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# Prosumers' intention to co-create business value and the moderating role of digital media usage

Sheshadri Chatterjee<sup>c</sup>, Marcello Mariani<sup>a,b,\*</sup>, Samuel Fosso Wamba<sup>d</sup>

<sup>a</sup> Henley Business School, University of Reading, UK

<sup>b</sup> University of Bologna, Italy

<sup>c</sup> Department of Computer Science & Engineering, Indian Institute of Technology Kharagpur, West Bengal, India

<sup>d</sup> TBS Business School, 1 Place Alphonse Jourdain, TOULOUSE, 31068, France

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## ABSTRACT

The study identifies the factors impacting prosumers' intention for co-production and future participation. It also investigates the moderating role of digital media usage in the relationship between behavioral intention of prosumers for value co-creation and business benefit of the organization. Based on a literature review of co-creation and related theories and a survey, we developed and tested a conceptual model using the PLS-SEM technique. The study also analyzes the moderating impact of digital media by using multi group analysis. This study has also analyzed the impacts of three control variables (i.e., age, gender, and education) on the behavioral intention of the prosumers for value cocreation by means of mediation analysis. We find that the intention of prosumer for co-production as well as intention of prosumers for future participation influences behavioral intention of prosumers for value cocreation which in turn positively impacts business benefits of the organization. The study also finds that usage of digital media has significant moderating impact on the relationship between behavior intention of prosumers for value co-creation and business benefit of the organization.

## 1. Introduction

In the business landscape, three terms are used for capturing the dynamic role of consumers. The three terms are prosumption (Toffler, 1980), co-production (Vargo and Lusch, 2004), and co-creation (Prahalad and Ramaswamy, 2004a). In the context of the Service Dominant Logic (SDL) framework, co-production and co-creation can be investigated as a phenomenon which is concerned with the production as well as delivery of services. The internet has made it possible for the consumers to take an active role as co-producers since it has been possible for firms to directly communicate with the consumers towards customization of the products (Yadav and Varadarajan, 2005). Moreover, some researchers have opined that “the customer is always a co-creator of value” (Vargo and Lusch, 2008, p.2). However, though consumers take part as a co-producer in the production process, after the manufacturing process ends, consumers should learn how to use the product to satisfy the unique needs and here lies the need to understand the concept of prosumer. Prosumer is conceptualized as a short term combining the terms of consumer and producer. Researchers also have conceptualized the term prosumer as a combination of professional and

consumer (Humphreys and Grayson, 2008), referring to this term to indicate an expert user who claims high and advanced performance features. The concept of prosumer emerges from the participatory culture bridging the intimate relationship between buyers and sellers gradually blurring the aspects and concepts of consumptionscape (Jenkins et al., 2006; Parker et al., 2016; Jose Planells, 2017; Chatterjee, 2019). The role played by the prosumers is perceived to be vital in the context of co-creation, co-production, distribution, participation, and promotion by the help of interactive dialogs among the brand communities (Wang, 2020). The business market is gradually becoming a conversation forum with involvement of various actors across several platforms (Yen and Dey, 2019; Eckhardt et al., 2019; Mariani & Borghi, 2021). Prosumers interact with consumers and producers providing feedback and reviews (Filieri, 2013; Kim, Park, & Mariani, 2023; Mariani & Borghi, 2020; Zaman et al., 2023). They play a critical role of the influencer towards the decision-making of the fellow consumers (Niu et al., 2016; Chaudhuri, 2022; Mariani, Styven, & Nataraajan, 2021). Thus, in the business context, prosumption has become a social as well as psychological phenomenon and it has brought a dramatic change in the consumptionscape. However, there is a dearth of studies

\* Corresponding author at: Henley Business School, University of Reading, UK & University of Bologna, Italy.

E-mail addresses: [sheshadri.academic@gmail.com](mailto:sheshadri.academic@gmail.com) (S. Chatterjee), [m.mariani@henley.ac.uk](mailto:m.mariani@henley.ac.uk) (M. Mariani), [s.fosso-wamba@tbs-education.fr](mailto:s.fosso-wamba@tbs-education.fr) (S. Fosso Wamba).

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investigating how the intention of the prosumers could be helpful to cocreate business value and how digital media usage could influence the relationship between the intention of the prosumers to cocreate value and business benefit. This has necessitated having a theoretical understanding about the behavior of the prosumer in terms of marketing implication. Business style has become more consumer-centric where even the prosumers' intimate engagement in different business activities could impact the coproduction of the firms (Ballantyne & Varey, 2008). This has been derived from the Service Dominant Logic (SDL) literature (Vargo & Lusch, 2016). Moreover, the intention of the prosumers associated with coproduction and future participation could create business value. To explain this idea, this study has leveraged the Future Participation On Value Co-creation and Business Benefit (F-P-C-B) model (F-P-C-B) model (Chatterjee et al., 2021). Against this background, the aim of this study is to address the following objectives: (a) to determine the antecedents of intention of prosumers for coproduction; (b) to identify the antecedents of intention of prosumers for future participation for cocreating business values; (c) to investigate the moderating role of digital media usage on the relationship between intention of prosumers for value cocreation and business benefits.

The remainder of the paper is organized as follows. In section 2, we review the relevant literature. Section 3 illustrates the theoretical underpinnings and develops research hypotheses. Thereafter, section 4 describes the research methodology, that is followed by the findings, elucidated in section 5. Next, section 6 entails a discussion and conclusion, including theoretical contributions and practical implications, as well as limitations and future research directions.

## 2. Literature review

The term prosumer has been first introduced by Toffler (1980) wherein it has been envisaged that in the context of mass customization in this ever-changing marketplace, consumers used to have taken part in the process of production and designing for their own consumption. This concept has also given rise to the idea of 'do it yourself' (DIY) (Parker et al., 2016). The prosumer engagement has been increased manifolds owing to the widespread adoption of modern technologies like virtual reality and artificial intelligence (AI) supported by rapid proliferation of several social media platforms and AI systems (Dwivedi et al., 2020; Dwivedi et al., 2023; Mariani, Machado, Magrelli, & Dwivedi, 2023; Mariani, Hashemi, & Wirtz, 2023; Eckhardt et al., 2019; Wang, 2020; Basile et al., 2021). Previously, the process of value creation was confined to the product and firm-oriented view. But this has now been shifted to prosumer experience rendering the market a forum of interactions amongst the global actors through several platforms (Yen and Dey, 2019; Eckhardt et al., 2019; Shen et al., 2021; Lang et al., 2021). With the help of social media platforms, the global brand fans are now acting as evangelists for exchanging their experiences with the brand or the products (Dwivedi et al., 2015; Wang et al., 2018, 2019; Chatterjee et al., 2021; Styvén, Mariani, & Strandberg, 2020). The perception of prosumer is considered as the early marker of value-cocreation (Chandler and Chen, 2015; Chan et al., 2022). Though, there are some similarities between co-creators and prosumers, they are different since prosumers do not necessarily need another one for co-creating value and the prosumer-related literature does not principally focus on value-cocreation per se (Filieri, 2013; Zhang, 2017; Fox, 2018; Halassi et al., 2019; Martindale and McKinney, 2020). It is a fact that prosumers' coproduction activities are related to the extent to which firms possess the willingness to share control with the consumers which entails a sense of equitableness (Kotler, 1986; Hoyer et al., 2010; Heiko et al., 2010; Fisher and Smith, 2011; Vrontis et al., 2021). Besides, the prosumers' intention of coproduction is instrumental towards their intimate engagement with the firms' production activities through sharing and understanding the need of the firm (Pralhad and Ramaswamy, 2004b). Prosumers' active participation in the process of coproduction is assessed by the prosumers' behavioral action, integrative role and

**Table 1**

Different types of prosumers and explanation.

Prosumer type	Source(s)	Explanation
Engaging prosumer (monetization)	Sawhney et al. (2005); Patterson et al. (2006); Nambison (2009); Morreale (2014); Andrews and Ritzer (2018)	This type of prosumer engages with the firms and creates value. The value creation is accessible through a commercial deal using any third party or by them directly.
DIY prosumer (Do It Yourself)	Toffler (1980); Parker et al. (2016); Wang et al. (2018)	These kinds of Prosumers perform their entire tasks for their own benefits and usage.
Equity participative prosumers (Equitableness)	Hoyer et al. (2010); Heiko et al. (2010); Fisher and Smith (2011); Mele (2011)	This kind of prosumer engages with the firms based on equitableness and creates value for themselves as well as for the firms.
Empowering prosumer	Wigfield and Eccles (2000); Neghina et al. (2017); Busser and Shulga (2019)	This type of prosumer engages with firms due to feelings of empowerment and creates value for themselves and for others.
Self-service prosumer	Toffler (1980); Kotler (1986)	This type of prosumer uses technology and performs partial self-service related tasks.
Personalizing prosumer	Ritzer (2014); Fox (2018)	This kind of prosumer likes to personalize and customize their own products or services for different purposes and for their own consumption.
Collaborative prosumer	Pitt et al. (2006); DesAutels (2011)	This type of prosumer creates values for their own and other consumers. Different third parties can have access to their creation on non-commercial basis.
Economic prosumer	Brodie et al. (2011); Hollebeck et al. (2014); Jose Planells (2017); Eckhardt et al. (2019)	This kind of prosumer gets various commercial benefits and incentives directly or through a third party for creating values for others.
Future participative prosumer	Pralhad and Ramaswamy (2004a); Dey et al. (2016); Vargo and Lusch (2016); Tu et al. (2018)	These types of prosumers are interested in participating in future tasks to create value for the firms on a commercial or non-commercial basis.

spontaneity which are concerned with the experience of such consumers (Heinonen and Strandvik, 2015; Eckhardt et al., 2019; Nguyen, 2021). Prosumers' engagement with the firm's activities helps the prosumers to develop a sense of empowerment which supports the prosumers to acquire a tendency for participating more in the firm's activities (Cherpurna and Rialp Criado, 2018; Bhattacharjee et al., 2021). In the marketing literature, it is seen that for value creation, firms are found to have more dependence on consumers' personal needs with prosumers' experience that help the prosumers to participate more in the firms' activities (Yen and Dey, 2019). Engagement, self-service, and interaction are considered as the critical and indispensable ingredients towards joint creation of value (Oertzen et al., 2018; Sheshadri, 2020). The prosumers' coworking activities with the firms in the process of production or in the process of service provision have effective impacts on the value of cocreation as is revealed from other studies (Achrol and Kotler, 2012; Zhang et al., 2018). Prosumers' active participation in all marketing activities as active operant resources is perceived to have an impact on cocreation of values (Saarijarvi et al., 2013; France et al., 2018; Chaudhuri, & Vrontis, 2021). Several studies demonstrated that involvement of consumers in various firms' marketing activities concerning innovation along with product-dependent process help the firm

to enhance the value of the product impacting its business benefits (D'Andrea et al., 2019; Jayashankar et al., 2019; Mariani & Wamba, 2020). Studies have highlighted that the prosumers' coproduction and participation activities supported by digital media usage are perceived to bring in profitability of the firms impacting their business values (Kostakis, 2019; Saha et al., 2020; Sharma, Dwivedi, Mariani, & Islam, 2022). The different types of prosumers, their explanations and sources are illustrated in Table 1.

### 3. Theoretical underpinning and development of hypotheses

#### 3.1. Theoretical underpinning

In terms of the service dominant logic (SDL) (Vargo and Lusch, 2016), the marketing scenario has undergone a drastic change as the businesses now have become consumer centric where consumers' participation in the production process has invited the joint concept of production and consumption to generate the new term prosumer (Tofler, 1980). Consumers have become prosumers to create or rather co-create value (Ranjan and Read, 2016). It is pertinent to mention here that prosumers can build and create value towards coproduction because of their intimate engagement with the production activities of the firms and because they share their knowledge and experience in the production activities (Pralhad & Ramaswamy, 2004b).

The concept and framework of SDL has been applied in the present study by interpreting that prosumers' intimate engagement in the firm activities including intervention in the designing process with control over the firm's different activities (equitableness) will impact on the coproduction (Ballantyne and Varey, 2008) of the firm. This idea is also supplemented by the theory of value creation (Galvagno and Dalli, 2014) which enjoins that coproduction is concerned with designing business processes helpful to develop the products (Lehrer et al., 2012). Besides, SDL posits that firms not only emphasize the development of products or services but also take into account the feedback of the consumers which could cocreate value in the promotional activities of the products and services (Grönroos and Voima, 2013). SDL also highlights that for ameliorating value cocreation is predicted by prosumers' coproduction activities, role of prosumers' engagement, involvement in designing activities along with having control is perceived to be critical (Grönroos, 2008). In this context, it has been observed by the scholars that "we define service science, models, theories, and applications to drive service innovation, competition, and wellbeing through cocreation of value" (Ostrom et al., 2010, p.5). The SDL also indicates that consumers' different attributes like experience, experiment as well as personalization impact on the consumers' active future participation in several firm's activities that prompt to cocreate value. This idea has been confirmed by other studies (Jansen and Pieters, 2017; Xiao et al., 2020). Thus, prosumers' intention towards coproduction as well as future participation are perceived to prompt value cocreation impacting business value which is in consonance with the F-P-C-B model enunciated by Chatterjee et al. (2021). This model emphasizes that intention of future participation (F) and intention of coproduction (P) could jointly prompt to cocreate (C) value leading to ensure business benefits (B) for a firm. Thus, it has become evident that engagement of consumers, consumers' designing abilities in the firms and equitableness predict coproduction intention of the prosumers, whereas experience, empowerment as well as personalization are perceived to impact future participation of the prosumers. Again, it also appears that coproduction as well as future participation have the joint possibility to cocreate value eventually impacting the business value of the firms.

#### 3.2. Hypotheses development

From the review of literature and from the theories, it has become evident that some factors impact coproduction as well as future participation of the prosumers which simultaneously can co-create value

prompting eventually business benefits for the firms. Besides, the use of digital media also helps to impact business value (Dwivedi et al., 2020). Here all these determinants will be interpreted with an endeavor to formulate some hypotheses for developing a model conceptually.

##### 3.2.1. Consumer engagement (CEN)

Consumer engagement (CEN) can be divided into two categories, behavioral engagement, and psychological engagement. A consumer acting as a prosumer is said to have been behaviorally engaged with a firm when it is seen that such engagement is associated with focal brand, recommendations, feedback, value cocreation, and so on (D'Ambra, Akter, & Mariani, 2022; Mariani, Mura, & Di Felice, 2018; Sawhney et al., 2005; Nambisan and Robert, 2009). This concept is related to the feelings of the brands or firms (Hollebeek et al., 2014; Sharma et al., 2021). Consumer psychological engagement can be conceptualized with vigor, dedication, as well as absorption (Patterson et al., 2006). Vigor means that it is an assessment of energy of consumers to spend time in several firms' activities (Morreale, 2014). Dedication is concerned with the sense of the prosumers which helps to assess zeal, egotism, challenges, interaction, and so on towards the services or the products (Andrews and Ritzer, 2018). Absorption is conceptualized as the prosumers' involvement with brands or services or the products (Tyler, 1978). Consumer psychological engagement is interpreted as "a psychological state that occurs by virtue of interactive, co-creative experiences with a focal agent or object" (Brodie et al., 2011, p.259). The prosumers' engagement with the firms behaviorally and psychologically is perceived to have impacted the intention of the prosumers for coproduction. Accordingly, it is hypothesized what follows.

H1a: Consumer engagement (CEN) with the firms has a positive influence on the intention of prosumers for co-production (IPC).

##### 3.2.2. Do it yourself (DIY)

Do it yourself (DIY) is defined as the behaviors where "individuals use raw or semi-raw materials and parts to produce, transform, or reconstruct material possessions, including those drawn from the natural environment (e.g., landscaping)" (Wolf and McQuitty, 2011, p.154). Thus, DIY helps to promote the concept that anyone can perform a task or a variety of tasks without depending on the specialists or experts. This concept of DIY gives rise to the concept that consumers can take part in the coproduction activities of a firm in designing a product or can provide effective inputs to the firm for restructuring the existing activities for betterment of the firms (Triggs, 2006). The phrase 'do it yourself' (DIY) came into popular usage by 1950s in relation to the emergence of a trend of individuals' undertaking of various projects as a cost-saving activity or as a creative-recreational activity (Pitt et al., 2006). Prosumers also act in terms of DIY when they directly or indirectly take part in the marketing activities of the firm to help the firms' production or service unit (Kotler, 1986). This idea helps to formulate the following hypothesis.

H1b: The concept of do it yourself (DIY) impacts the intention of the prosumers for coproduction (IPC).

##### 3.2.3. Equitableness (EQT)

Equitableness (EQT) is associated with the concept of willingness of a firm to impose control in the context of the desire and expectation of the consumers to contribute some input in coproduction as a cocreation activity (Hoyer et al., 2010; Fisher and Smith, 2011). Through consumers' centralism, equitableness can be ensured (Pralhad and Ramaswamy, 2002) in a firm provided the firm authority possesses willingness to share control with the consumers for improvement of coproduction activities (Heiko et al., 2010). EQT brings in effective and fruitful synchronization of interest for achieving the goal with value actualization to ensure improved coproduction activities (Karpen et al., 2012; Sheshadri, 2019). EQT is seen to have brought effective results



towards improvement of co-production activities when there exists a conducive environment relating to the relationship between consumers and the firm (Mele, 2011). These inputs help to formulate the following hypothesis.

H1c: Equitableness (EQT) positively influences the intention of the prosumers for co-production (IPC).

### 3.2.4. Consumer experience (CEX)

Experience can be conceptualized as emotional, memorable, and empathetic interactions which are perceived to carry some intrinsic values (Ballantyne and Varey, 2008). Experience is associated with the concept of an artefact concerned with the products or services offered by the firms (DesAutels, 2011). With the help of cognitive as well as physical dimensions, consumers can linkup the above-mentioned artefacts for value cocreation and it can be achieved by experience of the consumers (Edvardsson et al., 2011). Through the help of behavioral action, spontaneity and integrative role, a consumer can gain experience (Heinonen and Strandvik, 2015). The experience of a consumer is assessed by the extent to which the consumer can apply modern technology in the firm (Pantano and Timmermans, 2014). Technology related experience of a consumer represents an experience that impacts the intention of the consumer for future participation that could influence value cocreation (Homburg et al., 2017; Mariani & Predvoditeleva, 2019). Accordingly, it is hypothesized as follows.

H2a: Consumer experience (CEX) positively impacts the intention of prosumer for future participation (IPF).

### 3.2.5. Consumer empowerment (COE)

Consumer empowerment (COE) is associated with the concept that the tendency of a consumer to be engaged in cocreation activities for fulfilling the needs of the consumer is transferred into the empowerment motivation of the consumer (Neghina et al., 2017). COE is conceptualized as the extent of expectation of the consumers in the context of power to be exercised by the consumers in the firm activities (Wigfield and Eccles, 2000). COE helps the consumers value cocreation that is gained by the consumers through the active participation in the firm activities as cocreation is construed as a direct result of collaborative activities (Busser and Shulga, 2019). The value which is developed through cocreation activities helps the consumers to achieve and gain the sense of empowerment motivating the consumers to be more involved for participation in the firm activities (Hoyer et al., 2010). These discussions help to formulate the following hypothesis.

H2b: Consumer empowerment (COE) positively impacts the intention of prosumers for future participation (IPF).

### 3.2.6. Personalization (PER)

Consumers of today appear to be more diverse breed (Fox, 2018). In the dynamic market, the expectations and the choices of the consumers are found to be ever-changing (Ritzer, 2014). With the help of different information, their expectations are developed and changed with time. Firms need to understand the actual needs of the consumers in the real-time scenario (DesAutels, 2011). In this respect, if the consumers take part in the designing process of the products commensurate with the need of the consumers, which is interpreted as personalized service, it will help the firm to improve their cocreation values (Ritzer, 2014). Participation of the prosumers will impact meeting the ever-changing demands of the consumers through improving the design, features, and so on of the products according to the present need of the consumers (Kotler, 1986). Economics of integration have ensured the participation of the prosumers towards the production tasks for better cocreation of personalized and customized offerings for the consumers in the dynamic market (Dwivedi et al., 2015; Piller et al., 2004; Sandström et al., 2008). For offerings of personalized products, help of prosumers become

essential and that is why in the context of personalization, the prosumers have become “reactive consumers” (Cova and Salle, 2008). These prosumers are also called customizing prosumers since they used to have personalized and customized their own products as well as services which could also meet the changing expectations of the other consumers (Ritzer, 2014; Fox, 2018). Accordingly, it is hypothesized as follows.

H2c: Personalization (PER) of the products or services by the prosumers positively impacts the intention of prosumers for future participation (IPF).

### 3.2.7. Intention of prosumers for coproduction (IPC)

The coproduction activities of the prosumers emerge from the co-working activities of the prosumers with the firm's production activities which are perceived to impact cocreation values (Achrol and Kotler, 2012; Yang et al., 2017; Zhang et al., 2018). In the coproduction activities of the prosumers, the prosumers play an active role and help the firms value cocreation by their collaborative efforts during several stages of production (Hoyer et al., 2010). Value configuration is achieved and implemented by the integration activities between the prosumers and the firm through intimate intention and collaboration which comes under the ambit of coproduction activities to develop value cocreation (Prahalad and Ramaswamy, 2004b; Ballantyne and Varey, 2008). Thus, self-service engagement and interaction are deemed to have been considered as critical components of prosumer coproduction activities which are perceived to impact the behavioral intention of prosumers for value cocreation (BIP). Accordingly, it is hypothesized as follows.

H3: Intention of prosumers for coproduction (IPC) positively impacts behavioral intention of prosumers for value cocreation (BIP).

### 3.2.8. Intention of prosumers for future participation (IPF)

In the context of complex and traditional industrial development perspective in the hyper marketing environment, there is no role of consumers in the traditional value chain concept (Dey, Pandit, Saren, Bhowmick, & Woodruff-Burton, 2016). But with passage of time, in the complex dynamic marketing scenario, there has been a total change of marketing dynamics (Prahalad and Ramaswamy, 2004a). The changed marketing processes have brought in active participation of all the stakeholders in the process of consumption as well as production (Vargo and Lusch, 2016; Lin et al., 2017; Zollo et al., 2020) inviting the concept of cocreation. It has become a joint endeavor of the consumers and the firm rendering the consumers as prosumers (Tu et al., 2018; Bazi et al., 2020). Value cocreation emerges from active participation of the consumers renamed in the changed context as prosumers (France et al., 2018). This dyadic and collaborative relation between the consumers and the firm comes out because of active participation of the consumers renamed as prosumers. In such a scenario, it is expected to intend the prosumers for value cocreation. In terms of the above discussions, the following hypothesis is developed.

H4: Intention of prosumers for future participation (IPF) positively impacts behavioral intention of prosumers for value cocreation (BIP).

### 3.2.9. Behavioral intention of prosumers for value cocreation (BIP) and business benefit (BUB)

Several studies have demonstrated that consumers' involvement in the innovation as well as production process has brought in business benefits of the firms owing to increase of product value (Jayashankar et al., 2019; Mariani & Nambisan, 2021). Several emerging countries have stressed the need of active participation of the consumers in the firm's business activities to enhance value cocreation (Prahalad and Ramaswamy, 2004b; Filieri et al., 2018). The value of creation is perceived to be helpful to ensure profitability of a firm (D'Andrea et al.,

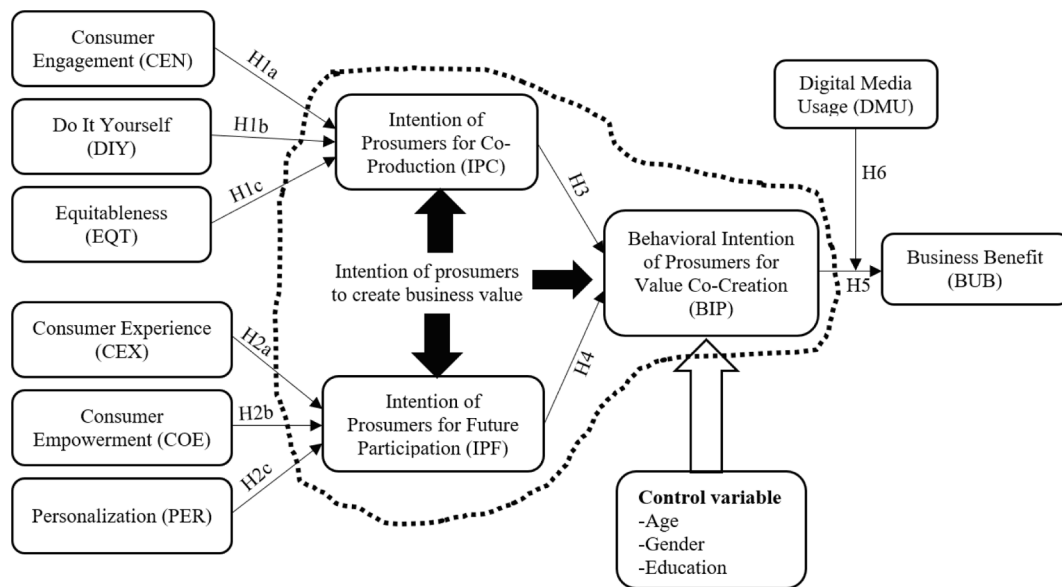


Fig. 1. The conceptual model.

2019). Coproduction and active participation are bringing business society to arrive at a consumer-based cocreation era (Saha et al., 2020). When the consumers utilize the experience with the concept of product service proposition of a firm, value is cocreated (Yu et al., 2020). Accordingly, it is hypothesized as follows.

H5: Behavioral intention of prosumers for value cocreation (BIP) positively impacts the business benefit (BUB) of the firm.

### 3.2.10. Moderating effects of digital media usage (DMU)

Social networking communities are involved in working together to achieve better services and products (Silver, 2009). This process has been able to put more power in the consumers' hands who have consequently become voice for a brand (Coulton, 2011). It has been stated that "brand owners do not tell brand stories alone but cocreate brand performances in collaboration with consumers" (Singh and Sonnenburg, 2012, p.189). Thus, products and services have become social objects that can be assessed and shared amongst the members of a network of peers (Dwivedi et al., 2022; Metz, 2011; Ek Styvén & Mariani, 2020). In this perspective, the vision of Toffler (1980) in the concept of prosumer has given birth to social consumer concerning embodiment of the prosumers because they are using digital media considering them as principal information resources (Silver, 2009). In this context, the digital media services have been named as "prosumers platforms, explaining that they have the capacity to initiate and sustain affective relations and value realization through informational capitalism" (Arvidsson and Colleoni, 2012, p.135). Thus, high digital media usage is perceived to help with improved cocreation activities by the prosumers impacting better business benefit. Accordingly, it is hypothesized what follows.

H6: Digital media usage (DMU) moderates the relationship between behavioral intention of prosumers for value cocreation (BIP) and business benefit (BUB) of a firm.

It has been suggested in another study that there is probability of influencing any innovative system by the behavioral, psychographic, and demographic nature of the consumers (Porter and Donthu, 2006). Thus, to ensure better delineation of different relationships proposed in this model, some demographic variables of the consumers such as, age, gender, and education of the prosumers have been considered.

With all these inputs, a model has been developed conceptually. This is shown in Fig. 1.

## 4. Research methodology

The conceptual model and the related hypotheses were tested deploying partial least square (PLS) – structural equation modelling (SEM) technique with PLS3.2.3 software (Sarstedt et al., 2017). PLS-SEM has been preferred because the approach is deemed to be flexible and can analyze a complex model in a simple way (Lowry and Gaskin, 2014). Besides, the PLS-SEM technique has been chosen since it does not impose any sample restriction (Willaby et al., 2015) and does not require the data to be normally distributed, which is the essential condition for analysis of data by covariance-based (CB) structural equation modelling (SEM) technique (Rigdon et al., 2017).

## 5. Research instruments

With the knowledge of the constructs and from the inputs of the existing validated scales, some instruments have initially been prepared to ensure the content validity. For ascertaining the defects in the readability of the instruments, a pretest has been conducted, the result of which helped to rectify the wordings and some of the formats of the instruments so that the respondents do not feel any difficulty understanding the instruments, and this will also ensure better response. A pilot study was also conducted after the items have been refined in the pretest stage. The pilot test has been conducted to confirm the readability of the scales and to assess the contemplated response rate. From the feedback of the pilot test, some instruments were dropped for improving the readability of the relevant constructs. Thereafter, the opinions of six experts, having adequate knowledge in the domain of this study, were taken for enhancement of the comprehensiveness of the instruments. Out of the six experts, four experts work in the industry, each possessing more than ten years of professional experience in the topic of this study. The remaining two experts work in academia, each of them has more than fifteen years of research experience in the domain of this work.

In this way, through step-by-step rectification process, 36 instruments could be prepared. The details of instruments with their sources are provided in the appendix.

### 5.1. Collection of data

An online questionnaire survey method has been preferred for data collection. 36 instruments have been sent to the consumers, employees

**Table 2**  
Demographic information (N = 349).

Particulars	Category	Number	Percentage (%)
Gender	Male	229	65.6
	Female	120	34.4
Age	<25 years	44	12.6
	25–40 years	161	46.1
	41–55 years	87	24.9
	>55 years	57	16.4
Education	Higher secondary	66	18.9
	Undergraduate	117	33.5
	Postgraduate	143	40.9
	Researchers	23	6.7

**Table 3**  
Measurement properties.

Constructs / Items	Mean	SD	LF	AVE	CR	$\alpha$	t-values
CEN				0.86	0.89	0.92	
CEN1	3.7	1.7	0.98				24.07
CEN2	2.3	1.9	0.89				25.11
CEN3	4.1	1.1	0.91				31.77
DIY				0.82	0.85	0.89	
DIY1	3.6	1.2	0.88				14.81
DIY2	3.1	1.4	0.94				11.37
DIY3	3.8	1.1	0.90				22.02
EQT				0.86	0.89	0.94	
EQT1	3.2	1.7	0.97				28.11
EQT2	3.4	1.9	0.88				31.17
EQT3	3.6	1.3	0.96				29.07
EQT4	4.2	1.5	0.89				17.17
CEX				0.83	0.87	0.91	
CEX1	3.7	1.6	0.93				25.18
CEX2	4.3	1.4	0.88				27.17
CEX3	4.5	1.3	0.92				32.06
COE				0.78	0.82	0.85	
COE1	3.7	1.7	0.87				34.18
COE2	4.7	1.8	0.85				32.17
COE3	3.2	1.3	0.87				23.11
COE4	4.1	1.4	0.94				26.65
PER				0.80	0.83	0.87	
PER1	3.5	1.5	0.90				24.89
PER2	4.4	1.6	0.96				28.17
PER3	4.6	1.6	0.89				26.12
PER4	3.9	1.1	0.95				31.99
IPC				0.88	0.92	0.95	
IPC1	4.1	1.3	0.92				30.48
IPC2	2.8	1.1	0.96				32.88
IPC3	3.1	1.4	0.97				19.89
IPC4	4.6	1.7	0.96				29.11
IPF				0.80	0.83	0.87	
IPF1	3.4	1.8	0.85				26.97
IPF2	3.1	1.2	0.96				38.11
IPF3	3.7	1.6	0.93				33.12
IPF4	4.6	1.9	0.89				24.18
BIP				0.80	0.84	0.88	
BIP1	4.4	1.4	0.90				26.11
BIP2	3.4	1.3	0.94				27.13
BIP3	2.1	1.7	0.85				34.13
BIP4	2.7	1.8	0.88				36.65
BUB				0.78	0.82	0.86	
BUB1	3.8	1.1	0.85				22.20
BUB2	2.1	1.3	0.89				34.04
BUB3	4.2	1.6	0.88				27.18

of different firms, and some researchers who are involved in the research of prosumer-related domains. This process has been preferred because it involves lower cost, ensure better reachability to the potential respondents, and the process seems to be less time consuming. Moreover, this online survey system requires minimum human involvement since it is associated with corporatized auto-data entry system. This also eliminates the scope of human error. The questionnaire link was also sent through Instagram, Facebook, LinkedIn and so on to

ensure better reachability. Questionnaire hyperlinks had also been sent to different individuals through emails with whom the authors have personal contact. In this way, it was possible to tap 805 prospective respondents. Regular reminders were given to them to ensure a better response rate. With this technique, it was possible to obtain responses of 361 respondents within a window of three months (May 2022 to July 2022). The response rate was 44.7 %. A non-response bias test has been conducted. Recommendations as envisaged in [Armstrong and Overton \(1977\)](#) have been duly followed. Chi-Square test and independent *t*-test have been conducted considering the feedback of first 100 respondents and the feedback of last 100 respondents. No appreciable deviation of results was noted. This confirms that the result does not suffer from the defect of non-response bias. On scrutiny of the 361 responses, 12 responses were found incomplete. Hence, those were not considered. These 12 responses were not considered because they pertain to 12 respondents who put tick marks in more than one option out of five options against each question. The analysis was conducted with 349 responses against 36 instruments which are within the permissible range ([Deb and David, 2014](#)). The responses have been quantified in 5-point Likert scale with strongly disagree (SD) marking as 1 to strongly agree (SA) marking as 5. The demographic information of 349 respondents is provided in [Table 2](#).

The participants were 65.6 % male, 46.1 % within age of 25–40 years and 40.9 % possess postgraduate qualification.

## 6. Findings

### 6.1. Measurement properties

To verify the content validity of each instrument, loading factor (LF) has duly been estimated. To examine the validity, reliability, and internal consistency of each construct, average variance extracted (AVE), composite reliability (CR), and Cronbach's alpha ( $\alpha$ ) have duly been estimated. All the estimated values are found to be within the allowable range. It appears from the results that all the values of LFs are greater than the lowest acceptable value of 0.7 ([Chin, 2010](#)). Moreover, the estimated values of AVEs are all found to be higher than the lowest permissible value of 0.5 ([Hair et al., 2017](#)). The results are provided in [Table 3](#).

### 6.2. Discriminant validity test

It has been observed that all the square roots of AVE are greater than the corresponding bifactor correlation coefficients satisfying Fornell and Larcker criteria ([Fornell & Larcker, 1981](#)). This confirms discriminant validity. The results are shown in [Table 4](#).

### 6.3. Moderator analysis (Multi group Analysis)

In this study, digital media usage (DMU) has been considered as a moderator impacting on the linkage BIP → BUB (H5). Effects of DMU on H5 have been considered taking Strong DMU and Weak DMU by dividing the effects of DMU in two groups. Here multi group analysis (MGA) technique has been used with consideration of bootstrapping system taking 5000 resamples. The results show that the *p*-value difference between the effects of High DMU and Low DMU on H5 is 0.03 ( $\leq 0.05$ ). Hence the effects of DMU on H5 are significant ([Hair et al., 2017](#)).

### 6.4. Effect size $f^2$ test

The  $f^2$  values have been estimated to verify if there is any contribution of exogenous latent variables on the corresponding endogenous variables. As opined by [Cohen \(1988\)](#),  $f^2$  value indicates weak (0.020 to 0.150), it is called medium (0.150 to 0.350), it is considered as large ( $>0.350$ ). The findings of this study show that effect size of CEN on IPC



**Table 4**

Discriminant validity test (Fornell and Larcker criteria).

Constructs	CEN	DIY	EQT	CEX	COE	PER	IPC	IPF	BIP	BUB	AVE
CEN	0.93										0.86
DIY	0.17	0.90									0.82
EQT	0.22	0.27	0.93								0.86
CEX	0.24	0.22	0.35	0.91							0.83
COE	0.29	0.24	0.26	0.18	0.88						0.78
PER	0.26	0.31	0.33	0.26	0.25	0.89					0.80
IPC	0.19	0.29	0.35	0.22	0.32	0.28	0.94				0.88
IPF	0.32	0.27	0.39	0.23	0.34	0.32	0.25	0.89			0.80
BIP	0.30	0.33	0.19	0.25	0.19	0.17	0.27	0.33	0.89		0.80
BUB	0.24	0.26	0.32	0.21	0.17	0.29	0.21	0.29	0.34	0.88	0.78

**Table 5**Effect size\*  $f^2$ .

Construct	IPC	IPF	BIP	BUB
CEN	0.168 (M)			
DIY	0.112 (W)			
EQT	0.276 (M)			
CEX		0.412 (L)		
COE		0.117 (W)		
PER		0.291 (M)		
IPC			0.411 (L)	
IPF			0.399 (L)	
BIP				0.426 (L)

\* L: Large; M: Medium; W: Weak.

**Table 6**

Mediation analysis\*.

Mediation hypotheses	Indirect effect (IE)	p-value	LCL	UCL
Age → BIP → BUB	0.11	0.01	0.04	0.19
Gender → BIP → BUB	0.14	0.02	0.07	0.26
Education → BIP → BUB	0.16	0.00	0.03	0.17

\*LCL: Lower Confidence Level; UCL: Upper Confidence Level.

is 0.168 (M), of DIY on IPC is 0.112 (W), of EQT on IPC is 0.276 (M), of CEX on IPF is 0.412 (L), of COE on IPF is 0.117(W), of PER on IPF is 0.291 (M), of IPC on BIP is 0.411 (L), of IPF on BIP is 0.399 (L), of BIP on BUB is 0.426. The results are presented in Table 5.

### 6.5. Causality test

Causality is considered an important issue. This needed to be conducted before hypotheses testing (Guide and Ketokivi, 2015). In terms of suggestions of Kock (2015), non-linear bivariate causality direction ratio (NLBCDR) has been assessed. The acceptable value is  $\geq 0.7$  (Wamba et al., 2019). The results of NLBCDR of each path emerges as CEN → IPC (0.981); DIY → IPC (0.999); EQT → IPC (1.000); CEX → IPF (1.001); COE → IPF (1.003); PER → IPF (0.996); IPC → BIP (0.998); IPF → BIP (1.001); BIP → BUB (1.004). All these values are found to be  $>0.7$ . The values highlight strong evidence that the causality is weak concerning the reversed hypothesized direction. In total, causality should not be considered as a major issue in this study.

### 6.6. Mediation analysis

Using Process tools, mediation analysis has been conducted (Mishra et al., 2018) considering mediating variable BIP between Age and BUB; between Gender and BUB, and between Education and BUB linkages (Hayes, 2013). The mediating role of BIP between these three control variables Age, Gender, and Education of the respondents and the Business Benefit (BUB) have been analyzed by examining indirect effects

(IEs) and bias correlated confidence interval (CI) with bootstrapping taking 90 % confidence level (Nitzl et al., 2016). The results are provided in Table 6.

The results demonstrate that BIP acts as an important mediating variable between BUB and its three control variables Age, Gender, and Education. Hence, BIP acts as a complementary vital mediator. The results highlight that confidence interval regarding bias correlated bootstrapping of BIP as mediator is different from zero for Age (0.04 to 0.019), for Gender (0.07 to 0.26), and for Education (0.03 to 0.17). The results highlight that the effects of the three control variables – i.e., age, gender, and education – on the behavioral intention of the prosumers for value-cocreation (BIP) are significant and it is also concluded that BIP acts as a significant mediator between the three aforementioned control variables and business benefit (BUB).

### 6.7. Common method variance (CMV)

In the case of survey-based data, there is potential for CMV because the respondents replied with their perception associated with implicit social desirability that might cause certain amount of CMV. To minimize CMV, some steps have been taken as a procedural remedy. As a pre-emptive measure, the respondents were assured that their anonymity and confidentiality will be strictly preserved during the survey. Also, during pretest, the wordings of the questionnaire along with some formats of the items were rectified to make them simple and understandable by the respondents. These procedural steps are taken with an expectation that the respondents will respond without any bias. However, in addition, two statistical tests have been conducted for assessing the severity of CMV. Harman's Single Factor Test (SFT) was performed. The first factor emerged as 27.24 %, which is  $<50$  % as recommended by Podsakoff et al. (2003). Also, CMV was examined with correlation marker technique (Lindell and Whitney, 2001) since some scholars opined that Harman's SFT does not provide a robust test (Ketokivi and Schroeder, 2004). In such a scenario, use of marker variables is recommended as one of the most important tests, especially in the marketing operational management area (Wamba et al., 2019). The marker variable technique yielded a result that the difference between the original and CMV based correlations was appreciably small ( $\leq 0.06$ ) (Mishra et al., 2018). Hence, CMV is deemed to have not severely affected the prediction and the results of this study.

### 6.8. Hypotheses testing with structural equation modelling approach

Using SmartPLS and with the help of bootstrapping process considering 5000 resamples, hypotheses have been tested by the blindfolding process (Mishra et al., 2018). The procedure has been recommended by Henseler et al. (2014). This process is also recommended as convenient when PLS-SEM approach is taken (Hair et al., 2011). With consideration of omission separation 5, the cross-validated redundancy has been measured by estimating Stone-Geisser  $Q^2$  values which came out to be 0.062 (Stone, 1974; Geisser, 1975). This confirms that the model has

**Table 7**Path coefficients, R<sup>2</sup> values, p-values, and remarks.

Linkages	Hypotheses	Path coefficients/ R <sup>2</sup> values	p-values	Remarks
Effects on IPC		R <sup>2</sup> = 0.31		
By CEN	H1a	0.21	p < 0.001 (***)	Supported
By DIY	H1b	0.33	p < 0.05 (*)	Supported
By EQT	H1c	0.02	p > 0.05 (ns)	Not Supported
Effects on IPF		R <sup>2</sup> = 0.37		
By CEX	H2a	0.22	p < 0.01 (**)	Supported
By COE	H2b	0.03	p > 0.05 (ns)	Not Supported
By PER	H2c	0.34	p < 0.05 (*)	Supported
Effects on BIP		R <sup>2</sup> = 0.41		
By IPC	H3	0.38	p < 0.01 (**)	Supported
By IPF	H4	0.43	p < 0.001 (***)	Supported
Effects on BUB		R <sup>2</sup> = 0.67		
By BIP	H5	0.49	p < 0.001 (***)	Supported
(BIP → BUB) × DMU	H6	0.19	p < 0.05 (*)	Supported

predictive relevance. To verify the model-fit, Standardized Root Mean Square Residual Error (SRMR) has been considered as a standard index. Its values have been estimated and it has been found that the SRMR values came out to be 0.062 for PLS and 0.034 for PLSc, both being less than the recommended highest value of 0.08 (Hu and Bentler, 1998). The results confirm that the model is in order. This procedure helped to compute path coefficients, R<sup>2</sup> values, and p-values for the different linkages. The results are shown in Table 7.

With all these inputs, the validated model is shown in Fig. 2.

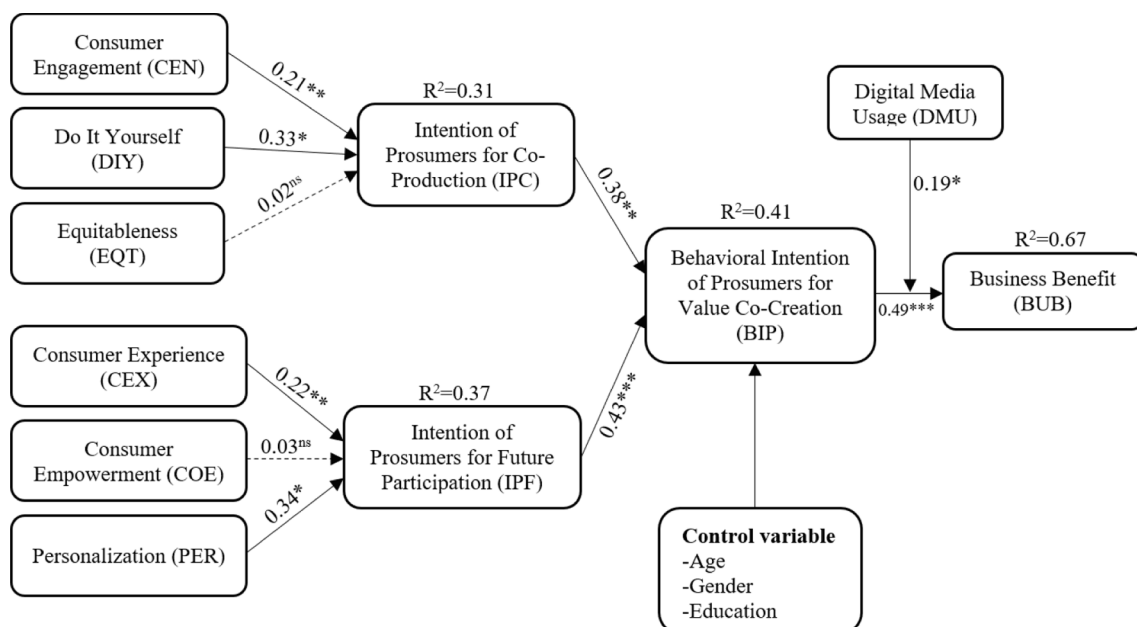
### 6.9. Summary of results

In this study 10 hypotheses have been formulated. Out of these 10 hypotheses, one hypothesis (H6) is concerned with moderating effects of

DMU on the linkage BIP → BUB (H5). The results highlight that CEN and DIY positively and significantly impact IPC (H1a and H1b) since the concerned path coefficients are 0.21 and 0.33 respectively with levels of significance as p < 0.01(\*\*) and p < 0.05(\*), respectively. It is also seen from the results that CEX and PER positively and significantly impact on IPF (H2a and H2c) since the path coefficients concerned are 0.22 and 0.34, respectively with levels of significance as p < 0.01(\*\*) and p < 0.05(\*), respectively. This study also shows that EQT and COE impact on IPC and on IPF (H1c and H2b) respectively insignificantly since the concerned path coefficients are 0.02 and 0.03, respectively with each having non-significance level p > 0.05 (ns). IPC and IPF both impact on BIP positively and significantly since the concerned path coefficients are 0.38 and 0.43, respectively with levels of significance as p < 0.01(\*\*) and p < 0.001(\*\*\*), respectively. The results also highlight that BIP impacts BUB (H5) significantly and positively since the concerned path coefficient is 0.49 with level of significance as p < 0.001(\*\*\*). The effects of the moderator DMU on the linkage BIP → BUB (H5) is significant and positive as the concerned path coefficient is 0.19 with level of significance p < 0.05(\*). So far as coefficients of determinant (R<sup>2</sup>) are concerned, the results demonstrate that CEN, DIY, and EQT could explain IPC to the tune of 31 % (R<sup>2</sup> = 0.31), whereas CEX, COE, and PER could explain IPF to the extent of 37 % (R<sup>2</sup> = 0.37). The results also highlight that IPC and IPF could jointly explain BIP to the tune of 41 % (R<sup>2</sup> = 0.41). The results also transpired that BUB could be explained by BIP to the extent of 67 % (R<sup>2</sup> = 0.67) which is the predictive power of the proposed theoretical model.

## 7. Discussion and conclusion

The present study has analyzed that CEN, DIY, and EQT impact IPC whereas the other three exogenous factors CEX, COE, and PER impact IPF. In the present research study, it has been demonstrated that IPC and IPF simultaneously impact BIP. From this study it appears that out of impacts of CEN, DIY, and EQT, the effects of DIY on IPC are the maximum (H1d) since among the three, the impact of DIY on IPC is the highest (β = 0.33). This validated hypothesis also received support from another study (Watson and Shove, 2008) wherein the authors examined the recursive relation amongst projects, products, and practices with the concept of DIY and showed that it derives better coproduction effects if the consumers are creatively as well as actively involved integrating and

**Fig. 2.** Validated model (SEM).

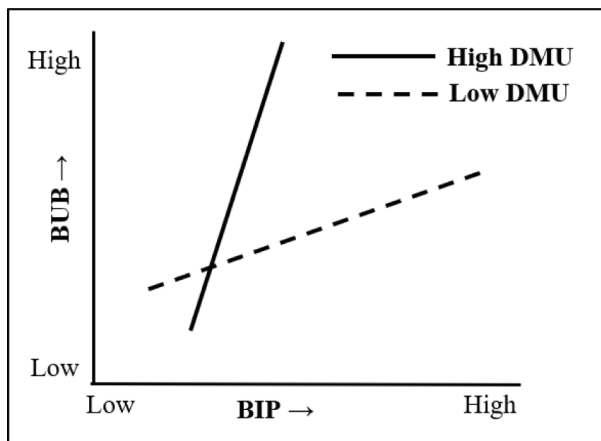


Fig. 3. Effects of DMU on H5.

transforming complex arrays of material goods. Also, the present study reveals that CEN positively and significantly impacts IPC (H1a). This signifies that more engagements with the firms' activities improve the relationship between the prosumers and the firms helping for better coproduction. This idea has received support from another study (Prahalad and Ramaswamy, 2004a) wherein that study indicated that relationship acts as a primary interface impacting better coproduction activities. It has also been observed that EQT has an insignificant impact on IPC (H1c) and as such this hypothesis was not supported. This result appears to have contradicted another study (Karpen et al., 2012). Such contradiction is presumably because still the firms possess some conservativeness to share more control in favor of consumers who contribute their active role in coproduction activities which is conceptualized as the sense of equitableness (EQT). This research study shows that CEX and PER positively and significantly impact IPF (H2a and H2c) which received support from other studies (Neuhofer et al., 2015; Wuenderlich et al., 2015). These two studies highlight that experience as well as personalization have effective impacts on future participation. However, the present study has shown that COE has an insignificant impact on IPF (H2b) contradicting the concept of earlier study (Zhang et al., 2018). This is because possibly the consumer empowerment (COE) attribute could not create a congenial and supportive environment to motivate the consumers to participate in these activities. The authors also argue that there might be another reason for not supporting these two hypotheses (H1c and H2b). Analysis of the feedback of the respondents helped to arrive at such results. In selecting the respondents, the attempts did not cover all the corners of India which might have contributed such results. Had it been possible to touch all the corners, the results might have been otherwise. The present study has shown that IPC and IPF significantly and positively impact BIP (H3 and H4) which received support from earlier studies (McColl-Kennedy et al., 2012; Zhang et al., 2018). These two hypotheses provided two significant outcomes that cocreation by prosumers are favorably affected not only by coproduction activities but also by the active participation of the prosumers. This study has also hypothesized that behavioral intention of the prosumers for cocreation brings in business benefits (H5) of a firm and such benefits are increased if supported by DMU (H6). Both these validated hypotheses have received support from earlier studies (Silver, 2009; Kostakis, 2019). The effects of High DMU and Low DMU on H5 have been interpreted here graphically as shown in Fig. 3. Here Fig. 3 highlights the moderating effects of DMU on the linkage BIP → BUB (H5).

In Fig. 3, continuous and dotted lines represent the effects of High DMU and Low DMU on the linkage H5 respectively. With the increase of BIP, the rate of increase of BUB is more for the effects of High DMU compared to the effects of Low DMU on H5 since the gradient of the continuous line is more than the gradient of the dotted line. The gradient

of a straight line is interpreted as the trigonometrical tangent of the angle which the straight line makes with the positive direction of horizontal axis.

### 7.1. Theoretical contributions

The present study has provided several theoretical contributions. First, this research study is an early attempt to identify the salient factors which could impact prosumers' intention to be involved in coproduction activities as well as intention of the prosumers' participation in business activities. This study has found what prosumers contribute to the products or services available in the markets. This work has demonstrated that prosumers function as creative actors designing their own service experience by doing things by themselves (DIY) and do not act as passive responders responding to the pre-existing offers from the firms. This study has projected that the role of the prosumers is critical in production activities as well as in service-related activities justifying the opinion and vision: "instead of seeing the business as a flow of material to which value is continuously added and ending with the customers, we now see business starting from the customer and following to the company" (Normann, 2001, p.21). Second, this study has tried to provide a dramatic change in the idea that marketing scenario should not be construed to be confined on the target to profit by only improving product quality with reduction of cost of production. However, this study has suggested that active participation of the prosumers in businesses and coproduction activities will effectively cocreate value of products and services prompting business benefit of the firms. Third, this study may be considered as one of the first attempts for significantly exploring the substantial contribution of the control variables associated with several individual-centric behavioral attributes mainly of the consumers to realize the concept of presumption through value cocreation activities in the prosumer-oriented business landscape. Fourth, when viewed through theoretical lenses, it is necessary to note that the present research study has lent inputs from different theories and did not blindly follow one theory to develop the theoretical model. Not only that, by considering the moderating effects of digital media usage, the theoretical model has taken an attractive shape achieving such a respectful explanative power. This is construed to be a unique theoretical contribution of this study. Fifth, from the presumption perspective, this research has shown that prosumers' coproduction intention impacts positively and significantly on cocreation activities. This is claimed to have opened options for more studies on the dependence of coproduction activities to improve cocreation prompting improvement of business value. Projecting that cocreation impacts business value in the prosumer-related business activities, the present work has provided much food for reflection to the future researchers a new mechanism for achieving better profitability of a firm. Sixth, a study of Halassi et al. (2018) has demonstrated how the salient factors of the UTAUT2 model (Venkatesh et al., 2012) along with Do-it-Yourself (DIY) business models could impact behavioral intention of the prosumers to bring a supply chain revolution in 3D printing. The idea of that study has been extended in this work to analyze how, apart from DIY, other factors like consumers' experience, equitableness, involvement, empowerment, and personalization could impact prosumers' intention to coproduce, as well as future participation. The latter could influence the behavioral intention of prosumers for value cocreation translating into improved business benefits for the firm supported by digital media usage. This idea adds value to the literature that analyzed the intention of the prosumers to be involved in business activities under different perspectives.

### 7.2. Implications for practice

This research work provides practical implications for marketing managers to achieve enhanced business benefit by improving cocreation activities. First, this study has pointed out that marketing management process has undergone a paradigm shift by diverting its focus from

product-related activities to prosumer-oriented activities by the help of importing a novel concept of cocreation (Prahalad and Ramaswamy, 2004a, 2004b). Second, marketing managers need to think that days have come when consumers should not be conceptualized as merely passive receivers of several marketing messages regarding different information of the products and services. The marketing managers should arrange for increasing coproduction activities with the consumers to improve value cocreation. Third, policy makers are required to arrange for getting the consumers more involved in different business activities of the firms by providing the consumers ample opportunities so that they may not feel any impediment in sharing their expertise, ideas, and other congenial inputs to the firms. By such contributions of the consumers to the firms, there will be enhancements of cocreation activities helping the firms to achieve better business benefit. Fourth, managers must focus on the prosumers' activities in the business process and practices of the firms through exchange of their knowledge ensuring better value cocreation that would ensure an increase of profitability of the firms. In addition, managers should focus on the business activities of the firms by arranging improved relationship between the prosumers and the firms for enhancing coproduction activities. Managers must ensure active participation of the prosumers in the firms' business activities for improving value cocreation. For this, the managers must keep in close contact with the prosumers so that any unwanted interruption in the interference of the prosumers in the firms' activities is forthwith removed. It will be the duties of the employees of the firms to educate the consumers to take active role as prosumers by appraising them that their effective inputs to the firms will derive benefits both to the firms and the consumers through enhancing value cocreation. The present research work has demonstrated that equitableness has an insignificant impact on coproduction activities. Equitableness prescribes firms' willingness to allow the consumers to have power of controlling the business process and practices of the firms that would help eventually to cocreate values. In this context, it will be part of the managers' duties to create a congenial, conducive, and supportive cordial atmosphere in the firms by expressing explicit willingness of the firms to share control with the prosumers. This will help prosumers to realize that they are an important part of the firms' business ecosystem and then the coproduction activities will be improved affecting value cocreation which, in turn, improves business value of the firms.

### 7.3. Limitations of study and future research scope

This study has arrived at a finding depending on cross-sectional data. This gives rise to causality defects in the relation between the constructs. It creates problems of endogeneity. It is suggested that to remove these defects, future researchers may conduct longitudinal survey with econometric analysis to avoid the defects of endogeneity. This study is based on the finding having inputs of 349 usable respondents. This should not be considered as a representative sample. Future researchers may conduct surveys considering inputs of larger samples to portray more holistically the results. This study depends on the inputs of the respondents from India making this study country specific. The work therefore lacks universal applicability. Future researchers may consider inputs of respondents dispersed across the globe to put the results in a generalized form. More specifically, the study might control for cultural differences using for instance the Hofstede model (Hofstede and Bond, 1984). The cocreation activities and the concept of prosumers are still in the rudimentary stage in India. Hence, the inputs have been obtained in this study from the non-adopters. When the results will be applied to the adopters, proper precautions may be taken by including or excluding (as the case may be) several boundary conditions. This is left for future researchers to nurture. Future research might also control for the device deployed when using digital media, as devices and online channels have been found to play a differentiated role (Kim, Lee, & Mariani, 2021). The explanative power of the model is 67 %. Future researchers may consider if by inclusion of more boundary conditions and other

**Table A1**  
Summary of Questionnaire.

Items	Source	Statements	Response [SD][D][N] [A][SA]
CEN1	Sawhney et al., 2005; Nambison, 2009; Brodie et al., 2011	Involvement of customers is necessary for developing better products.	[1][2][3] [4][5]
CEN2	Tyler, 1978; Patterson et al., 2006; Hollebeck et al., 2014	Better association with the customers helps with customization of the products.	[1][2][3] [4][5]
CEN3	Morreale, 2014; Andrews and Ritzer, 2018	The coproduction process helps in developing more customer centric products.	[1][2][3] [4][5]
DIY1	Wolf and McQuitty, 2011	Customers are encouraged to design and develop their own products.	[1][2][3] [4][5]
DIY2	Triggs, 2006; Pitt et al., 2006	Incorporation of customers' inputs while developing the products make the products more superior.	[1][2][3] [4][5]
DIY3	Kotler, 1986	It is more efficient if customers are given options to customize their own products.	[1][2][3] [4][5]
EQT1	Hoyer et al., 2010; Fisher and Smith, 2011	Equal opportunity is to be given to customers and firms to develop products.	[1][2][3] [4][5]
EQT2	Prahalad and Ramaswamy, 2002	Customers should be entitled to get equal opportunity to cocreate products.	[1][2][3] [4][5]
EQT3	Heiko et al., 2010	Equitable opportunity to the customers for cocreation helps in coproduction process.	[1][2][3] [4][5]
EQT4	Mele, 2011; Karpen et al., 2012	Customers should be incentivized for cocreating products along with the firms.	[1][2][3] [4][5]
CEX1	Ballantyne and Varey, 2008; DesAutels, 2011	Customer experience is an important aspect when developing any new products.	[1][2][3] [4][5]
CEX2	Edvardsson et al., 2011; Heinonen, and Strandvik, 2015	Better customer experience will motivate prosumers for future participation in cocreating activities.	[1][2][3] [4][5]
CEX3	Pantano and Timmermans, 2014; Homburg et al., 2017	Cocreation activities help in realizing better customer experience.	[1][2][3] [4][5]
COE1	Neghina et al., 2017	Participation of customers during product development provides better empowerment to the customers.	[1][2][3] [4][5]
COE2	Wigfield and Eccles, 2000	Because of the creation process, customers' opinion can be considered during product development activities.	[1][2][3] [4][5]
COE3	Busser and Shulga, 2019	The creation process helps customers involving in decision making process during product development activities.	[1][2][3] [4][5]
COE4	Hoyer et al., 2010	If customers are more empowered in decision making process while developing the products, they will be more encouraged in developing products in future.	[1][2][3] [4][5]
PER1	Fox, 2018	Cocreation helps in personalization of the product.	[1][2][3] [4][5]
PER2	Cova and Salle, 2008; DesAutels, 2011	Personalization process encourages the customers for future participation in product development.	[1][2][3] [4][5]
PER3	Sandström et al., 2008; Ritzer, 2014	Product personalization helps better realization of product value.	[1][2][3] [4][5]
PER4	Kotler, 1986; Piller et al., 2004	Customized products are preferred by the customers.	[1][2][3] [4][5]

(continued on next page)



Table A1 (continued)

Items	Source	Statements	Response [SD][D][N] [A][SA]
IPC1	Achrol and Kotler, 2012	Coproduction process helps in better product acceptability to the prosumers.	[1][2][3] [4][5]
IPC2	Hoyer et al., 2010; Prahalad and Ramaswamy, 2004b	Prosumer involvement in the production process helps in the product designing process.	[1][2][3] [4][5]
IPC3	Ballantyne and Varey, 2008	Coproduction activities encourage customers to cocreate products for the firms.	[1][2][3] [4][5]
IPC4	Zhang et al., 2018	Profit sharing with customers will encourage customers to participate in coproduction activities.	[1][2][3] [4][5]
IPF1	Dey et al., 2016	Participation of customers is essential when developing any product or services.	[1][2][3] [4][5]
IPF2	Prahalad and Ramaswamy, 2004a; Vargo and Lusch, 2016	Participation in co-creation activities provides options for prosumers to personalize the product.	[1][2][3] [4][5]
IPF3	Tu et al., 2018	Customer opinion is important when developing any future product or services.	[1][2][3] [4][5]
IPF4	offler, 1980; France et al, 2018	Customer participation while product development helps in value co-creation process.	[1][2][3] [4][5]
BIP1	Jayashankar et al., 2019	Cocreation activities help in the promotional process.	[1][2][3] [4][5]
BIP2	Prahalad and Ramaswamy, 2004b	Cocreation activities add value to the product development process.	[1][2][3] [4][5]
BIP3	D'Andrea et al., 2019	Cocreation activities help to develop a good impression on all the potential customers.	[1][2][3] [4][5]
BIP4	Yu et al., 2020	Prosumers' cocreation activities help the product to become more acceptable to the other customers.	[1][2][3] [4][5]
BUB1	Saha et al., 2020; Silver, 2009	Involvement of prosumers helps the firm to earn better business profit.	[1][2][3] [4][5]
BUB2	Coulton, 2011; Arvidsson and Colleoni, 2012	Prosumers help the firm to become more competitive.	[1][2][3] [4][5]
BUB3	Metz, 2011; Singh and Sonnenburg, 2012	Usage of digital media in cocreation activities makes the firm become more innovative.	[1][2][3] [4][5]

SD = Strongly Disagree; D = Disagree; N = Neither agree nor disagree; A = Agree; SA = Strongly Agree.

constructs, the explanatory power of the model may be improved.

#### CRedit authorship contribution statement

**Sheshadri Chatterjee:** Validation, Software, Methodology, Formal analysis, Data curation, Conceptualization, Investigation, Writing – original draft, Writing – review & editing. **Marcello Mariani:** Supervision, Resources, Methodology, Conceptualization, Writing – original draft, Writing – review & editing. **Samuel Fosso Wamba:** Validation, Writing – original draft, Writing – review & editing.

#### Declaration of Competing Interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

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#### Appendix

See Table A1.

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**Sheshadri Chatterjee**, PhD, is a post-doctoral research scholar at Indian Institute of Technology Kharagpur, India. He has completed PhD from Indian Institute of Technology Delhi, India. He is having work experience in different multinational organizations such as Microsoft Corporation, Hewlett Packard Company, IBM and so on. Sheshadri has published research articles in several reputed journals such as Government Information Quarterly, Information Technology & People, Journal of Digital Policy, Regulation and Governance and so on. Sheshadri is also a certified project management professional, PMP from Project Management Institute (PMI), USA and completed PRINCE2, OGC, UK and ITIL v3 UK.

**Marcello Mariani**, PhD, is a Professor of Management at the University of Reading (UK) and University of Bologna (Italy), member of the Academy of Management and the European Institute for Advanced Studies in Management. His current research interests include the drivers and consequences of the adoption of digital technologies (e.g., big data and analytics, Artificial Intelligence, robots, AVR, IoT) by firms and consumers, as well as a wide range of topics and issues in the strategic management, innovation management, entrepreneurship and marketing fields. His researches have been published in *Journal of Business Research*, *Harvard Business Review*, *Industrial Marketing Management*, *Journal of Advertising*, *Psychology & Marketing*, *MIT Sloan Management Review*, *Industrial and Corporate Change*, *Long Range Planning*, *Technological Forecasting and Social Change*, *IEEE-TEM*, *IEEE Access*, *International Journal of Electronic Commerce*, *Tourism Management*, *Annals of Tourism Research*, *Journal of Travel Research*, *International Journal of Contemporary Hospitality Management*, *International Journal of Hospitality Management*, *European Management*

*Journal*, *European Accounting Review*, *International Studies in Management and Organizations*, *Journal of Destination Management and Marketing*, and more.

**Samuel Fosso Wamba**, PhD, is Associate Dean for Research at TBS Education, France, and a Distinguished Visiting Professor at The University of Johannesburg, South Africa. He earned his Ph.D. in industrial engineering at the Polytechnic School of Montreal, Canada. His current research focuses on the business value of information technology, blockchain, artificial intelligence for business, business analytics, and big data. He is among the 2% of the most influential scholars globally based on the Mendeley database that includes 100,000 top scientists for 2020, 2021 and 2022. He ranks in Clarivate Analytics' Highly Cited Researchers List, which consists of the top 1% of the "world's most impactful scientific researchers," for 2020, 2021 and 2022, and in CDO Magazine's Leading Academic Data Leaders 2021. ORCID: 0000-0002-1073-058X