design of products and services? Also, the question arises as to what specific attributes of firm-customer participation with respect to brands are relevant for learnings, projects, brand management, design and re-design, innovations, knowledge and business networks, and business logic?

## **II. Conceptual Background**

### **2.1. Input Variables of Value Co-creation**

Web portals are increasingly seeing brands facilitating customers to design products and services resulting in value co-creation for both the customer and the firm. Prahalad and Ramaswamy (2003) have focused on a perspective of creativity that involves value co-creation and the locus of competence (i.e., firm resources; extended enterprise and networked customers) that has become relevant for socio-technological innovations (Cova and White, 2010; Messinger et al., 2009; Wagner and Majchrzak, 2007). Research across various disciplines such as Information management, information systems, marketing and strategy have discussed how firms and brands have facilitated internet design portals to be used by customers and firms to personalize and customize the designing of products and services. There are numerous variables that directly lead to value co-creation for both customers and firms. Published research identified these variables, namely, subjectivity, norms, vocations or professions, proficiency, infrastructure, popularity of technologies, net neutrality, equity and incentives, along with branded product or service co-creation. These are explained in the next section. NVivo 10, a qualitative analysis software helped organize the comprehensive analysis

of published research on how information technology facilitates the antecedents, processes and outcomes of value co-creation between firms and customers in creative interactions for personalization and customization of branded products and services. In terms of implementation of value co-creation in web portals, a classification of the variables, processes and outcomes of value co-creation between customers and firms for the personalization and customization of the designing of products and services becomes necessary. These when mapped to information systems concerning learning systems, business processes and service management becomes relevant for industry.

2.1.1. Competency

Research demonstrates that advanced skills of employees in their areas of specialization and experience of integrating libraries of knowledge for work expands creativity, efficacy and eventually the innovativeness

of the firm (Gray et al., 2011; Frey et al., 2011). Prahalad and Ramaswamy (2003) have focused on this perspective of creativity during value co-creation involving the locus of competence (i.e., firm resources; extended enterprise and networked customers) that has become relevant for socio-technological innovations (Cova and White, 2010; Messinger et al., 2009; Wagner and Majchrzak, 2007). For example, online crowdsourced projects providing both intrinsic and extrinsic incentives to intellectuals have facilitated knowledge growth, creativity and innovation (Frey et al., 2007).

2.1.2. Norms

In online social networks, identity is the control variable that encourages participation towards value co-creation in *social networks*. Published research demonstrates that it is a moderator of participation within web portals and a facilitator of profiles

<Table 1> Classification of Antecedents, Processes and Value Co-creation

Variables	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
Technology facilitators	PI	Authentication and motivations
	PII	Interaction
	PIII	Networking
Measures	O	Customer
		Establishment

(Dholakia et al., 2004). Identity and norms on the internet are associated with the cultures of a group of participants in a network that co-create with brands resulting in collaborative product or service knowledge, decision support, sales and co-shopping (Riegner, 2007; Riedel et al., 2013). The routine of knowledge creation and learning across the internet has improved customer efficacy in daily life, professions and vocations resulting in norms of interaction. In this regard, the technical aspects of designing web portals, navigation and information systems that support and integrate knowledge and deliver content gives the user the option of personalizing and customizing their normative experience (Hung and Li, 2007; Valck et al., 2009).

### 2.1.3. Information Systems

Online web portals and information systems have supported customers for entertainment, learning, participation, mobility, networking, shopping and sales (Holzwarth et al., 2006; Riedel et al., 2013; Riegner, 2007; Viswanathan et al., 2007; Zhu and Zhang, 2010). *Social networks* have facilitated in the growth of knowledge, efficacy and learning by integrating knowledge and encouraging participation in the creation, aggregation and curation of knowledge (Ransbotham and Kane, 2011). Online web portals have also contributed to growing product and service reviews and ratings that reflect on sales, markets and businesses. In this regard, information systems have played a critical role in defining markets for brands and the logistical information flow during inter-firm business processes (Grover and Kohli, 2012) and maintaining the balanced scorecard. For the logistics industry, information systems have facilitated the co-creation of value by reducing the complexities associated with automation, co-ordination,

integration and synchronization of logistics processes, thereby enhancing inter-firm IT capabilities and improving IT communications required for business and IT growth (Rai et al., 2012). Information systems and the internet have also enabled small and medium businesses to expand their alliances and partnerships and also reach out to customers across networks making businesses cost effective and research units efficient in terms of leveraging industry knowledge both internal and external to the firm (Bell and Loane, 2010).

### 2.1.4. Product or Service Knowledge

Improved customer knowledge and learning across the Internet regarding branded products and services in online shopping portals reinforces customer trust (Colliander and Dahlén, 2011; Kim et al., 2008; Nambisan and Watt, 2011; Rafaeli and Noy, 2002; Valck et al., 2009). Brands in return have facilitated and reached out to customer-initiated brand communities in social networks and encouraged referrals, coupons and discounts for co-shoppers resulting in greater reach of branded products and services. This has led to brands raising investments in the digital economy (Chan and Li, 2010). The regionalization of online shopping, popularity of brands and the efficacy of customers is redefining the digital economy in terms of shopping preferences and market segments (Lechner and Hummel, 2002; Zhao et al., 2007).

### 2.1.5. Information Technology and Incentives

Incentives, equity and participation have facilitated enthusiasm, promotion of branded products and services in online shopping (Cheung et al., 2010; Hsu and Lin, 2008). In the case of *electronic commerce*, the ability of IT networks to connect sellers

across marketplaces has enabled non-centrality and greater reach (Stephen and Toubia, 2010). Also, factors such as incentives, decision support for online shopping, sociability and customer efficacy and socio-technological innovations across social networks have also resulted in social rewards (Hsu and Lin, 2008). Growing subscriptions and membership in the digital economy have provided businesses with an estimate of incentives required for promoting branded products and services in popular social networks (Trusov et al., 2009). The enormity of participation around brands within *social networks* has invoked the motivation to learn, innovate and acquire knowledge gaining the respect of the public, news media and brands (Antin and Earp, 2010; Chan and Li, 2010; Hsu and Lin, 2008; Hsu and Lin, 2008; Kohler et al., 2011; Nambisan and Watt, 2011; Shen et al., 2010; Valck et al., 2009). Studies also suggest that businesses have responded to customers' needs for the personalization and customization of branded products and services enabling them to co-design products online (e.g., Nike).

## 2.2. Information Management of Value Co-creation

Research disciplines have discussed and industries have demonstrated that information technology and information management are playing critical roles in facilitating creative, interactive themes and quality interactions for customers and firms who are personalizing and customizing products and services. This collaborative creativity, interplay, interaction and the management of innovative processes using information technology in designs has enhanced the value of brands. Brands such as Nike, Lego, Ikea, BMW, Eli Lilly to name a few have involved customers to personalize and customize the design of products

and services to enhance their value towards customers and the brand. Virtual environments have undergone several transformations in the Internet age in terms of the past and the present and advances in creative technologies are presenting greater opportunities (Messinger et al, 2009). Research publications have demonstrated that brands have utilized co-creative design in virtual environments in areas such as online shopping, collaborative learning and design, crowd-sourced projects, architecture, distributed manufacturing and public information services to name a few. Value co-creation aims at a customer and brand centred interactivity facilitating collaborative design projects across the Internet to interact on concepts, ideas and various development stages in design (Łaszkiwicz, 2018).

For the industry, value co-creation is based on the idea that customers have to be an integral part of product and design to enhance the value of businesses and their brands (Gopalan and Kohtamäki, 2017; Sanders and Stappers, 2008). Co-creative design units in firms are similar to research and development departments that work on concepts and designs as a part of problem-solving and fulfilling customer expectations in improving designs and services (Dell'Era and Verganti, 2009; Schiavone et al., 2020). In logistics and supply chain management, firms and partners have worked towards developing inter-firm capabilities and business processes (Romero and Molina, 2011; Sarker et al., 2012; Schiavone et al., 2020). With increasing activism in social networks calling for eco-friendly business practices and visibility of firms investing in green supply chain management, industries have responded and research studies (Novitasari and Agustia, 2021) have claimed that firm performance has improved with more environment compliance certifications, distribution and marketing, recycling, supplier compliance and product

quality. Firm performance can be measured both financially and non-financially and green innovation is providing businesses a first mover advantage in terms of offering competitive pricing, visibility and greater market share (Weng et al., 2015).

In terms of information technology playing its role in public services, firm facilitated collaborative problem-solving in open-source software development projects have successfully developed innovative public services as a part of urban development (Au et al., 2009; Brynskov et al., 2018; Ketonen-Oksi and Valkokari, 2019). In healthcare, innovation systems have integrated the needs of the customer (micro level), healthcare networks (meso level) and community (macro level) for re-designing the service experience (Omachonu and Einspruch, 2010; Schiavone et al., 2020). Participatory design used for many years in Scandinavian industries of Europe has involved workers in the design process who share their knowledge, skills and experience during every stage of product design for improvements (Schuler and Namioka, 1993). In other complex design projects, 3D printing is now offering industries better visualization of designs during the personalization, customization and optimization of designs (Rindfleisch and Im, 2019). Developing information management systems across these various contexts would fit the needs of industrial learning systems and research. The next section discusses many of the contexts for building information management systems.

### 2.3. Value Networks

Various industries are using information systems and technologies for facilitating customer centricity in the design process (Rindfleisch and Im, 2019). Studies have also discussed about service design and the significance of experience centricity (Zomerdiijk

and Voss, 2010). Distributed manufacturing is now bringing together more industries to work collaboratively towards product and service design. Value centric networks today in the digital economy are being viewed as value creators for businesses (Grover and Kohli, 2012; Ketonen-Oksi and Valkokari, 2019; Lechner and Hummel, 2002; Rai et al., 2012; Romero and Molina, 2011; Stephen and Toubia, 2010). Due to increasing demands for specialized products and services, the shorter time to market of concepts has pressurized the industry towards investing in information management and knowledge sharing with industry partners in the co-creation of products and services. These are found to improve the performance of small and medium manufacturers (Kim et al., 2019).

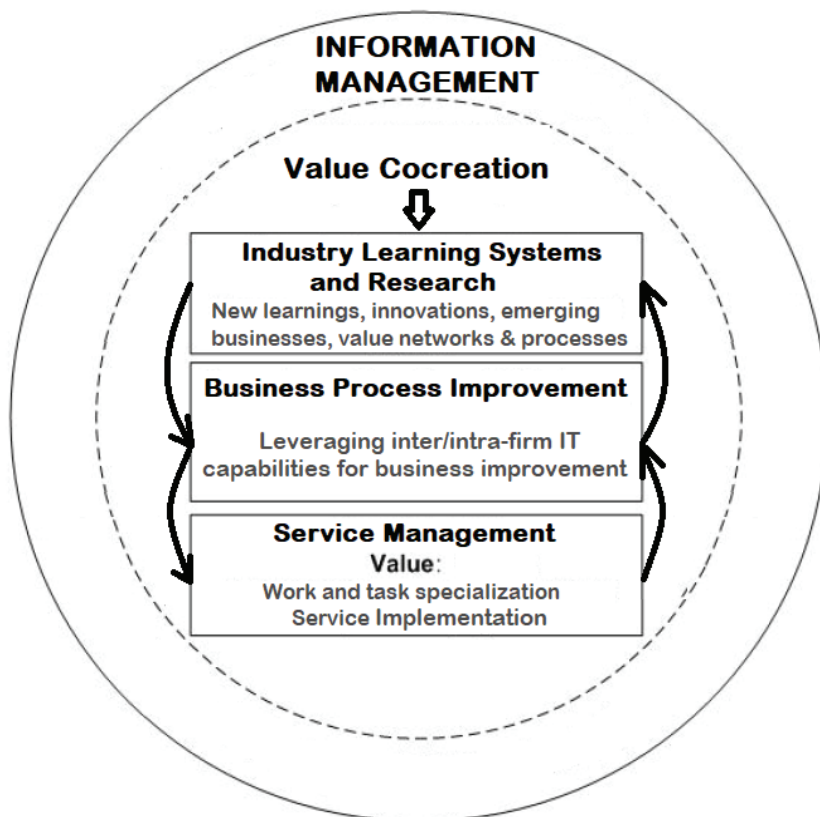
Research studies have identified that IT industry partnerships of value depend on market share of business investments, business processes and routines, complementarity of resources, capabilities and effective governance (Grover and Kohli, 2012). Effective leadership and governance facilitate control of business process integration involving partners and IT, work specialization needs and opportunities to produce new business value. Growth of IT firms depend on investments in hardware and software through partnerships that adds value to the business. An example is how smartphone companies have created partnerships with online shopping firms, services, education apps, music services, social media, social networks and software that offer value for the customer. Open-source programming and the use of license free software have produced socio-technological innovations such as social media, social networks and service-based apps that have grown in membership (Kim et al., 2008; Romero and Molina, 2011). For improving effectiveness of governance and information management for the industry, firms would need to focus on the role played by IT added capital

and customer added capital within three layers, namely, (1) Industry learning systems and research (2) Business process improvements and (3) Service management.

The industry learning systems and research layer involves sourcing value from collaborative learning, collaborative design environments and investments in innovation talent (Bouncken and Reuschl, 2018; Daalhuizen et al., 2019; Day and Shea, 2019; Ketonen-Oksi and Valkokari, 2019; Rathore et al., 2016; Romero et al., 2011; Sanders and Stappers, 2008; Łaskiewicz, 2018). In this regard, knowledge capital, knowledge networks and value centric networks have also added value to industry learning systems and research (Kim et al., 2008; Rafaeli and Noy, 2002; Romero and Molina, 2011; Stephen and

Toubia, 2010). For the industry, sponsored innovation projects have resourced innovation talent, entrepreneurs and start-ups from around the world to solve some of the world's most challenging problems (Au et al., 2009; Daalhuizen et al., 2019; Ketonen-Oksi and Valkokari, 2019; Schiavone et al., 2020; Łaskiewicz, 2018).

The *business process improvement* layer would focus on value addition to existing processes or improving business processes by mobilizing industry knowledge from research and development both internal and external to the firm and the patenting of innovations. In logistics firms, the inter and intra-firm capabilities using IT for business learning, market reach and service conveniences require auto-



<Figure 1> IT Value Co-creation

mation, integration and co-ordination of complex logistics processes for trade (Rai et al., 2012).

#### 2.4. Role of Customer and Information Technology Added Capital

In papers published within research on Information systems, IT use in firms were found to improve various business activities (Devaraj & Kohli, 2003; Köhler et al., 2011; Rafaeli & Noy, 2002; Wagner & Majchrzak, 2007). Other studies have emphasized that the process of generating patent inventions and innovations depended on advancing knowledge along with customers in the area of specialization for the manufacture, personalization and customization of products and services (Dong and Yang, 2019; Gray et al., 2011; Rai et al, 2012). The digital economy now co-creates IT value supporting businesses in inter-firm business networks with new capabilities and metrics and productivity (Bughin et al., 2011; Christopherson et al., 2008; Grover and Kohli, 2012). Brand related social networks are also producing value with credible and quality content and learning resulting in growing knowledge and the personalization and customization of brands (Colliander and Dahlen, 2011). Crowdsourced projects now resource knowledge and motivation (Frey et al., 2011) from across the world by integrating innovators both in terms of quantity and quality of interactions for creative work cultures (Füller et al., 2011) beyond the boundaries of the firm. This has resulted in design driven laboratories of innovation (Dell’Era and Verganti, 2009). For the industry, value co-creation resulting in patents and citations from firm investments in information technology depend on the interaction intensity and variety of business processes (Dong and Netten, 2017; Khansa et al., 2012). With the growth of the digital economy and the increasing

participation of the labor force in the digital economy, it becomes necessary to focus on purchasing power parity and also innovations in renewable energy to support the labor force (Gopalan, 2017). In today’s digital economy, the efficacy of the labor force depends on education and knowledge in IT skills. For example, the use of social networks, knowledge libraries and learning involves personalization, creativity and innovation resulting in greater customer efficacy (Chan and Li, 2010; De Valck et al., 2009). Customer added capital in the digital economy in terms of innovativeness, knowledge and skills, brand loyalty, online co-shopping, incentivized participation in IT-enabled services and projects have enabled value co-creation (Frey et al., 2011; Zomerdijk and Voss, 2010). The role played by IT added capital is also significant in terms of firm investments in innovation talent, learning, business processes, knowledge capital and extension of customer relationship management (CRM) in the virtual world (Au et al., 2009; Bughin et al., 2011; Ceccagnoli et al., 2012; Christopherson et al., 2008; Dell’Era and Verganti, 2009). Information technology has demonstrated to have increased the efficiency of scientific knowledge sharing in firms for research and development during knowledge dissemination and assimilation from within and outside the firm leading to partnerships, entrepreneurships and start-ups (Dong & Netten, 2017; Forman & van Zeebroeck, 2012). In this regard, firm investments in education and IT skills for the labor force have directly added to value co-creation (Füller et al., 2009; Gray et al., 2011). However, the success of this would depend on both the customer added capital and information technology added capital that add value to the three layers, namely, (1) Industry learning systems and research, (2) business process improvements and (3) service management.



## 2.5. Collaborative Learning, Design Environments and Innovation

In the digital economy, businesses are increasingly utilizing the benefits of various IT based support services, business process improvements and collaborative learning (Rathore et al., 2016) for improving the value of brands (Daalhuizen et al., 2019; Sanders and Stappers, 2008; Łaskiewicz, 2018). In this regard, knowledge capital, knowledge networks and value centric networks have added value to learning systems and research for many organizations. This has been in the case of sourcing brand related interactions in social networks, business networks and its resourcefulness for design co-innovation in the digital economy (Au et al., 2009; Dell’Era and Verganti, 2009; Gummesson and Mele, 2010; Lechner and Hummel, 2002; Romero and Molina, 2011; Łaskiewicz, 2018). Open source software has played a significant role in socio-technological innovations and innovation ecosystems resulting in social networks, virtual worlds and services that have enhanced the value for businesses and customers (Au et al., 2009; Carroll and Helfert, 2015; Ketonen-Oksi and Valkokari, 2019; Messinger et al., 2009; Pikkarainen et al., 2019; Schiavone et al., 2020). The interplay between digital and social networks in the digital economy have created various channels for entrepreneurship, electronic commerce and education (Agarwal et al., 2008; Bouncken and Reuschel, 2018; Oh and Teo, 2010; Ohei and Brink, 2019).

## 2.6. New Product and Service Development, Entrepreneurship and Start-ups

With the growth of the digital economy, industries involved in creating new products and services have benefitted from more customer centricity and busi-

ness process improvements with the use of information technologies for product customization, personalization, optimization and diversification of services and design capabilities in firms (Alexiou, 2018; Carroll and Helfert, 2015; Dell’Era and Verganti, 2009; Frey et al., 2011; Grover and Kohli, 2012; Łaskiewicz, 2018). IT has facilitated the market expansion of small and medium businesses by leveraging effective IT-enabled services (Bell and Loane, 2010; Schlosser et al., 2006). Studies have also discussed how Internet-based co-creation has enabled creativity for innovating brands during design by integrating both quality and quantity of interactions (Füller et al., 2011; Füller et al., 2009; Healy and McDonagh, 2013; Lechner and Hummel, 2002).

Knowledge capital, knowledge networks and value centric networks have added significant value to the creation of new products and services, entrepreneurship and start-ups in terms of value co-creation with customers (Stephen and Toubia, 2010). For example, co-working spaces involving a shared economy have created new trends in work spaces and entrepreneurial support (Bouncken and Reuschel, 2018). In the case of online events such as auctions, greater quality of participating members during biddings has resulted in greater revenue (Rafaeli and Noy, 2002). In this context, collaborative networked organizations have added significant value to product and brand value co-creation and co-innovation (Ramaswamy and Ozcan, 2018; Rathore et al., 2016; Romero and Molina, 2011). Socio-technological innovations have significantly added value to entrepreneurship and innovation in numerous contexts such as social networks, video gaming, public service apps and virtual worlds transforming in themes over many decades within various innovation ecosystems (Gray et al., 2008; Ketonen-Oksi and Valkokari, 2019; Kohler et al., 2011, Messinger et al., 2009). New business models

thus have evolved in networked and integrated digital economies resulting in network based innovation, open source software projects, IT-enabled decisions and services, online co-shopping and the app economy (Au et al., 2009; Gray et al., 2011; Grover and Kohli, 2012; Lechner and Hummel, 2002; Omachonu and Einspruch, 2010; Zomerdijk and Voss, 2010; Łaskiewicz, 2018).

## 2.7. Lean Management, Environment Activism and the Circular Economy

The circular economy as a concept is gaining significance in terms of its relevance to environment benefits and sustainability of manufacturing industries. This has brought about new challenges in the area of industrial design research. Studies have suggested that for the circular economy to succeed, the focus needs to shift towards (1) Designing environment friendly production, (2) Recycling (3) Policy formulation, regulation and their implementation and (4) Design education (Kirsten et al., 2020). This is having a significant impact on the logistics and supply chain management for manufacturing firms in terms of environment friendly benefits of long lasting design, maintenance, durability, reuse, re-manufacturing and recycling (Geissdoerfer et al., 2017). Research within manufacturing has emphasized that the use of additive manufacturing or 3D printing is considered to be more customer centric (Rindfleisch and Im, 2019) and may facilitate environment friendly practices in the long term for product lifecycle management. For example, in terms of production timelines, the shortening of supply chains for transportation of goods is more environment friendly and cost effective when localized manufacturing is encouraged instead of transporting goods over long distances (Markou et al., 2017).

As the logistics and supply chain industry depends on efficient governance, inter and intra-firm business processes, multichannel interactions and networked routines (Gnyawali and Penner, 2010; Hazen et al., 2021; Rai et al., 2012; Sarker et al., 2012), it becomes relevant to incorporate circular economy practices that are environment friendly. This has been the case in the fashion and textile industry utilizing textile waste for the regeneration of fabric transforming the fashion system towards sustainability (Mazzarella et al., 2017; Moorhouse and Moorhouse, 2017). The success of this would depend on multistakeholder collaboration in environmental innovation, utilizing operational processes that involve scientific expertise, design, manufacturing, technological capabilities and value framing of co-creative innovative solutions for a more systematized learning towards sustainability focused decision making (Goldsworthy and Ellams, 2019; Nohra et al., 2019; Santolaya et al., 2019; Watson et al., 2018).

Studies have explored the need for design education in the context of the circular economy that would source collaborative networks for recycled materials (Collina et al., 2017; Leube and Walcher, 2017; Virtanen et al., 2017). In the logistics and supply chain industry, it is observed that the greater the size of the investments in product manufacturing, vendor management, order fulfilment needs and incentives, greater is the need for a circular economy (Hazen et al., 2021). Enforcing environment friendly practices have been demonstrated in green supply chain and logistics (Hazen et al., 2011; Srivastava, 2007). Some business initiatives such as Amazon Prime Now (2015) deliberate on shifting the entire order fulfilment process from suburban locations to cities and adopting already existing urban transportation delivery modes. The main objective of green logistics is discussed in research as a cost savings

initiative (Murphy et al., 1996; Rao and Holt, 2005). This is through the improvement of efficiency in transportation and utilization; optimization of routing networks, environment friendly packaging, renewable energy sources, recycling and sustainability (Flemming, 2013; Hatcher et al., 2014; McKinnon et al., 2010).

## 2.8. Rewards, Accomplishments and Recognition

Brand discussion groups have been popular across social networks and social media in the context of luxury products, social rewards, reviews and ratings and the personalization and customization of designs (Kim et al., 2008; Lechner and Hummel, 2002; Nambisan and Watt, 2011; Romero and Molina, 2011; Sarker et al., 2012; Quach and Thaichon, 2017). Due to the enormity of socio-technological innovations across the Internet, the resulting new products and services, entrepreneurship, start-ups, knowledge capital and value centric networks have gained popularity, rewards and recognition from industries, government and customers. This has become relevant for business research, advertising and marketing in successful online brand communities, brand ratings and co-shopping (Moran and Gossieaux, 2010; Riegner, 2007; Schiavone et al., 2020). Numerous online shopping, online magazines and web portals such as Amazon, Lego, Yelp, Flipkart and others have facilitated customers to rate products, share ideas and add recommendations that have resulted in an increasing trend towards the phenomenon of co-shopping.

Successful collaborative learning and sponsored innovation projects involving value centric networks have emerged from knowledge capital and knowledge networks. For example, the co-creation of value of highly innovative collaborating firms having inter

and intra-firm IT capabilities and market share in the digital economy have been successfully stock listed (Ceccagnoli et al., 2012). In the context of online shopping and IT businesses, technology licensing, services such as IT enabled CRM, secure digital payment conveniences, pricing, data-driven services, incentives and rewards have added significant value to brands in the digital economy (Ceccagnoli et al., 2012; Pikkarainen et al., 2019; Tellis and Gaeth, 1990). The success of online businesses, brands and social networks that have multiplied customer reach in terms of sales and services by co-creating value are winning awards. As more businesses are incorporating IT enabled services, firms and customers see customer experience-based IT service design to be relevant (Gummesson, 2008; Oh and Teo, 2010; Romero and Molina, 2011; Stephen and Toubia, 2010; Verma et al., 2012; Zomerdijk and Voss, 2010).

## 2.9. IT Enabled Customer Relationship Management

IT has enabled firms to extend their CRM practices in the digital economy. Firms are developing CRM services based on customer experiences (Lemon and Verhoef, 2016). For example, studies have highlighted customer sensitivity towards pricing, quality and value of brands during purchase decisions (Zeithaml, 1988). This has resulted in customer centric firms paying more attention to brand loyalty, incentives, discounts and rewards, co-shopping and networked innovations (Yang et al., 2017). Pricing of products and services based on customer preferences of brands are examples that focus on customer centricity (Gummesson, 2008; Tellis and Gaeth, 1990). With electronic commerce and online shopping of popular brands becoming common, industry is increasing investments in business process improvement and

CRM for various product and service portfolios, energy and utility requirements, market typologies, pricing, geographies and services value added (Colliander and Dahlén, 2011; Gummesson, 2008; Iglesias et al., 2018; Kim et al., 2008; Kohler et al., 2011). Data from a survey of managers from across seven industries in India demonstrates that the Internet and mobile subscriptions of a sizeable and educated labor force are critical in the value co-creation process for services value added and business innovations in the digital economy (Gopalan, 2017). Further, digital payment conveniences, secure transactions, incentives and rewards, shared economy innovations in the digital economy have resulted in increased membership and subscriptions (Lechner and Hummel, 2002; Oh and Teo, 2011; Romero and Molina, 2011; Tellis and Gaeth, 1990; Yang et al., 2017; Zeithaml, 1988).

## 2.10. Digital Economies, Online Shopping and Socio-technologies

With the increasing popularity of online shopping, the need for managing various product and service portfolios, pricing, geographies and market segments becomes challenging in terms of balancing the services value added (Brynskov et al., 2018; Gopalan, 2017; Yang et al., 2017). Entrepreneurship, start-ups and socio-technological innovations are transforming the digital economy with new business models and have gained brand loyalty in terms of membership and subscriptions from around the world (Kim et al., 2008; Kohler et al., 2011; Lechner and Hummel, 2002; Messinger et al., 2009; Rafaeli and Noy, 2002; Romero and Molina, 2011). Efficacy with information and communication technologies and inter and intra-firm IT capabilities have played a critical role in the success of online services, brand communities and crowdsourced innovation in the digital economy

(Colliander and Dahlén; Frey et al., 2011; Gray et al., 2011; Ketonen-Oksi and Valkokari, 2019; Rai et al., 2012; Pikkarainen et al., 2019).

## 2.11. Brands and Social Networks

Brand related social networks and innovation projects involving customer, firm and intra-firm participation in the design of products and services have played a critical role in transforming businesses in the digital economy (Au et al., 2009; Bouncken and Reuschel, 2018; Carroll and Helfert, 2015; Daalhuizen et al., 2019; Dell’Era and Verganti, 2009; Frey et al., 2011; Grover and Kohli, 2012; Hamilton and Hewer, 2010; Nambisan and Watt, 2011; Verma et al. 2012; Łaszkiwicz, 2018). Customer and business innovativeness and their efficacy in the use of information technologies have also played a significant role in terms of problem solving, creativity, entrepreneurship and start-ups (Au et al., 2009; Bouncken and Reuschl, 2018; Daalhuizen et al., 2019; Dell’Era and Verganti, 2009; Gray et al., 2011; Łaszkiwicz, 2018). The interplay between digital and social networks in the digital economy have brought customers to the forefront of value co-creation for the personalization and customization of branded products and services, learning and formation of successful online brand communities (Agarwal et al., 2008; Lechner and Hummel, 2002; Moran and Gossieaux, 2010; Riegner 2007; Rathore et al., 2016; Romero and Molina, 2011; Stephen and Toubia, 2012; Valck et al., 2009; Wagner and Majchrzak, 2007).

## 2.12. Digital Payment Conveniences, Secure Transactions and Incentives

Hybrid commerce service delivery systems and subscription services in the digital economy have

facilitated digital payment conveniences, secure transactions and incentives leading to new business models, branding and co-shopping. Increase in subscription to these digital services are due to pricing preferences, incentives, quality and value of the brand (Tellis and Gaeth, 1990; Yang et al., 2017; Zeithaml, 1988). These have enhanced decision support on brands for customers, markets, management information systems and virtual worlds in the digital economy (Grover and Kohli, 2012; Messinger et al. 2009; Ramaswamy and Ozcan, 2016; Valck et al., 2009). Other studies on brands have focused on interactions in networks, integration of knowledge, advertising, incentives and success factors relevant for innovation ecosystems, business markets, multifirm capabilities and brand management (Gray et al., 2011; Grover and Kohli, 2012; Gummesson and Mele, 2010; Ketonen-Oksi and Valkokari, 2019; Kim et al., 2008; Pikkarainen et al., 2019; Riegner, 2007).

### 2.13. Managing Innovativeness with Governance and Networked Innovation

With the growing use of IT for developing inter and intra-firm business capabilities, the governance of network logistics and complementarities becomes relevant and critical in the networked economy where innovativeness creates brands, brand loyalty and networked sales (Frey et al., 2011; Gray et al., 2011; Grover and Kohli, 2012). This is relevant for service designs, co-creation of IT value and brand value co-creation based on experience centric services (Grover and Kohli, 2012; Ramaswamy and Ozcan, 2016; Zomerdijk and Voss, 2010). The transformation of virtual worlds in the past, present and future are the results of improved programming languages (Messinger et al., 2009). This has also transformed hybrid commerce delivery systems for brands (Oh

and Teo, 2010).

The value of Inter and Intra-firm business networks in industries has depended on the business assets, knowledge exchange, complementarity and effective governance (Grover and Kohli, 2012). The innovativeness of such collaborative businesses in the digital economy is associated with shared analytics, knowledge base and business process improvement. The success of innovativeness is dependent upon business routine specialization that leads to the creation of new value such as products and services. Effective governance digital economy and trade facilitates responsible utilization of IT assets and its integration to ensure that it creates value for the customer. For example, firms such as United Parcel Services (UPS) have co-created value by sharing their transportation and logistics involving automated scanning, accounting and delivery timelines with other delivery firms who may utilize their trucks when not fully loaded. This has also been the case with other businesses such as General Mills and Land O'Lakes (Cohen and Levinthal, 1990; Hammer, 2001). The co-creation of IT value has resulted in efficient interorganizational IT, business process improvements, knowledge exchange, decision making and cost control.

### 2.14. Digitized Business Processes, Projects and Networks

The increasing incorporation of IT enabled business logic and subscription software have resulted in business process improvements, start-ups and entrepreneurship, sponsored innovation projects and the app economy. In software implementations and upgrades, consulting with customers on experiences with IT services and the subsequent learnings have further improved business logic (Nambisan and Watt,

2011; Schiavone et al., 2020). This also necessitates the need for innovation ecosystems for better technology innovation management (Ketonen-Oksi et al., 2019). Studies on IT enabled value co-creation in design for brands have elaborated on utilizing design principles, design value, design method, design process and participative design tools (Daalhuizen et al., 2019). Research encourages brands to involve customers in product, service and business design (Łaskiewicz, 2018) and studies demonstrate that venture capital and sponsorship have played a critical role in its success (Bouncken and Reuschl, 2018; Dell'Era and Verganti, 2009; Frey et al., 2011; Ketonen-Oksi and Valkokari, 2019; Romero and Molina, 2011). Examples are the growth in app development and mobile applications on Google playstore and Apple's app store (Buchanan et al., 2019). More than 25 billion iOS apps and 50 billion Android apps were downloaded in 2015 and eMarketer's report has mentioned that 51.8 percent of people booked for travel services on mobile devices and received close to a billion messages regarding bookings on their phones (Dogtiev, 2015; eMarketer, 2015).

### III. Hypothesis Development

In the digital economy numerous variables facilitate value co-creation processes for both customers and firms. Published research identified these input variables, namely, subjectivity, norms, vocations and professions, proficiency, infrastructure, popularity of technologies, net neutrality, equity and incentives, along with knowledge about branded products and services. This paper has helped identify the technology, market and demographic variables that form the input variables for value co-creation. A classification of the input variables and motivation varia-

bles that lead to successful value co-creation for customers and firms becomes necessary. The success of web portals for product and service design depends on the networked interactions and motivations that lead to value co-creation between customers and firms for the personalization and customization of branded product and service designs. Linkage exploration studies of published research on value co-creation across the Internet have identified that *social, economic and intellectual motivation* between customers and businesses are relevant for interactions to be successful in the *value co-creation* process involving brands (Gopalan, 2019). The study explores 25 years of research published on value co-creation across journals in information systems, information management, marketing and strategic management.

A survey of managers from across seven industries in India also verify and support the view that *social, economic and intellectual motivation* enabled by online design portals and information technology are relevant for firms and customers to succeed in the value co-creation of brands. The value co-creation that results from online interactions in the personalization and customization of brands were identified from published research and classified into social, economic and intellectual motivation for statistical analysis. A study of the inter-play between social, economic and intellectual motivation identifies the complexity of interactions involved in the personalization and customization of brands that cumulatively facilitate value co-creation to be successful. Implementation of value co-creation processes in the personalization and customization of product and service designs using information technologies and the internet will succeed based on its ability to facilitate interactions and motivations that are social, economic and intellectual. Various attributes of social, economic and intellectual motivation were identified

&lt;Table 2&gt; Social, Economic and Intellectual Motivation as Enablers of Value Co-creation (Source: Gopalan, 2019)

Motivation Attributes	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	Customer knowledge Purchase intentions Customer income and incentive Market knowledge Software as a service/cloud services Advertising/promotion/business strategy/CRM

and selected from research involving a comprehensive analysis, synthesis and evaluation of published research on value co-creation to formulate and list the three hypotheses.

Three hypotheses were proposed

*H1: In online participation the customer innovativeness, efficacy, knowledge, learning and problem solving are relevant attributes of intellectual motivation in value co-creation.*

*H2: In online participation the customer incentives, market knowledge, advertising, shopping preferences, business promotion, software services, strategy and*

*CRM are relevant attributes of economic motivation for firms and customers in value co-creation.*

*H3: In online participation the customer values, customer loyalty, customer wellness, customer commitment, online co-shopping, entertainment and sociability of networks are relevant attributes of social motivation for firms and customers in value co-creation.*

#### IV. Research Methodology, Data Collection and Analysis

A study of 25 years of research published on value

co-creation across journals in information systems, information management, marketing and strategic management were able to identify the input variables, processes and outcomes of value co-creation. Linkage exploration studies of published research on value co-creation across the Internet were able to identify that *social, economic and intellectual motivation* between customers and businesses are relevant in the *value co-creation* process involving the personalization and customization of brands (Gopalan, 2019). A survey of managers from the industry and a statistical analysis of the data was required to study the interplay between social, economic and intellectual motivation of customers and firms participating in the use of online web portals for the personalization and customization of brands and the resulting business logic. It is observed from the survey of managers from across seven industries in India, managers were able to identify certain value co-creation factors of social, economic and intellectual motivation specific for businesses to facilitate the personalization and customization of branded products and services. The respondents to the survey consisted of managers from India representing small, medium and large businesses across seven industry sectors. Industries in India including both local and multinational businesses were surveyed. These industries included manufacturing, information technology, construction, wood products, food processing and products, cosmetics and the solar sector. Business managers who were familiar with their brand's products and services were invited for the survey. 135 managers were interviewed face to face to discuss about the relevance of online web portals and value co-creation and the significance of social, economic and intellectual motivation to the role of customer participation in the personalization and customization of branded products and services. Statistical analysis

of the data collected was verified to demonstrate and explain the interplay between social, economic and intellectual motivation of businesses and customers during value co-creation in online web portals.

The survey respondents were required to complete a questionnaire. The responses to the survey questionnaire were rated on a seven-point Likert scale. A sample size of 135 was arrived at for the purpose of running *reliability tests, factor loadings, principal component analysis* and *structural equation model*. Statistical tests were completed on data samples collected from managers working in different industries periodically over a one-month timeframe. IBM SPSS, Minitab 18, IBM SPSS AMOS 25 and PAST 3.18 statistical software packages were chosen to run the statistical tests. *Intellectual motivation, social motivation and economic motivation* among participants were studied individually and evaluated for correlation. The structural equation models were developed to study the interactions between social, economic and intellectual motivation during value co-creation.

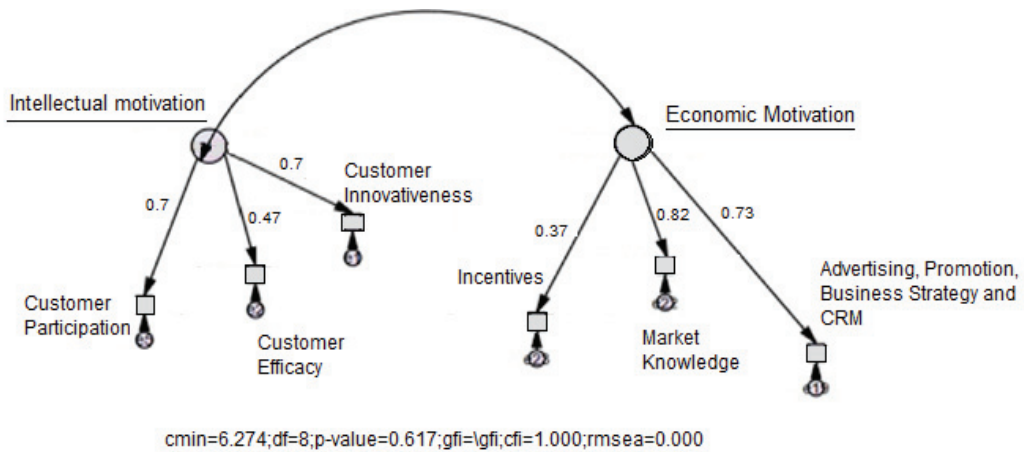
The model was retained due to the model fit indicated by a low *rmsea value* and a greater *cfi value* of 1.000. The attributes with a very low correlation value were eliminated, while the others were retained in the model.

In online environments, the customer innovativeness, efficacy, participation during value co-creation with brands are relevant attributes of intellectual motivation associated with the economic motivation attributes of customer incentives, market knowledge, advertising, promotion, business strategy and CRM.

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.

In online environments, the customer wellness,





<Figure 2> SEM Model of Intellectual Motivation Versus Economic Motivation of Customer and Firm Interactions in Value Co-creation

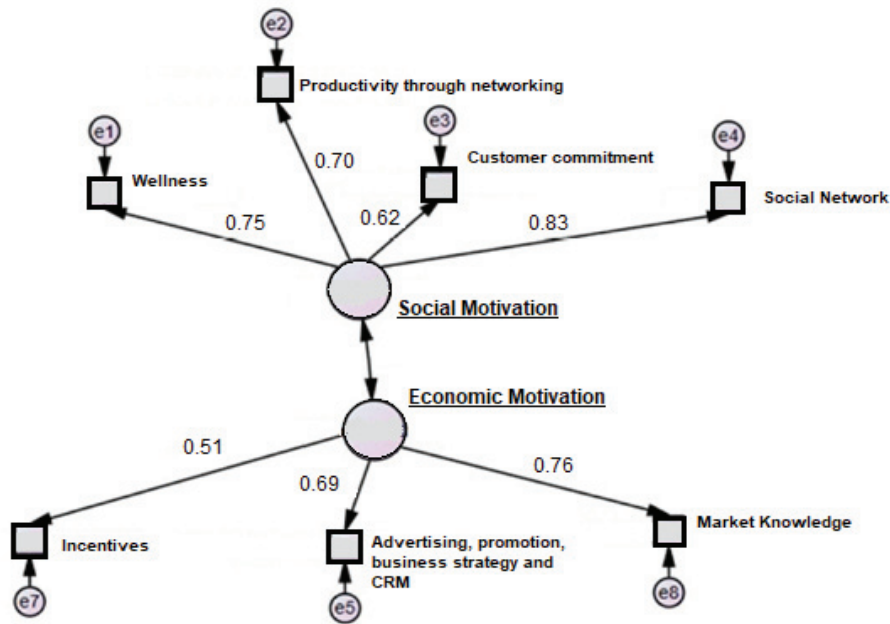
Standardized Regression Weights: (Group number 1 – Default model)		
		Estimate
Customer Innovativeness	< ---- Intellectual Motivation	.695
Customer Efficacy	< ---- Intellectual Motivation	.467
Customer Participation	< ---- Intellectual Motivation	0.704
Advertising / Promotion / Business Strategy / CRM	< ---- Economic Motivation	.727
Customer Income Incentive	< ---- Economic Motivation	.367
Market Knowledge	< ---- Economic Motivation	.818

productivity, customer commitment and the sociability of networks are relevant attributes of social motivation associated with the economic motivation attributes such as customer incentives, market knowledge, advertising, promotion, business strategy and CRM.

There appears to be a good fit for *intellectual and social motivation*. In virtual environments, the customer participation, customer innovativeness, customer efficacy, knowledge, learning and problem solving are relevant attributes of intellectual motivation associated with social motivation attributes of customer values, customer generosity and reciprocity, customer motivation and customer experiences with

products and services during value co-creation.

The structural equation model was studied for the firm-customer interactions of social, economic and intellectual motivation on the internet during value co-creation. The attributes from the different motivation factors were identified based on the statistics. This paper previously has emphasized on the relevance of online interactions in terms of social, economic and intellectual motivation and the use of information technologies and the internet in the value co-creation process for brands to succeed. The inter-play between social, economic and intellectual motivation shown in the SEM model identifies the complexity of interactions that lead to successful value

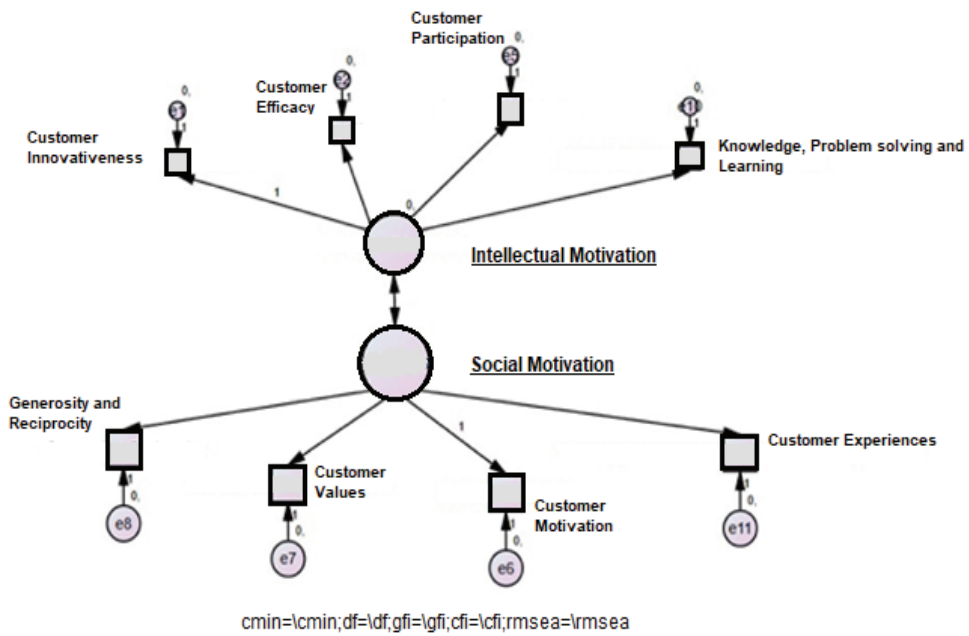


<Figure 3> SEM Model of Social Motivation Versus Economic Motivation of Customer and Firm Interactions in Value Co-creation

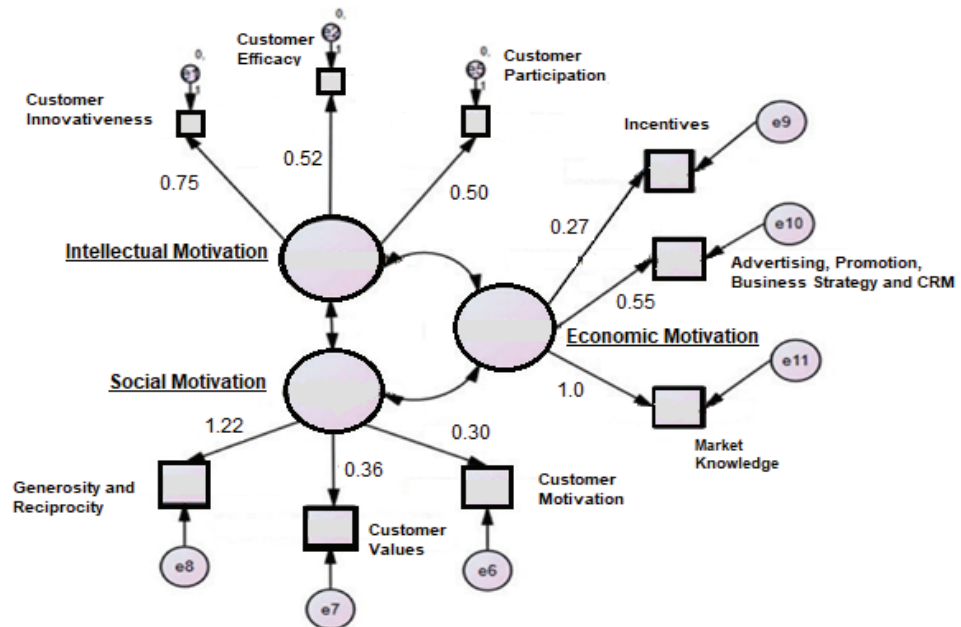
Standardized Regression Weights (Group Number 1 – Default Model)		
		Estimate
Customer Employee Wellness	< ---- Social Motivation	.746
Productivity through Networking	< ---- Social Motivation	.698
Customer Commitment	< ---- Social Motivation	.620
Social Network	< ---- Social Motivation	.829
Advertising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

co-creation. Implementation of value co-creation processes in the personalization and customization of product and service designs using information technologies will succeed based on a web portal's ability to facilitate interactions involving the social, economic and intellectual motivation of customers towards brands. The intellectual motivation factors of customer innovativeness, customer efficacy, customer participation was associated with the economic

motivation factors of incentives, advertising, promotion, business strategy and CRM, and the social motivation factors of generosity and reciprocity, customer values and customer motivation towards successful value co-creation for brands.



<Figure 4> SEM Model of Intellectual Motivation Versus Social Motivation of Customer and Firm Interactions in Value Co-creation



<Figure 5> SEM Model of Intellectual Motivation Versus Social Motivation of Customer and Firm Interactions in Value Co-creation

## V. Discussion and Conclusions

The survey of 135 managers interviewed face to face provided information on the relevance of value co-creation for business and the significance of social, economic and intellectual motivation. Statistics on the data collected was verified to demonstrate and explain the interplay between social, economic and intellectual motivation that leads to successful value co-creation between businesses and customers. 25 years of published research on value-co-creation supports this statistical study and adds to the conclusions on what facilitates successful value co-creation between customers and businesses. This has been discussed in the text. These are relevant to information management, value networks, customer and information technology added capital, collaborative systems, new products and services, lean management and circular economies, rewards and accomplishments, customer relationship management, digital economy, social networks, online shopping and various other systems. Research published on value co-creation from firm customer interactions have identified numerous other attributes of value co-creation associated with social, economic and intellectual motivation. Information technologies (IT) in the digital economy now integrates individuals, businesses and professions to participate actively and creatively in the product and service lifecycle. Businesses globally are now using virtual co-creative web portals to generate greater sales revenue, increasing brand value and developing new products and services. Businesses in the digital economy are producing a greater range of branded products and services being purchased or subscribed by customers. Web portals are now directly engaging businesses and customers and adding variety towards the design of products and services (Łaszkiwicz, 2018) more effectively

without the issue of time constraints and geographical distances. In logistics and supply chain management of enterprise resource planning (ERP), firms and partners have worked towards developing inter-firm capabilities and business processes adding value to business logic. In the case of the digital economy and trade moving towards green supply chain management, research studies have confirmed that firm performance and image has improved with more environment compliance in innovation in terms of ISO 9000 or ISO 14000 certifications, distribution and marketing, reverse logistics and recycling, supplier compliance and product quality.

Various industries are using information systems and technologies for facilitating customer centricity in the design process. Distributed manufacturing is now bringing together more industries to work collaboratively towards product and service design. Value centric networks for many years in the digital economy have been viewed as value creators for businesses and these along with inter-firm and intra-firm business processes can add further value to industries. By developing industry specific information management systems, many firms may co-create value towards products and services when needed by leveraging the inter-firm and intra-firm information technology (IT) capabilities for specialization. IT industry partnerships of value depend on market share of business investments, business processes and routines, complementarity of resources, capabilities and effective governance.

Effective leadership and governance facilitate control of business process integration involving partners and IT, work specialization needs and opportunities to produce new business value for brands. Growth of IT firms depend on investments in hardware and software through partnerships that adds value to the business. An example is how smartphone companies

have created partnerships with online shopping firms, services, education apps, music services, social media, social networks and software that not only facilitates the digital economy but also adds to productivity and wellness. For improving industry effectiveness of governance and information management, firms would need to focus on the role played by IT added capital and customer added capital within three layers, namely, (1) Industry learning systems and research (2) Business process improvements and (3) Product and Service management. The industry learning systems and research layer involves sourcing value from collaborative learning, collaborative design environments and investments in innovation talent. Knowledge capital, knowledge networks and value centric networks have also added value to industry learning systems and research. In logistics firms, the inter and intra-firm capabilities using IT for information retrieval, purchases and service conveniences have been utilized for automation, integration and co-ordination in terms of managing complex logistics processes for shipping of products. This has facilitated business process improvements and service management. This is explained further.

Other studies have emphasized that the process of generating patent inventions and innovations depended on knowledge creation in the area of specialization involving various research disciplines in the firm and from across the industry to create and improve products and services. Firms have incorporated social networks into their work routines to improve employee productivity. Crowdsourced projects in web portals have mobilized knowledge diversity and motivation and integrated customers from across the world into co-creation due to the quantity and quality of interactions for creative work cultures. Sourcing brand related interactions in social networks and the resourcefulness of networked businesses for value

co-creation and design co-innovation have added value to the digital economy.

Due to increasing participation of the labor force in the digital economy and the use of commercial electronics, it becomes necessary for innovations in energy and affordable services. The interplay between digital and social networks has created value for firms and users in terms of entrepreneurship, electronic commerce and education. In the case of crowdsourcing, entrepreneurship and sponsored innovation projects, user friendly information technologies in the digital economy have facilitated new opportunities, design challenges, learning and solving. Information and communication technologies have facilitated the market expansion of small and medium businesses by leveraging IT-enabled services. Also, studies have suggested that industries that are part of a circular economy succeed when the focus shifts towards (1) Designing environment friendly production, (2) Recycling (3) Policy formulation, regulation and implementation and (4) Design education. This is having a significant impact on the logistics and supply chain management for manufacturing firms in terms of environment friendly benefits of long-lasting design, maintenance, durability, reuse, remanufacturing and recycling.

Brand social networks have been popular across the Internet in the context of luxury products, designs and ratings. This has resulted in greater opportunities for context-based business research, advertising and marketing for successful brands, ratings and co-shopping. For example, highly innovative collaborating firms and brands having inter and intra-firm IT capabilities and market share in the digital economy have been successfully stock listed. In the context of online shopping and IT businesses, technology licensing, services such as IT enabled CRM, secure digital payment conveniences, pricing, data-driven

services, incentives and rewards have added significant value to brands in the digital economy. With electronic commerce and online shopping becoming more popular, firms have focused on business process development and CRM for various product and service portfolios, energy innovations, market typologies, pricing, geographies and services value added.

Data from a survey of managers from across seven industries in India demonstrates that the Internet and mobile subscriptions of a sizeable and educated labor force are critical in the value co-creation process for services value added and business innovations in the digital economy. Further, digital payment conveniences, secure transactions, incentives and rewards, shared economy innovations in online shopping have resulted in increased membership and subscriptions of businesses towards digitized business processes that have become change agents for their brands. The transformation of virtual worlds in the past, present and future are the results of improved programming languages. This has also transformed hybrid commerce delivery systems in online shopping. The value of Inter and Intra-firm business networks in industries has depended on the business assets, knowledge exchange, complementarity and effective governance. The innovativeness of such collaborative businesses is associated with shared analytics, knowledge base and business process development.

Studies on IT enabled value co-creation in the design of web portals have elaborated on utilizing design principles, design value, design method, design process and participative design tools. In the garment industry, brands such as Accumark-3D, Clo3D and Optitex have used CAD 3D software in the customization, personalization, configuration and simulation of designs for garment prototyping. Firms have also been able to integrate their digital design software with their supply chain management for production.

This has resulted in the reduction of lead time to market in terms of raw material management, design time, sampling, sales and cost control. Firms across industries such as apparel and footwear, food manufacturing, fast moving consumer goods, toy manufacturing, automobile design, perfumery, online publications, gaming, furniture and home décor have integrated value co-creation by making use of digital design software.

Social, economic and intellectual motivation factors of online firm-customer interactions during value co-creation in the personalization and customization of products and services were studied. In terms of social motivation, value co-creation factors identified are wellness, commitment and sociability. Customer incentives, market knowledge and advertising, promotions, business strategy and customer relationship management were associated with economic motivation. Customer participation, customer efficacy, customer knowledge, problem solving and learning, and customer innovativeness were identified with intellectual motivation. The needs of industry learning systems and research for various sectors is relevant in today's digital economy and can benefit from better information management of customer interactions for product and service design as it adds value to both the customer and the firm. The three types of motivation, namely, (1) social, (2) economic and (3) intellectual motivation during business and customer interactions that focus on product and service design facilitated by information technology and systems have resulted in successful value co-creation in the digital economy. Digital design software has successfully transformed the needs of many brands across various product segments who want to co-create and successfully integrate customers for personalized and customized product designs. Various ways to facilitate value co-creation

across collaborative systems and projects, entrepreneurship, start-ups, value networks and product and service personalization have been identified for future research.

<Table 3> Online Value Co-creation Contexts

Authors / Year	Contribution	Dimension
(Rathore et al., 2016; Romero et al., 2011), (Bouncken and Reuschl, 2018), (Ketonen-Oksi and Valkokari, 2019), (Daalhuizen et al., 2019) (Sanders and Stappers, 2008), (Day and Shea, 2019; Łaszkiwicz, 2018)	Collaborative Systems	Collaborative Learning, Innovation Projects, Collaborative Design, Socio-technological innovation, New products and services, Entrepreneurship and Start-ups, Sponsored innovation projects, Knowledge capital, Knowledge networks, Value centric networks
(Rathore et al., 2016; Romero et al., 2011), (Rindfleisch and Im, 2019), (Bouncken and Reuschl, 2018), (Verma et al., 2012), (Ramaswamy and Ozcan, 2018)	New Products and Services	Product and Service Development, Entrepreneurship and Start-ups
(Au et al., 2009), (Schiavone et al., 2020), (Ketonen-Oksi and Valkokari, 2019), (Daalhuizen et al.2019), (Łaszkiwicz, 2018),	Crowdsourced projects	Sponsored Innovation Projects
(Sutanto et al., 2011), (Stephen and Toubia, 2010), (Rafaeli and Noy, 2002), (Kim et al., 2008; Romero and Molina, 2011)	Value Networks	Knowledge Capital, Knowledge Networks, Value Centric Networks
(Hazen et al., 2021), (Gnyawali and Penner, 2010), (Rai et al., 2012), (Sarker et al., 2012), (Grover and Kohli, 2012)	Lean Management and Green Supply Chains	Governance, complementarity, networked logistics and channels, inter-intra firm capabilities.
(Nambisan and Watt, 2011), (Quach and Thaichon, 2017), (Moran and Gossieaux, 2010), (Quach and Thaichon; Moran and Gossieaux, 2010), (Lechner and Hummel, 2002), (Romero and Molina, 2011), (Kim et al., 2008), (Valck et al., 2009)	Social Network Innovation	Digitization of business processes, Socio-technological innovation, Rewards, Accomplishments, Endorsements
(Rindfleisch and Im, 2019), (Rathore et al., 2016; Romero et al., 2011), (Bouncken and Reuschl, 2018), (Verma et al., 2012), (Ramaswamy and Ozcan, 2018)	Product or Service Customization	Distributed manufacturing and services, 3D Printing
(Valck et al., 2009), (Ramaswamy and Ozcan, 2018), (Grover and Kohli, 2012), (Messinger et al., 2009), (Oh and Teo, 2010), (Schiavone et al., 2020), (Gummesson, 2008), (Gummesson and Mele, 2010), (Yang et al., 2017), (Riegner, 2007), (Kim et al., 2008)	Product and Service Management	Networked Innovation, Brand Loyalty, Online Co-shopping, App economy, Subscription based services.
(O'Hern and Rindfleisch, 2010), (Lemon and Verhoef, 2016), (Zeithaml, 1988), (Tellis and Gaeth, 1990), (Gopalan, 2017), (Zeithaml, 1988; Tellis and Gaeth, 1990), (Valck et al., 2009), (Ramaswamy and Ozcan, 2018), (Tellis and Gaeth, 1990), (Yang et al., 2017), (Zeithaml, 1988)	Customer Relationship Management	Product portfolios, New services, Geographies, New market typologies, Services value added, Digital payment conveniences, secure transactions, incentives, discounts and rewards

## &lt;References&gt;

- [1] Agarwal, R., Gupta, A. K., and Kraut, R. (2008). The interplay between digital and social networks. *Information Systems Research*, 19(3), 243-252. doi: 10.1287/isre.1080.0200.
- [2] Alexiou, M. V. (2018). Modeling guided tour participants' experiences. *International Journal of Culture, Tourism and Hospitality Research*, 12(3), 257-276. doi:10.1108/ijcthr-10-2017-0104.
- [3] Amazon Prime Now (2015), (2019, July 20) *Amazon Prime Now*, <https://primenow.amazon.com/onboard?sourceUrl%2F>.
- [4] Antin, J., and Earp, M. (2010). With a little help from my friends: Self-interested and prosocial behavior on MySpace music. *Journal of the American Society for Information Science and Technology*, 61(5), 952-963.
- [5] Au, Y. A., Carpenter, D., Chen, X., and Clark, J.G. (2009). Virtual organizational learning in open source software development projects. *Information & Management*, 46(1), pp. 9. doi:10.1016/j.im.2008.09.004.
- [6] Bell, J., and Loane, S. (2010). New-wave global firms: Web 2.0 and SME internationalization. *Journal of Marketing Management*, 26(3-4), 03, 213-229. doi: 10.1080/02672571003594648.
- [7] Bouncken, R. B., and Reuschl, A. J. (2018). Coworking-spaces: how a phenomenon of the sharing economy builds a novel trend for the workplace and for entrepreneurship. *Review of Managerial Science*, 12(1), 317-334. doi:10.1007/s11846-016-0215-y.
- [8] Brynskov, M. Heijnen Adrienne, Mara, B., and Christoph, R. (2018). Experimentation at scale: Challenges for making urban informatics work. *Smart and Sustainable Built Environment*, 7(1), 150-163. doi:10.1108/SASBE-10-2017-0054.
- [9] Buchanan, S., Wolfe, S., and Newton, C. (2019). Influential article review - device diversity and product performance: An analysis of the mobile technology industry. *Journal of Strategic Innovation and Sustainability*, 14(7), 1-27. Retrieved from <https://www.proquest.com/scholarly-journals/influential-article-review-device-diversity/docview/2540104079/se-2?accountid=177896>.
- [10] Bughin, J., Byers, A. H., and Chui, M. (2011). How social technologies are extending the organization. *McKinsey Quarterly Report*. <https://www.mckinsey.com/industries/technology-media-and-telecommunications/our-insights/how-social-technologies-are-extending-the-organization>.
- [11] Carroll, N., and Helfert, M. (2015). Service capabilities within open innovation. *Journal of Enterprise Information Management*, 28(2), 275-303. doi: 10.1108/JEIM-10-2013-0078.
- [12] Ceccagnoli, M., Forman, C., Huang, P., and Wu, D. (2012). Cocreation of value in a platform ecosystem: The case of enterprise software. *MIS Quarterly*, 36(1), 263-290. <https://www.proquest.com/scholarly-journals/cocreation-value-platform-ecosystem-case/docview/926550249/se-2?accountid=177896>.
- [13] Chan, K. W., and Li, S. Y. (2010). Understanding consumer-to-consumer interactions in virtual communities: The salience of reciprocity. *Journal of Business Research*, 63(9/10), pp. 1033. <https://www.proquest.com/scholarly-journals/understanding-consumer-interactions-virtual/docview/743886027/se-2?accountid=177896>.
- [14] Cheung, C. M. K., and Lee, M. K. O. (2010). A theoretical model of intentional social action in online social networks. *Decision Support Systems*, 49(1),24-30.
- [15] Christopherson, S., Kitson, M., and Michie, J. (2008). Innovation, networks and knowledge exchange. *Cambridge Journal of Regions Economy and Society*, 1(2), 165-173. doi:10.1093/cjres/rsn015.
- [16] Cohen, W. M., and Levinthal, D. A. (1990). Absorptive-Capacity: A New Perspective on Learning and Innovation. *Administrative Science Quarterly*, 35(1), 128-152. <https://www.proquest.com/scholarly-journals/absorptive-capacity-new-perspe>



- ctive-on-learning/docview/203983133/se-2?accountid=177896. doi:10.2307/2393553.
- [17] Colliander, J., and Dahlén, M. (2011). Following the fashionable friend: The power of social media - weighing the publicity effectiveness of blogs versus online magazines. *Journal of Advertising Research*, 51(1), pp. 313. <https://www.proquest.com/scholarly-journals/following-fashionable-friend-power-social-media/docview/874495440/se-2?accountid=177896>.
- [18] Collina, L., Galluzzo, L., Maei, S., and Monna, V. (2017). Designing design education. An articulated programme of collective open design activities. *Design Journal*, 20, S1000 - S1013. doi:10.1080/14606925.2017.1353044.
- [19] Cova, B., and White, T. (2010). Counter-brand and alter-brand communities: The impact of web 2.0 on tribal marketing approaches. *Journal of Marketing Management*, 26(3/4), 256. doi:10.1080/02672570903566276.
- [20] Daalhuizen, J., Timmer, R., Martijn van, d. W., and Gardien, P. (2019). An architecture of design doing: A framework for capturing the ever-evolving practice of design to drive organizational learning. *International Journal of Design*, 13(1), 37-52. Retrieved from <https://search-proquest-com.proxy.uwasa.fi/docview/2226896677?accountid=14797>.
- [21] Day, G. S., and Shea, G. P. (2019). Grow faster by changing your innovation narrative. *MIT Sloan Management Review*, 60(2), 1-9. <https://search.proquest.com/docview/2168845820?accountid=177896>.
- [22] Dell'Era, C., and Verganti, R. (2009). Design-driven laboratories: organization and strategy of laboratories specialized in the development of radical design-driven innovations. *R&D Management*, 39(1), 1-20. <https://www.proquest.com/scholarly-journals/design-driven-laboratories-organization-strategy/docview/233087120/se-2?accountid=177896>. doi:10.1111/j.1467-9310.2008.00541.x.
- [23] Devaraj, S., and Kohli, R. (2003). Performance impacts of information technology: is actual usage the missing link? *Management Science*, 49(3), 273-289, doi: 10.1287/mnsc.49.3.273.12736. <https://www.jstor.org/stable/4133926>.
- [24] Dholakia, U. M., and Bagozzi, R. P. (2004). A social influence model of consumer participation in network- and small-group-based virtual communities. *International Journal of Research in Marketing*, 21(3), 241-263.
- [25] Dogtiev, A. (2015). App usage statistics: 2015 roundup. <https://www.businessofapps.com/app-usage-statistics2015/>.
- [26] Dong, J. Q., and Netten, J. (2017). Information technology and external search in the open innovation age: New 622. J. Q. DONG AND C.-H. YANG findings from Germany. *Technological Forecasting and Social Change*, 120(1), 223-231. <https://www.proquest.com/scholarly-journals/information-technology-external-search-open/docview/1936517830/se-2?accountid=177896>.
- [27] Dong, J. Q., and Yang, C.-H., (2019). Information technology and innovation outcomes: is knowledge recombination the missing link? *European Journal of Information Systems*, 28(6), 612-626, doi:10.1080/0960085X.2019.1627489.
- [28] eMarketer (2015, November 19), By 2016, most digital travel bookers will use mobile devices, <http://www.emarketer.com/Article/By2016-MostDigital-Travel-Bookers-Will-Use-Mobile-Devices/1013248>.
- [29] Flemming, R. (2013) *Design Education for a Sustainable Future*. Routledge: Abingdon, UK. <https://doi.org/10.4324/9780203584071>.
- [30] Forman, C., and van Zeebroeck, N. (2012). Form wires to partners: How the internet has fostered R&D collaborations within firms. *Management Science*, 58(8), 1549-1568. <https://doi.org/10.1287/mnsc.1110.1505>.
- [31] Frey, K., Lüthje, C., and Haag, S. (2011). Whom should firms attract to open innovation platforms? The role of knowledge diversity and motivation. *Long Range Planning*, 44(5-6), 397-420. <https://www.proquest.com/scholarly-journals/>

- whom-should-firms-attract-open-innovation/docview/905088891/se-2?accountid=177896 (Accessed November 12, 2021). doi:10.1016/j.lrp.2011.09.006.
- [32] Füller, J., Mühlbacher, H. Matzler, K., and Jawecki, G. (2009). Consumer empowerment through internet-based co-creation. *Journal of Management Information Systems*, 26(3), 71-102. doi:10.2753/MIS0742-1222260303.
- [33] Füller, J., Hutter, K., and Faullant, R. (2011). Why co-creation experience matters? Creative experience and its impact on the quantity and quality of creative contributions. *R&D Management*, 41(3), 259-271. doi:10.1111/j.1467-9310.2011.00640.x.
- [34] Ge, B., Yang, Y., Jiang, D., Gao, Y., Du, X., and Zhou, T. (2018). An empirical study on green innovation strategy and sustainable competitive advantages: Path and boundary. *Sustainability*, 10, 3631. doi:10.3390/su10103631.
- [35] Geissdoerfer, M., Savaget, P., Bocken, N. M. P., and Hultink, E. J. (2017). The circular economy - a new sustainability paradigm? *Journal of Cleaner Production*, 143, 757-768. doi:10.1016/j.jclepro.2016.12.048.
- [36] Gray, P. H., Parise, S., and Iyer, B. (2011). Innovation impacts of using social bookmarking systems. *MIS Quarterly*, 35(3), 629-643. doi:10.2307/23042800.
- [37] Grover, V., and Kohli, R. (2012). Cocreating IT Value: New Capabilities and Measures for Multifirm Environments. *MIS Quarterly*, 36(1), 225-232. doi:10.2307/41410415.
- [38] Gnyawali, D. R., Fan, W., and Penner, J. (2010). Competitive actions and dynamics in the digital age: An empirical investigation of social networking firms. *Information Systems Research*, 21(3), 594-613. doi:10.1287/isre.1100.0294.
- [39] Gopalan, B. (2019). A Study on Variables, Technology Facilitators and Measures of Value Co-creation for Management. *Acta Wasaensia* 417, Doctoral dissertation, 2019, University of Vaasa. Vaasan yliopisto. ISBN: 978-952-476-848-1 (print). ISSN: 0355-2667 (Acta Wasaensia 417, print).
- [40] Gopalan, B. (2017). *Internet for Development and Telecommunications*. Lap Lambert Academic Publishing. ISBN-13: 978-3-330-05835-4.
- [41] Gopalan, B., and Kohtamäki, M. (2017). Customer-The Value Co-Creator. *International Journal of Scientific & Technology Research*, 6(4), April 2017 Edition. ISSN 2277-8616.
- [42] Goldsworthy, K., and Ellams, D. (2019). Collaborative Circular Design. Incorporating Life Cycle Thinking into an Interdisciplinary Design Process. *Design Journal*, 22, 1041-1055. doi:10.1080/14606925.2019.1595416.
- [43] Gummesson, E., and Mele, C. (2010). Marketing as value co-creation through network interaction and resource integration. *Journal of Business Market Management*, 4(4), 181-198. doi:10.1007/s12087-010-0044-2.
- [44] Hamilton, K., and Hewer, P. (2010). Tribal mattering spaces: Social-networking sites, celebrity affiliations, and tribal innovations. *Journal of Marketing Management*, 26(3-4), 271-289. doi:10.1080/02672571003679894.
- [45] Hammer, M. 2001. The Superefficient Company. *Harvard Business Review*, 79(8), 82-91. <https://www.proquest.com/magazines/superefficient-company/docview/227808846/se-2?accountid=177896> (Accessed November 12, 2021).
- [46] Hatcher, G. D., Ijomah, W. L., and Windmill, J. F. C. (2014). A network model to assist “design for remanufacture” integration into the design process. *Journal of Cleaner Production*, 64, 244-253. doi:10.1016/j.jclepro.2013.09.021.
- [47] Hazen, B. T., Russo, I., Confente, I., and Pellathy, D. (2021). Supply chain management for circular economy: Conceptual framework and research agenda. *International Journal of Logistics Management*, 32(2), 510-537. doi:10.1108/IJLM-12-2019-0332.
- [48] Healy, J. C., and McDonagh P. (2013). Consumer roles in brand culture and value co-creation in virtual communities. *Journal of Business Research*, 66(9), 1528-1540. doi:10.1016/j.jbusres.2012.09.014.
- [49] Holzwarth, M., Janiszewski, C., and Neumann, M.

- M. (2006). The influence of avatars on online consumer shopping behavior. *Journal of Marketing*, 70(4), 19-36. doi:10.1509/jmkg.70.4.019.
- [50] Hsu, C., and Lin, J. C. (2008). Acceptance of blog usage: The roles of technology acceptance, social influence and knowledge sharing motivation. *Information & Management*, 45(1), 65.
- [51] Hung, K. H., and Li, S. Y. (2007). The influence of eWOM on virtual consumer communities: Social capital, consumer learning, and behavioral outcomes. *Journal of Advertising Research*, 47(4), 485.
- [52] Iglesias, O., Markovic, S., Bagherzadeh, M., and Jatinder, J. S. (2018). Co-creation: A key link between corporate social responsibility, customer trust, and customer loyalty. *Journal of Business Ethics*, 1-16. Doi:<http://dx.doi.org/10.1007/s10551-018-4015-y>.
- [53] Ketonen-Oksi, S., and Valkokari, K. (2019). Innovation ecosystems as structures for value co-creation. *Technology Innovation Management Review*, 9(2), 25-35. <https://search-proquest-com.proxy.uwasa.fi/docview/2197276312?accountid=14797>. doi:10.22215/timreview/1216.
- [54] Khansa, L., Zobel, C., and Goicochea, G. (2012). Creating a taxonomy for mobile commerce innovations using social network and cluster analyses. *International Journal Of Electronic Commerce*, 16(4), 19-52. <http://www.jstor.org/stable/41739748>. doi:10.2753/JEC1086-4415160402.
- [55] Kim, J. W., Choi, J., Qualls, W., and Han, K. (2008). It takes a marketplace community to raise brand commitment: The role of online communities. *Journal of Marketing Management*, 24(3/4), 409. doi:10.1362/026725708X306167.
- [56] Kim, D. W., Trimi, S., Hong, S. G., and Lim, S. (2019). Effects of co-creation on organizational performance of small and medium manufacturers. *Journal of Business Research*. ISSN 0148-2963, doi: 10.1016/j.jbusres.2019.03.055.
- [57] Kirsten, v. D., Simeone, L., Keskin, D., Baldassarre, B., Niero, M., and Morelli, N. (2020). Circular economy in industrial design research: A review. *Sustainability*, 12(24), 10279. doi:10.3390/su122410279.
- [58] Kohler, T., Fueller, J., Matzler, K., and Stieger, D. (2011). Co-creation in virtual worlds: The design of the user experience, *MIS Quarterly*, 35(3), pp. 773. doi:10.2307/23042808.
- [59] Köhler, C. F., Rohm, A. J., Ruyter, K. D., and Wetzels, M. (2011). Return on interactivity: The impact of online agents on newcomer adjustment. *Journal of Marketing*, 75(2), 93-108. doi:10.1509/jm.75.2.93.
- [60] Lechner, U., and Hummel, J. (2002). Business models and system architectures of virtual communities: From a sociological phenomenon to peer-to-peer architectures. *International Journal of Electronic Commerce*, 6(3), 41. doi:10.1080/10864415.2002.11044242.
- [61] Lemon, K. N., and Verhoef, P. C. (2016). Understanding customer experience throughout the customer Journey. *Journal of Marketing*, 80(6), 69-96. doi:10.1509/jm.15.0420.
- [62] Leube, M., and Walcher, D. (2017). Designing for the next (Circular) Economy. An appeal to renew the Curricula of Design Schools. *Design Journal*, 20, S492 - S501. doi:10.1080/14606925.2017.1352999.
- [63] Oh, L., and Teo, H. (2010). Consumer value co-creation in a hybrid commerce service-delivery system. *International Journal of Electronic Commerce*, 14(3), 35-62. doi:10.2753/JEC1086-4415140303.
- [64] Markou, F., Segonds, F., Rio, M., and Perry, N. (2017). A methodological proposal to link design with additive manufacturing to environmental considerations in the early design stages. *International Journal of Interactive Design and Manufacturing (IJIDeM)*, 11, 799-812. doi:10.1007/s12008-017-0412-1.
- [65] Mazzarella, F., Storey, H., and Williams, D (2019). Counter-narratives towards sustainability in fashion. Scoping an academic discourse on fashion activism through a case study on the centre for sustainable fashion. *Design Journal*, 22, 821-833. doi:10.1080/14606925.2019.1595402.
- [66] McKinnon, A., Cullinane, S., Whiteing, A., and Browne, M. (2010), *Green Logistics: Improving the Environmental Sustainability of Logistics*. Vol. 1,

- p. 372. London, Philadelphia: Kogan Page Limited
- [67] Messinger, P. R., Stroulia, E., Lyons, K., Bone, M., Niu, R. H., Smirnov, K., and Perelgut, S. (2009). Virtual worlds - past, present, and future: New directions in social computing. *Decision Support Systems*, 47(3), 204-228. doi:10.1016/j.dss.2009.02.014.
- [68] Moorhouse, D., and Moorhouse, D. (2017). Sustainable design: circular economy in fashion and textiles. *Design Journal*, 20, S1948 - S1959. doi:10.1080/14606925.2017.1352713.
- [69] Moran, E., and Gossieaux, F. (2010). Marketing in a hyper-social world: The tribalization of business study and characteristics of successful online communities. *Journal of Advertising Research*, 50(3), 232. doi:10.2501/S0021849910091397.
- [70] Murphy, P. R., Poist, R. F., and Braunschweig, C. D. (1996). Green logistics: comparative views of environmental progressives, moderates, and conservatives. *Journal of Business Logistics*, 17(1), 191-211. <https://www.proquest.com/scholarly-journals/green-logistics-comparative-views-environmental/docview/212596065/se-2?accountid=177896> (Accessed November 12, 2021).
- [71] Nam, K., Kim, Y. J., Yim, M. S., Lee, N. H., and Jo, A. R. (2009). Understanding the Relationship between Value Co-Creation Mechanism and Firm's Performance based on the Service-Dominant Logic. *Asia Pacific Journal of Information Systems*, 19(4), 177-200.
- [72] Nambisan, P., and Watt, J. H. (2011). Managing customer experiences in online product communities. *Journal of Business Research*, 64(8), 889. <https://www.proquest.com/scholarly-journals/managing-customer-experiences-online-product/docview/875624988/se-2?accountid=177896> (Accessed November 12, 2021).
- [73] Nohra, C. G., and Barbero, S. (2019). Systemic Design for territorial thinking. Circular urban transitions for post-industrial cities. *Design Journal*, 22, 915-929. doi:10.1080/14606925.2019.1595408.
- [74] Novitasari, M., and Agustia, D. (2021). Green supply chain management and firm performance: The mediating effect of green innovation. *Journal of Industrial Engineering and Management*, 14(2), 391-403. doi:10.3926/jiem.3384.
- [75] Ohei, K. N., and Brink, R. (2019). A framework development for the adoption of information and communication technology web technologies in higher education systems. *South African Journal of Information Management*, 21(1) doi:10.4102/sajim.v21i1.1030.
- [76] Omachonu, V. K., and Einspruch, N. G. (2010). Innovation in healthcare delivery systems: a conceptual Framework. *The Innovation Journal: The Public Sector Innovation Journal*, 15(1), 1-20.
- [77] Pikkarainen, M., Huhtala, T., Kempainen, L., and Häikiö, J. (2019). Success factors for data - driven service delivery networks. *Journal of Innovation Management*, 7(4), 14-46. doi:10.24840/2183-0606\_007.004\_0003.
- [78] Prahalad, C., and Ramaswamy, V. (2003). The new frontier of experience innovation. *MIT Sloan Management Review*, 44(4), 12-18.
- [79] Quach, S., and Thaichon, P. (2017). From connoisseur luxury to mass luxury: Value co-creation and co-destruction in the online environment. *Journal of Business Research*, 81, 163-172, Business Source Premier, EBSCOhost, viewed 13 May 2018. doi:10.1016/j.jbusres.2017.06.015.
- [80] Rafaeli, S., and Noy, A. (2002). Online auctions, messaging, communication and social facilitation: A simulation and experimental evidence. *European Journal of Information Systems*, 11(3), 196-196-207. doi:10.1057/palgrave.ejis.3000434.
- [81] Rai, A., Pavlou, P., Im, G., and Du, S. (2012). Interfirm IT capability profiles and communications for cocreating relational value: Evidence from the logistics industry. *MIS Quarterly*, 36(1), 233-262. <https://www.proquest.com/scholarly-journals/interfirm-capability-profiles-communications/docview/926550335/se-2?accountid=177896> (Accessed November 12, 2021).
- [82] Ramaswamy, V., and Ozcan, K. (2016). Brand value co-creation in a digitalized world: an integrative framework and research implications. *International Journal of Research in Marketing*, 33(1), 93-106.

- doi:10.1016/j.ijresmar.2015.07.001.
- [83] Rao, P., and Holt, D. (2005). Do green supply chains lead to competitiveness and economic performance? *International Journal of Operations and Production Management*, 25(9), 898-916. doi:10.1108/01443570510613956.
- [84] Ransbotham, S., and Gerald C. K. (2011). Membership turnover and collaboration success in online communities: Explaining rises and falls from grace in wikipedia. *MIS Quarterly*, 35(3), 613-27.
- [85] Rathore, A. K., Ilavarasan, P. V., and Dwivedi, Y. K. (2016). Social media content and product co-creation: An emerging paradigm. *Journal of Enterprise Information Management*, 29(1), 7-18. doi:10.1108/JEIM-06-2015-0047.
- [86] Riedel, C., Blohm, I., Leimeister, J. M., and Krcmar, H. (2013). The effect of rating scales on decision quality and user attitudes in online innovation communities. *International Journal of Electronic Commerce*, 17(3), 7-36.
- [87] Riegner, C. (2007). Word of mouth on the web: the impact of Web 2.0 on consumer purchase decisions. *Journal of Advertising Research*, 47(4), 436-447. <https://www.proquest.com/scholarly-journals/word-mouth-on-web-impact-2-0-consumer-purchase/docview/205055534/se-2?accountid=177896> (Accessed November 12, 2021).
- [88] Rindfleisch, A., and Im, S. (2019). Enhancing customer centricity via 3D printing. *Handbook on Customer Centricity*. Robert Palmatier, Christine Moorman, and Ju-Yeon Lee, (Eds), New York: Edward Elgar Publishing.
- [89] Romero, D., and Molina, A. (2011). Collaborative networked organizations and customer communities: value co-creation and co-innovation in the networking era. *Production Planning and Control*, 22(5-6), 447-472. doi:10.1080/09537287.2010.536619.
- [90] Schiavone, F., Leone, D., Sorrentino, A., and Scaletti, A. (2020). Re-designing the service experience in the value co-creation process: An exploratory study of a healthcare network. *Business Process Management Journal*, 26(4), 889-908. doi:10.1108/BPMJ-11-2019-0475.
- [91] Sarker, S., Sahaym, A., and Bjørn-Andersen, N. (2012). Exploring value cocreation in relationships between an ERP vendor and its partners: A revelatory case study. *MIS Quarterly*, 36(1), 317-338. doi:10.2307/41410419.
- [92] Sanders, E. B. N., and Stappers, P. J. (2008). Co-creation and the new landscapes of design. *CoDesign*, 4(1), 5-18. doi:10.1080/15710880701875068.
- [93] Santolaya, J. L., Lacasa, E., Biedermann, A., and Muñoz, N. (2019). A practical methodology to project the design of more sustainable products in the production stage. *Research in Engineering Design*, 30(4), 539-558. doi:10.1007/s00163-019-00320-w.
- [94] Schlosser, A. E., White, T. B., and Lloyd, S. M. (2006). Converting web site visitors into buyers: How web site investment increases consumer trusting beliefs and online purchase intentions. *Journal of Marketing*, 70(2), 133-148. doi:10.1509/jmkg.70.2.133.
- [95] Schuler, D., and Namioka, A. (2009). *Participatory design: Principles and practices*. London, UK: CRC.
- [96] Shen, Y., Huang, C., Chu, C., and Liao, H. (2010). Virtual community loyalty: An interpersonal-interaction perspective. *International Journal of Electronic Commerce*, 15(1), 49.
- [97] Srivastava, S. K. (2007). Green supply-chain management: a state-of-the-art literature review. *International Journal of Management Reviews*, 9(1), 53-80. doi:10.1111/j.1468-2370.2007.00202.x.
- [98] Stephen, A. T., and Toubia, O. (2010). Deriving value from social commerce networks. *JMR, Journal of Marketing Research*, 47(2), 215. doi:10.1509/jmkr.47.2.215.
- [99] Tellis, G. J., and Gaeth, G.J. (1990). Best value, price-seeking, and price aversion: the impact of information and learning on consumer choices. *Journal of Marketing*, 54(2), 34-45. doi:10.2307/1251868.
- [100] Trusov, M., Bucklin, R. E., and Pauwels, K. (2009). Effects of word-of-mouth versus traditional marketing: Findings from an internet social networking site. *Journal of Marketing*, 73(5), 90-102. doi:10.1509/jmkg.73.5.90.

- [101] Uva, A., Cristiano, S., Fiorentino, M., and Monno, G. (2010). Distributed design review using tangible augmented technical drawings. *Computer-Aided Design*, 42(5), 364-372. doi:10.1016/j.cad.2008.10.015.
- [102] Valck, K. D., Van Bruggen, G. H., and Wierenga, B. (2009). Virtual communities: A marketing perspective. *Decision Support Systems*, 47(3), 185. doi:10.1016/j.dss.2009.02.008.
- [103] Verma, R., Teixeira, J., Patricio, L., Nunes, N. J., Nobrega, L., Fisk, R. P., and Constantine, L. (2012). Customer experience modeling: from customer experience to service design. *Journal of Service Management*, 23(3), 362-376. doi:10.1108/09564231211248453.
- [104] Virtanen, M., Manskinen, K., and Eerola, S. (2017). Circular material library. An innovative tool to design circular economy. *Design Journal*, 20, S1611 - S1619. doi:10.1080/14606925.2017.1352685.
- [105] Viswanathan, S., Kuruzovich, J., Gosain, S., and Agarwal, R. (2007). Online infomediaries and price discrimination: Evidence from the automotive retailing sector. *Journal of Marketing*, 71(3), 89-107. doi:10.1509/jmkg.71.3.089.
- [106] Wagner, C., and Majchrzak, A. (2007). Enabling customer-centricity using wikis and the wiki way. *Journal of Management Information Systems*, 23(3), 17-43. doi:10.2753/MIS0742-1222230302.
- [107] Watson, R., Wilson, H. N., Smart, P., Macdonald, E. K. (2018). Harnessing difference: A capability-based framework for stakeholder engagement in environmental innovation: HARNESSING DIFFERENCE. *Journal of Product Innovation Management*, 35, 254-279. doi:10.1111/jpim.12394.
- [108] Weng, H. H. R., Chen, J. S., and Chen, P. C. (2015). Effects of green innovation on environmental and corporate performance: A stakeholder perspective. *Sustainability (Switzerland)*, 7(5), 4997-5026. doi:10.3390/su7054997.
- [109] Yang, S., Song, Y., Chen, S., and Xia, X. (2017). Why are customers loyal in sharing-economy services? a relational benefits perspective. *Journal of Services Marketing*, 31(1), 48-62. doi:10.1108/JSM-01-2016-0042.
- [110] Zeithaml, V. A. (1988). Consumer perceptions of price, quality, and value: A means-end model and synthesis of evidence. *Journal of Marketing*, 52(3), 2-22. <https://doi.org/10.2307/1251446>.
- [111] Zomerdijs, L. G., and Voss, C. A. (2010). Service design for experience-centric services. *Journal of Service Research*, 13(1), 67-82. doi:10.1177/1094670509351960.
- [112] Zhao, M., Hoeffler, S., and Zauberaman, G. (2007). Mental simulation and preference consistency over time: The role of process-versus outcome-focused thoughts. *Journal of Marketing Research*, 44(3), 379-388. doi:10.1509/jmkr.44.3.379.
- [113] Zhu, F., and Zhang, X. (2010). Impact of online consumer reviews on sales: The moderating role of product and consumer characteristics. *Journal of Marketing*, 74(2), 133-148. doi:10.1509/jm.74.2.13.
- [114] Łaszkiwicz, A. (2018). Value creation by engaging customers in the process of product and business design in a virtual environment. *Handel Wewnetrzny*, 4(375), 160-168. Retrieved from <https://search-proquest-com.proxy.uwasa.fi/docview/2129933661?accountid=14797>.

◆ About the Authors ◆

---



**Dr. Balaji Gopalan**

Dr. Balaji Gopalan is Assistant Professor at Sri Dharmasthala Manjunatheshwara Institute for Management Development (SDMIMD) in Mysore (Karnataka), India. He has over 16 years of experience working across academics, research and consulting and has worked at institutes and companies in Finland, USA and India. He holds a Doctor of Science in Industrial Management from the University of Vaasa, Finland. His area of specialization includes production and operations management, logistics and supply chain management and value co-creation.

---

Submitted: August 4, 2021; 1st Revision: November 12, 2021; Accepted: December 8, 2021