

Use of Social Media Functionality for Improving Information Sharing, Problem-Solving, and Co-Production in a B2B Context

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Abstract: This study examines (i) the role of social media functionalities in building trust (ii) and trust's role in achieving co-production of the value proposition. This research confirms the positive impact of social media functionality on developing trust. A cross-sectional survey is conducted based on the questionnaire method in this study. The sample was drawn from Tehran and Arak companies located in Science and Technology Parks and industrial zones. Structural equation modeling was performed to test the relationship among the research variables. Drawing upon a sample of 358 participants working in industrial firms and using partial least squares structural equation modeling, the functionality of social media as particular tools to build trust is elaborated. Also, our research results prove the critical impact of trust on the co-production of value proposition dimensions, i.e., knowledge and information sharing, problem-solving, and co-production. Furthermore, it is shown that technological uncertainty has a positive moderating effect on the relationship between

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trust and co-production. Conversely, competition intensity has a negative moderating influence on the relationship between trust and problem-solving. The results of this study is particularly useful for B2B firms and shows that by investing in social media activities, they can extend their communications with their client and stakeholders to develop trust effectively. Such investment reaps the benefit of co-production of the value proposition. Based on the results, this paper suggests managerial implications for policymakers, sales managers, IT managers, and social media directors who wish to build a strong relationship with their clients and motivate them to take part in their production process and help them improve both quality and services.

Keywords: Social Media Functionalities, Trust, Co-production of Value, Competition Intensity, Technological Uncertainty

Introduction

Presently, policymakers in science and technology parks and industrial zones should pay attention to social media and its impact on value co-production. Policymakers, however, play a vital role in digital transformation. By providing suitable conditions and environments for businesses and citizens, they offer the ground for the development of the country (Nepal, Paris & Georgakopoulos, 2015). Social media policy is concerned with various disciplines such as sociology, economics, communications, and business; nonetheless, it belongs to organizations that produce and distribute content and create infrastructure related to these media (Jeffares, 2014). Businesses require an appropriate policy framework and space to generate co-production of value (Kirlin, 1996). It is now widely accepted that social media platforms highly contribute to this process and predict further growth in the future; particularly in business to business (B2B), where such firms operate in industrial zones and technology parks (Charalabidis & Loukis, 2012; Tuya & Tuya, 2019). Also, In Iran, the social media industry set off in 2007 and now there is a need to provide policies to exploit the existing opportunities given the growing situation of the industry (Labafi & Williams, 2019). Policy does not develop in a vacuum, but, it is created, as a response to a problem or challenge, consistent with the context in which it has emerged. Therefore, it requires awareness of the situation to improve outcomes. In this case, awareness requires knowledge of the concepts in policy making, and understanding these

concepts shall affect policies and the consequences, as well. Here, conceptual models provide a better understanding of the issue and stipulate the basis for optimal policies (Picard, 2020). This paper aims to examine a conceptual model for the co-production of value with social media. Social media functionalities and trust are essential for improving value co-production, including information sharing, problem-solving, and co-production. Social media functionality has provided firms with particular tools to cover their quest for sustained success, and help them stay connected with their clients, build trust, strengthen ties with them, and end up successful in emerging economies (Malthouse et al., 2013; Lagrosen & Grundén, 2014; Ahmed & Akhlaq 2015). So, it is crucial to reap the benefit of social media platforms and other internet-based communication tools that are today's marketing mantras (Solis & Breakenridge, 2009; Cowden, 2014).

Social media can be defined as a set of online tools employed by people to share ideas, write and edit content, and develop relationships through interaction and collaboration between members (Kim & Ko, 2012; Mount & Martinez, 2014). Different social media functionalities, including presence, reputation, social media group, and sharing content, have evolved over the past years. These capabilities have provided firms with particular tools to improve their marketing efficiency (Lv et al., 2012; Lam, Yeung & Cheng, 2016; Xu, Wei & Zhao, 2016).

To stay connected with clients and stakeholders, the existence of trust is another vital factor for developing relationships between organizations and stakeholders to reap the benefit of co-production of the value proposition. (Blomqvist, Hurmelinna & Seppänen, 2005; Lien et al., 2017). Scholars have investigated various aspects of this topic, and it is found that positive interaction between firms and their clients results in building trust, and it can contribute to interpersonal liking, sharing information, mutual perception, and motivation to help each other, solve a problem and take part in co-production behavior (Moorman, Zaltman & Deshpande, Moorman et al., 1992; Doney & Cannon, et al., 1997; Bettencourt et al., 2002; Ahmed and & Akhlaq, 2015).

Trust is generally counted as a fundamental part of offline social interactions that can result in the co-production of value propositions (Antoci et al., 2019; Fogel & Adnan, 2019; Shareef et al., 2020). For example, brand communities on social media can improve brand trust and loyalty by enhancing customer relationships

with the brand, other clients, the company, and the products (Laroche, Habibi & Richarde, et al., 2013; Ismail 2017; Jain et al., 2018). Other researchers have found that participating in virtual social communities (social media groups) positively affects brand loyalty (Casaló, Flavián & Guinalú, 2010), and it is shown that social networking practices positively influence brand trust (Habibi et al., 2014), leading to co-production (Cai et al., 2015).

Although the fore-mentioned studies showed that social media functionalities are deemed to be tools to build trust, and the existence of trust is a pivotal point to start cooperating with firm clients, there has not been an integrated study that investigates the relationship among social media functionalities, trust, and co-production of value proposition through a single study and this gap needs to be covered. Also, the number of researches investigating the impact of social media functionality on a B2B context is highly limited, demonstrating another gap in the literature related to this topic (Zhang & Li, 2019). So, this study examines the impact of social media functionalities on building trust and, in turn, developing co-production of value propositions in a B2B context. Although there has been a rise in internet access and social media usage in developing countries in recent years, the use of social media by firms in such countries is not as developed as in first-world countries since most social media users are personal users. As a result, the number of researches that studied B2B social media functionality in developing countries is scarce, and there is a clear gap here. First, this study demonstrates whether social media features impact positively making trust or not. Second, it aims to show whether developing trust between a firm and its clients could result in the co-production of the value propositions. Finally, the moderating effect of the business environment, including technological uncertainty and competition intensity, on the relationship between trust and the value proposition of co-production is studied.

Theoretical Background and Hypothesis

In this section, we review the literature related to social media functionalities. Based on the reviewed literature, we develop our research model, Fig. 1, propose nine research hypotheses Social media as a new communication tool, and hire smartphones and web-based technologies to create very interactive

platforms through which people and communities share, co-create, discuss, and modify content and information (Kietzmann et al., 2011). This tool is considered a combination of three key elements: content, user communities, and Web 2.0 technologies (Ahlqvist et al., 2010). Social media orientation is another concept in this realm that relates to a firm social media functionality and refers to a company's strategic orientation toward social media. Based on this concept, social media orientation refers to a set of principles and objectives that drive and affect a company's activities on social media to enhance its performance. (Dutot & Bergeron, 2016; Charoensukmongkol et al., 2019). Other social media functions, including presence, reputation, content sharing, and social media groups, have evolved over the past years. Presence in social media shows the extent to which users can know if other users are attainable, including knowing where others are and whether they are accessible. This information is delivered through status icons like 'online' or 'offline' (Kietzmann et al., 2011). Also, based on another research, social media presence is defined as being present and active in social media (Koskinen, 2010). Another function of social media is reputation, which shows the extent to which others can identify a user (Kietzmann et al., 2011). A good reputation is defined as how users think positively about an organization's services and products (Ponzi, Fombrun & Gardberg, 2011) - having a good reputation can result in being identified as a trustworthy company (Aula 2011). Sharing content is another capability provided by social media that enable social interaction between participants. It includes sharing ideas, information, photos, audio, videos, website, etcetera (Lu et al., 2016). A virtual group is another feature available in most social networking services. Social media group members typically have similar interests and formal or informal membership criteria. Social media group users create, share, and discuss information in a computer-mediated environment (Ogunbameru 2004; Hutchings & Michailova, 2006; Rass 2017).

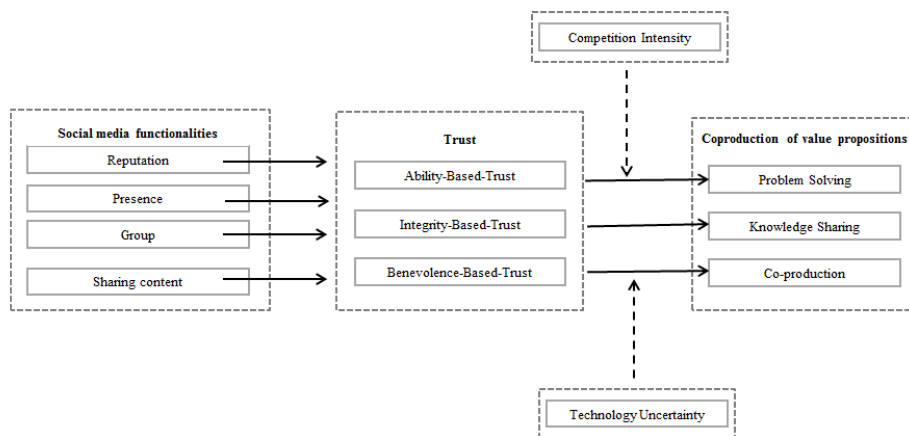


Fig 1. Research Model

Social Media Functionality

Presence on Social Media and Trust

Social presence and human warmth are crucial parameters that positively impact building trust, and trust is a vital element in developing successful customer-supplier relationships. It is proved that trust can be successfully built through online presence and online activities through the web interface and social media. Specifically, newly introduced social media provide companies with various communication tools to stay connected with their customers. This causes developing trust and affective commitment (Calefato, Lanubile & Novielli, 2015; Mpiganjira, 2015). Also, it is suggested that online social media presence contributes significantly to developing trustworthy and online exchange (Lu et al., 2016). Creating trust in an online environment that is an uncertain and risky place is possible as long as sufficient data become available to assess the company's reputation (Turilli, Vaccaro & Taddeo, 2010). Also, trust reduces uncertainty, so it is a precondition for people to engage in online activities, including online transactions. Social media presence can bridge the disconnection between offline and online business through online interaction as it is assumed that social presence enhances trust (de Vries, 2006). Furthermore, newly developed functionality and accessories built upon social media technologies, including comment lists, grading, suggestions, and conversation, allow customers to participate more actively and enhance their

information, contributing to developing trust (Olbrich & Holsing, 2011; Huang & Benyoucef, 2013). Based on the reviewed literature, we formulate our first hypothesis as follows,

H1: Presence on social media has a positive impact on building trust

Sharing Content in Social Media and Trust

Sharing content refers to the extent to which users exchange, distribute, and receive content (Kietzmann et al., 2011) and is considered as a social exchange process (Shi et al. 2014) that involves at least three parties: the creator, the sharer who distribute the content, and the person with whom the content is shared. Information technology and web-based applications have provided infrastructures through which users can easily and promptly disseminate information. Sharing content in social media means distributing content that social media users create; this process could be initiated by one individual and may reach a mass audience (ibid). Consequently, this content could be passed through a vast number of people, and its impact on them is inevitable and may lead to their feedback and more communication. According to findings, sharing content and information results in developing stronger ties, decreases uncertainty level, leads to higher levels of trust (Campbell et al., 2005). Also, it is proved that there is a positive connection between sharing information and partnership quality, which leads to a high level of trust. Accordingly, parties perceive mutual benefits from this interaction (Lee & Kim, 1999). Sharing social media information is the content that is shared and leads to improved interactions in these media. Accordingly, it improves interactions such as “liking” and “commenting” builds trust (Hai-Jew, 2017). It is approved that, however, sharing information on social media by opinion leaders improves followers’ trust and consequently their greater engagement (Pop et al., 2021). Also, it is already shown that inter-organizational information sharing creates trust between the collaborating companies over time (Karlsson et al., 2017). So, it is concluded from the literature that sharing information could positively affect building trust as our following hypothesis.

H2: Sharing content in social media has a positive impact on building trust

Corporate Reputation and Trust

The concept of corporate reputation has attracted researchers' attention in various sciences, including sales and marketing, economics, and sociology (Brown et al., 2006). The literature review revealed reputation could have different meanings on social media platforms. Reputation is the degree to which users can identify the standing of others, including themselves, in a social media channel (Kietzmann et al., 2011). Having a good reputation refers to doing your job rightly and reasonably, and it means people think positively about you and your services (Ponzi, Fombrun & Gardberg, 2011).

For a firm, it is essential to create a positive reputation, and it can be gained through three different methods. First, they try to decrease the uncertainty through economic and good reputation as positive corporate reputation is related to good performance over a certain period (Rindova et al., 2005), and highly reputable corporates are perceived as trustworthy companies in the eyes of clients. Second, interrelated features like responsibility, credibility, reliability, and trustworthiness are tightly linked with reputable companies. It can enhance customers' expectations of a company's capability to produce high-quality products or services (Grund, 1996). Third, it must be considered that creating a firm's good reputation is a time-consuming process. It is regarded as an intangible asset but could be easily dismantled, so it is often viewed as a "fragile resource (Hall, 1993). Therefore, corporates that are viewed as reputable companies should behave carefully and are less likely to get involved in negative behaviors that harm their reputation. They always try to strengthen customers' confidence through their integrity and reliability (Keh & Xie, 2009). Based on the reviewed literature, corporate reputation significantly impacts building trust; therefore, the following hypothesis is our third hypothesis in this study.

H3: Corporate reputation has a positive impact on building trust

Social Media Groups and Trust

Human beings as social creatures are inherently interested in forming groups together through the structure of societies (Backstrom et al., 2006). Several social media platforms such as Facebook, Twitter, LinkedIn, WhatsApp, Telegram,

Line, and WeChat have been introduced over the past decades to facilitate communication and develop trust between individuals and groups' members. Through these virtual channels, users join the group to keep strong ties with friends and coworkers and fortify their relationships with new people (Ellison, Steinfield & Lampe, 2007).

Group communication on social media platforms is defined as the communication behavior of group members. It combines common goals and the desire to cooperate (Butler, 2001). The group consciousness developed during information transmission and interaction usually causes a sense of belonging to a community (Aksoy et al., 2013). Group norms adjust group members' behavior and result in similarity among members in the same group (Biron & Bamberger, 2012). In group communications, the perceived communication quality, receptiveness, openness, and pertinence are all determinative of a group communication efficiency (Ngwenyama & Lee, 1997; Burgoon et al., 2002). By joining a group with similar individuals, people would be open to sharing their ideas, preference, and information, and they have a higher tendency to communicate together. Also, through this virtual group, as shared topics and similar interests are easily available, it could help maintain bilateral relationships and act to improve mutual trust (Cheng, Fu & de Vreede, 2017).

H4: Social media group has a positive impact on trust

Trust and Problem Solving

Arguably, in many organizations, employees use informal networks to find information, solve complex problems, and learn skills regarding doing their job. However, before that, they need to trust the network members. Two kinds of interpersonal trust: competence and benevolence trust enable creating knowledge effectively and sharing through these networks to solve the problems (Abrams et al., 2003). Other studies suggest that interpersonal trust is a prerequisite to solving a problem effectively in a group. Conversely, persistent criticism causes a defensiveness position in a group, resulting in mistrust among members and decreasing their ability to identify and accept the right ideas to solve a problem (Parloff & Handlon, 1964). Also, it is reported that in a high trust atmosphere, the group members are significantly more efficient in solving a problem compared with

the output of those working in a low-trust environment. In other words, contrary to a high trust environment in which the likelihood of solving a problem creatively and practically is more, in an environment where trust is low among the members, problem-solving is ineffective and weak (Boss, 1978). It is reported that, while weak ties are vital elements for the transfer of shallow information, people rely on strong ties and a high level of trust to solve problems effectively (Cross, 2001). As mentioned above, to solve a problem effectively, a high-level atmosphere must be created. So, the following hypothesis;

H5: Trust has a positive impact on solving a firm's problem

Trust and Information Sharing

The sharing of information process occurs internally, between corporate employees and externally, between firms and suppliers or clients (Ritzman, Krajewski & Klassen, 2004). For example, in the Japanese automaker market, the tendency of a supplier to share information is a crucial element in being chosen as an automaker partner. It can help develop a long-term relationship (Dyer, 1997). Also, buyers who clearly share the information regarding their requirements significantly help the seller understand what they really need. This results in a more committed relationship on the part of suppliers (Humphreys, Li & Chan, 2004). Social capital researchers have considered trusting a critical cause that motivates people to share knowledge and information. Many researchers have proved that in high trust level relationships people are not only more willing to share fruitful knowledge and information, but also they are more willing to listen to and absorb each other's knowledge (Mayer & Davis, 1995). Also, according to both practical experience and scholarly studies, it has been proved that social networks have a significant impact on creating and sharing knowledge in organizations. In several organizations, employees try to find information, solve complex problems, and learn how to do their jobs through informal networks considered the primary means for these purposes (Abrams et al., 2003). Therefore, we can expect trust to have a positive influence on sharing knowledge and information, so the following hypothesis is suggested:

H6: Trust has a positive influence on sharing knowledge and information

Trust And Co-production

It is believed that co-production can develop trust (Fledderus, Brandsen & Honingh, 2014) and that trust results in co-production, too (Van de Walle, 2010). As indicated, while doing an interdisciplinary project, the existence of a higher level of trust enhances performance, efficiency, and teamwork. It is found that trust-based collaboration is more likely to arise and persist, particularly in the first step of a co-production project. The presence of trust influences the participants' behavior, team-building processes, and communication. So, if trust exists, people can spontaneously get involved in constructive communication. No matter what the hidden motivation of partners is or who is responsible for problems, they are ready to openly share information and cooperate (Kadefors, 2004). Also, it is stated that trust has been identified as a vital element in developing customer relationships, a phenomenon that, in turn, results in the co-creation of value (Berry, 1995; Grönroos, 2004). In a knowledge-intensive business service, to successfully deliver high-quality services, the cooperation and participation of clients are necessary because of the following reason: the necessity of clients' co-production behavior as clients need to share particular business knowledge with suppliers and vendors in this process. However, clients need to ensure the suppliers' and vendors' competency and goodwill to do so. In other words, they need to trust them, and this trust could lead to co-production behavior as a great outcome (Cai et al., 2015). Other researches have demonstrated the importance of trust in the co-production of value propositions (Kohtamäki, Partanen & Möller, 2013).

H7: *Trust has a positive impact on co-production*

The Moderating Role of Environment Intensity

Firms are working in an increasingly uncertain environment and a fast pace era, in which the competition intensity is extreme and technological uncertainty is pervasive. In this competitive and turbulent business environment, collaborating with external parties, customers, and suppliers is critical for firms to create competitive advantages by offering superior products and services. Business environment elements, including competition intensity and technological

uncertainty, have long been considered a major contributor to the capacity of customer and supplier collaborations to drive co-production of value propositions (Cooper & Hedges, 1993; Heirati et al., 2016). Competition intensity is defined as the degree to which firms are affected by competitors, industries, and markets due to the presence of numerous rivals and the lack of opportunities for further growth (Auh & Menguc, 2005; Lee, Chu & Tseng, 2011). Also, it is proved that competition intensity moderates negatively the relationship between joint problem solving and supply chain management efficiency (Abdallah, Obeidat & Aqqad, 2014). Altogether, the above discussion points to the moderating effect of competitive intensity on the relationship between trust and problem-solving. The following hypothesis is thus proposed:

H8: High competitive intensity weakens the positive effect of trust on problem-solving.

Technological uncertainty refers to the situation in which possible results are more than one, but which kind of situation will emerge cannot be clearly forecasted in advance. As 'uncertainty' is often deemed ignorant, technological uncertainty means humans' inability to predict future technological developments (Shi et al., 2014). Scholars have studied technological uncertainty's moderating effect on a firm's performance over the past decades. Previous researchers have found that technological uncertainty moderates the strength of the relationship between market orientation and performance (Cooper & Hedges, 1993). Another research examined the effect of technological uncertainty on industrial product innovation in Canada and Australia. It proved that a higher degree of technological uncertainty moderates the relationship between the development process, project organization, and time efficiency (Bstieler, 2005). Further, it was shown that technological uncertainties moderate the relationship between the development process, project organization, and new product success (Bstieler & Gross, 2003). Considering the pre-mentioned literature, the moderating effect of technological uncertainty on the relationship between trust and co-production, the following hypothesis can be proposed:

H9: High technological uncertainty strengthens the positive effect of trust on co-production

Methods

Sample Selection and Data Collection

This study presents a quantitative approach and it is applied research in terms of purpose. A cross-sectional survey is conducted based on the questionnaire method. Ninety-five companies were investigated during 2019-2020. To collect the surveys, we checked the company list that located in Science and Technology Parks, and Industrial Zones to select the chemical companies from among them, the questionnaires were sent through three different distribution channels, including hard copy, online pdf or Google Forms. The chemical industry was selected because it is one of the leading industries in Iran, and it was easy to access. As an example, in Tehran and Markazi provinces, there are several chemical companies available. Also, the various fields the chemical industry is related to a variety of other fields such as pharmaceutical, health, food, etc.

At first stage, a pilot study was conducted through 70 managers and experts to test the validity and freedom from error of the measurement items. At this stage, exploratory factor analyses (EFA) were applied to identify any patterns in the data (Foroudi et al., 2016). After the pilot study, another 480 questionnaires were sent to the audiences from which 410 were replied back and from those, 358 responses were usable, representing a response rate of 74%. We used a convenience sampling method allowing us to easily access the potential audience who were accessible and tended to cooperate with us in this survey (Bryman & Bell, 2007). The sample was drawn from companies located in Science and Technology Parks and Industrial Zones since these companies are more likely to use newly-born tools like social media to develop their business. The survey included 53 questions referring to the company's perceptions of social media functionalities, trust, co-production of value propositions and business environment. The data were collected using online and face-to-face methods.

Table one summarizes the demographic data of participants. It shows that around 72% were male and the rest were females. The ages of most of the participants ranged from 20- to 30 and 31 to 40 (59.4% and 37.9%, respectively) and mainly were managers (48.9%). The job experience of participants ranged from 1 to 5, 6 to 10 and 11 to 15 (47.3%, 21.5% and 31.2%, respectively). Also, almost 50% of the participants were working in production companies, 27% in

service companies and 22% were working in companies offering both products and services. Table 1 demonstrates the frequency of using different types of social media platforms and online channel that respondents use. As it shows, most of the companies had websites (255) and telegram channels; Instagram, WhatsApp, and LinkedIn were other frequently used platforms used by 200, 170, 137 and 131 of the respondents, respectively.

Table 1. Demographic profile of respondents (N= 358)

Frequency Percent			Frequency Percent		
Gender			Job experience		
Male	259	72.34	1 to 5	169	54.34
Female	99	27.65	6 to 10	77	24.76
Age			11 to 15	112	36.01
20-30	213	68.49	Frequency of using different type of online platform		
31-40	136	43.73	Website	255	81.84
41-60	9	2.89	Telegram	200	64.24
Job			Instagram	170	54.46
Manager	175	56.27	Whatsapp	137	44.569
Expert	101	32.48	LinkedIn	131	42.45
Deputy	40	12.86	Wechat	66	18.44
Supervisor	14	4.50	Youtube	75	20.94
Miscellaneous	28	9.00	Imo	20	11.12
Organization field					
manufacturing	180	50.16			
Services	99	22.18			
Manufacturing & Services	79	27.65			

Measures

In this study, the questionnaires contained two sections: In the first section, the demographic and company information were collected and in the second

section, on a seven-point Likert-type scale ranging from (1) strongly disagree to (7) strongly agree, participants were asked to indicate their ideas toward social media functionalities, trust, and co-production of value propositions. Based on previous studies, four key components of social media functionalities are sharing information, presence, reputation, and social media group (Kietzmann et al., 2011; Kietzmann et al., 2012; Felix, Rauschnabel & Hinsch, 2017). Also, this study measures trust, based on three constructs, including ability, integrity and benevolence (Razak et al., 2014; Tenzer, Pudelko & Harzing, 2014; Calefato, Lanubile & Novielli, 2015). Co-production of value propositions was measured via co-production, knowledge sharing and problem solving constructs (Tsai, Vaccaro & Taddeo, 1998; Lindberg & Nordin, 2008; Vargo, 2008; Athaide & Zhang, 2011; Ballantyne et al., 2011; Storbacka & Nenonen, 2011; Aarikka-Stenroos & Jaakkola, 2012; Frow et al., 2014; Felix, Rauschnabel & Hinsch, 2017). The items employed in this study are shown in Table 2.

Table 2. Exploratory Factor Analyses and Reliability of Measures

	Factor loading	Mean	SD	Cronbach Alpha	CR	AVE
Social media functionalities						
Presence				0.923	0.944	0.809
The presence on social media allows us to promote our new products (Dutot and Bergeron 2016)	0.928	4.07	0.591			
The presence on social media allows us to increase the visibility of the company (Dutot and Bergeron 2016)	0.893	4.115	0.58			
The presence on social media allows us to improve customer relationship management (Dutot and Bergeron 2016)	0.885	4.115	0.58			
The presence on social media allows us to improve our customer database (Dutot and Bergeron 2016)	0.891	4.179	0.551			

	Factor loading	Mean	SD	Cronbach Alpha	CR	AVE
Reputation				0.925	0.944	0.774
I feel that sharing our company knowledge on social media groups can enhance our company's reputation (Pi et al. 2013).	0.904	4.218	0.703			
Through our organization's online communications, we can influence what kinds of assessments are made by our stakeholders about our public image. (Aula and Mantere 2008; Aula 2011)	0.784	4.235	0.656			
Through our organization's online communications, we can influence how well our organization is recognized (Aula and Mantere 2008; Aula 2011).	0.756	4.235	0.656			
Through our organization's online communications, we can influence the stories told about our organization (Aula and Mantere 2008; Aula 2011).	0.949	4.176	0.66			
Our organization's online communications increase our Company's reputation (Aula and Mantere 2008; Aula 2011).	0.852	4.215	0.631			
Group				0.928	0.945	0.777
Is membership in the virtual helpful group?" (Liu et al. 2016)	0.787	3.98	0.863			
It is important to me to maintain strong ties to the group" (Chiang et al. 2013)	0.789	3.818	0.814			
I participated in the group's discussions (Chiang et al., 2013)	0.788	3.818	0.814			
I invited others to join this group (Chiang et al., 2013)	0.949	3.824	0.945			
My personal image has overlapping with the group identity (Chiang et al., 2013)	0.950	3.782	0.947			

	Factor loading	Mean	SD	Cronbach Alpha	CR	AVE
Sharing Content				0.807	0.873	0.633
In general, I am very interested in what the group members think about sharing my knowledge and information through social media (Ashforth et al., 1998).	0.810	4.223	0.812			
I feel a sense of belonging to the group when I share my knowledge and information through it (Ashforth et al., 1998).	0.830	4.254	0.829			
Sharing of my knowledge on social network Groups is always beneficial (Ashforth et al., 1998).	0.825	4.254	0.829			
I am willing to provide my experiences and suggestions when my social network group friends seek my advice on buying something (Ko, 2018).	0.765	3.947	0.701			
Trust				0.950	0.956	0.628
Integrity based trust						
Through our organization's online communications, we can find out if the partner firm has a strong sense of justice (Mayer et al., 1999; Becerra et al., 2008; Qiu et al., 2019).	0.870	4.073	0.773			
Through our organization's online communications, we can find out if this alliance partner stands by its words (Mayer and Davis, 1999; Becerra et al., 2008; Qiu and Haugland, 2019).	0.792	4.07	0.797			
Through our organization's online communications, we can find out if sound principles seem to guide the partner firm's actions (Mayer and Davis 1999; Becerra et al. 2008; Qiu and Haugland 2019).	0.776	4.07	0.797			

	Factor loading	Mean	SD	Cronbach Alpha	CR	AVE
The partner firm is fair in business dealings with us (Mayer and Davis 1999; Becerra et al., 2008; Qiu and Haugland, 2019).	0.775	3.882	0.871			
Through our organization's online communications, we can find out if sound principles seem to guide the partner firm's actions (Mayer and Davis, 1999; Becerra et al., 2008; Qiu and Haugland, 2019).	0.897	4.078	0.818			
Benevolence-based trust						
Through our organization's online communications, we can find out if when making important decisions, the partner firm is concerned about our company's welfare (Mayer and Davis, 1999; Becerra et al., 2008; Qiu and Haugland, 2019).	0.780	4.137	0.729			
Through our organization's online communications, we can find out if the partner would not knowingly do anything to hurt our company (Mayer and Davis, 1999; Becerra et al., 2008; Qiu and Haugland, 2019).	0.710	3.896	0.884			
Through our organization's online communications, we can find out if our firm's needs are important to the partner firm (Mayer and Davis, 1999; Becerra et al., 2008; Qiu and Haugland, 2019).	0.702	4.128	0.736			
The partner firm looks out for what is important to our firm in the alliance (Mayer and Davis, 1999; Becerra et al., 2008; Qiu and Haugland, 2019).	0.788	3.893	0.928			

	Factor loading	Mean	SD	Cronbach Alpha	CR	AVE
Ability based trust						
Through our organization's online communications, we can find out if the partner firm is capable of performing its role in the alliance (Mayer and Davis, 1999; Becerra et al., 2008; Qiu and Haugland, 2019).	0.876	4.131	0.764			
Through our organization's online communications, we can find out if the partner firm is well-qualified for the alliance (Mayer and Davis, 1999; Becerra et al., 2008; Qiu and Haugland, 2019).	0.846	4.182	0.715	0.846	4.182	0.715
Through our organization's online communications, we can find out if the partner firm has much knowledge about the work that needs to be done in the alliance (Mayer and Davis, 1999; Becerra et al., 2008; Qiu and Haugland, 2019).	0.784	4.24	0.712			
Through our organization's online communications, we can find out if the partner firm has specialized capabilities that add value to the alliance (Mayer and Davis 1999; Becerra et al., 2008; Qiu and Haugland 2019).	0.741	4.229	0.704			
Coproduction of value Propositions						
Knowledge and information sharing				0.949	0.963	0.868
Our companies exchange information related to changes in market structure, such as mergers, acquisitions or partnering (Selnes et al., 2003; Kohtamäki et al., 2016).	0.886	3.807	0.842			

	Factor loading	Mean	SD	Cronbach Alpha	CR	AVE
Our companies exchange information related to changes in the technology of the focal products (Selnes and Sallis, 2003; Kohtamäki and Partanen, 2016)	0.932	3.802	0.892			
Our companies exchange information related to changes in end-user needs, preferences and behavior (Selnes and Sallis, 2003; Kohtamäki and Partanen, 2016).	0.979	3.718	0.888			
This company and ours have learned much from the direct contact between our two organizations (Bagozzi et al., 1998; Qiu and Haugland, 2019).	0.927	3.804	0.833			
Problem-solving				0.949	0.963	0.868
Since our company started using social media, the company and customers have been willing to solve problems emerging in collaborations (Chuang, 2020).	0.886	3.807	0.842			
Since our company started using social media, the ties between our company and customers have been describable as "mutually gratifying (Chuang, 2020).	0.932	3.802	0.892			
Our company is ready to talk other companies with customer satisfaction surveys to find and fix weaknesses (Ballantyne et al., 2011).	0.979	3.718	0.888			
We worked consistently with the customer to solve specific problems related to the product (Ballantyne et al., 2011).	0.927	3.804	0.833			

	Factor loading	Mean	SD	Cronbach Alpha	CR	AVE
Co-production				0.890	0.916	0.646
Our business unit encourages customers to participate interactively in designing products and services (Chen et al., 2012).	0.851	3.556	0.978			
The client's goodwill trust in the vendor has a positive impact on the client's co-production behavior (Cai et al., 2015).	0.781	3.7	0.887			
The key supplier participates in our product development process (Miao et al., 2018)	0.828	3.88	0.884			
Our company asks for the key supplier's input for continuous improvement in our operations (Miao et al., 2018).	0.728	3.668	0.915			
While developing new products/ services, the company sees customers as co-producers, and they develop products or services together (Chien et al., 2011).	0.848	3.821	0.99			
The company allows customers to become involved in the process of designing and in evaluating new products (Chien and Chao, 2011).	0.779	3.955	0.814			
Competition Intensity				0.980	0.985	0.944
Price competition is a hallmark of our industry (Prajogo, 2016; Miao et al., 2018).	0.9750	4.036	0.77			
There are many competitors in our target market (Zhou et al., 2005; Miao et al., 2018)	0.956	4.109	0.674			
There are too many similar products in the market; it is very difficult to differentiate our brand (Zhou et al., 2005; Miao et al., 2018).	0.979	4.089	0.711			

	Factor loading	Mean	SD	Cronbach Alpha	CR	AVE
Firms in our industry will aggressively fight to hold on to their market share (Zhou et al., 2005).	0.975	4.05	0.74			
Technology Uncertainty				0.840	0.894	0.682
It is very difficult to forecast technological developments in our industry (De Luca et al., 2007; Chen et al., 2012).	0.720	3.534	0.967			
The technology environment is highly uncertain (De Luca and Atuahene-Gima, 2007; Chen et al., 2012).	0.914	3.383	0.837			
Technological developments are highly unpredictable (De Luca and Atuahene-Gima, 2007; Chen et al., 2012).	0.925	3.341	0.872			
Technologically, our industry is a very complex environment (De Luca and Atuahene-Gima, 2007; Chen et al., 2012).	0.720	3.659	0.987			

Analysis and Results

This study applies partial least squares structural equation modeling (PLSSEM) to analyze the research model using Smart PLS 3. The measurement model was used to evaluate the construct measure's reliability and validity. The research measurement items were subjected to a series of factor and reliability analyses as an initial examination of their performance within the entire sample. Cronbach's α and composite reliability are measured to determine the Internal consistency reliability and all the items α and CR is above 0.80, which regarded as satisfactory (Preacher & Hayes, 2004). As table 3 shows, discriminant validity and Convergent validity (AVE) are tested for each construct (see Table 3). All the AVEs for constructs are above 0.50, representing that on average, the construct explains more than half of the variance of its indicators (Field 2013), and all the indicators' outer loadings on a construct are higher than its cross-loadings, representing that discriminant validity is achieved (Chin, 1998). As Table 4 shows, the square

root of the AVE is more than the intercorrelations of the construct with the other constructs in the models; that is there are no discriminant validity issues. So, we proceed with the structural model evaluation to test the hypotheses.

Table 3. Discriminant Validity

	Co-production	Group	Knowledge and information sharing	Presence	Problem-solving	Reputation	Sharing Content	Trust
Co-production	0.804							
Group	0.364	0.882						
Knowledge and information sharing	0.454	0.357	0.932					
Presence	0.400	0.340	0.337	0.899				
Problem solving	0.508	0.403	0.414	0.725	0.837			
Reputation	0.381	0.211	0.400	0.192	0.156	0.880		
Sharing Content	0.495	0.507	0.470	0.392	0.400	0.448	0.796	
Trust	0.396	0.255	0.457	0.319	0.367	0.410	0.405	0.792

Findings

Before conducting the path coefficient estimation, the collinearity among the constructs is examined. To determine the collinearity, we test each set of predictors in the structural model, and it was found that each predictor's Variance inflation factors (VIF) value is lower than 5. Then, to investigate the hypothesis relationships, we assess the significance of path coefficients. To produce producing t-statistics, the significance of all the path coefficients is tested using 5000 bootstrapping (Table 5).

Potential nonresponse bias was conducted by checking the difference between early and late respondents with respect to the means of all the variables through the Mann-Whitney U test (Lambert & Harrington, 1990; Podsakoff et al., 2003). According to the proportions of the times the survey questionnaires were returned, the first 80 observations were taken as early respondents, and the rest

were taken as late respondents. The results showed that the significance value of any variable was not less than or equal to a 0.5 probability value, which is insignificant. Therefore, there is no statistically major difference between early and late respondents; thus, nonresponse bias is not a concern. We employed Harman's one-factor test to analyze the common method bias and a common latent factor suggested by previous studies, using a chi-square difference between the original and fully constrained model (Harman, 1967; Lindell & Whitney, 2001; Malhotra, Kim & Patil, 2006). The result proved that the two models are statistically different and share a variance. So, the original results of the model were examined without any consideration of method biases.

Table 5. Results of hypothesis testing

	H	Expected sign	β	Standard Deviation (STDEV)	T Statistics (O/STDEV)	P Values	Supported
Presence -> Trust	H1	+	0.177	0.054	3.255	0.001	Yes
Reputation -> Trust	H2	+	0.283	0.051	5.548	0.000	Yes
Group -> Trust	H3	+	0.038	0.055	0.700	0.484	No
Sharing Content -> Trust	H4	+	0.190	0.075	2.542	0.011	Yes
Trust -> Problem solving	H5	+	0.367	0.042	8.711	0.000	Yes
Trust -> sharing information	H6	+	0.457	0.050	9.114	0.000	Yes
Trust -> Co-production	H7	+	0.396	0.047	8.385	0.000	Yes
Moderation effect of competition intensity							
Trust -> problem solving (competition intensity)	H8	-	-0.192	0.084	2.299	0.022	Yes
Moderation effect of technology uncertainty							
Trust -> Co-production (Technology Uncertainty)	H9	+	0.240	0.062	3.859	0.000	yes

The statistics show that H1, the impact of presence in social media on trust ($\beta=0.177$, $p < 0.001$) and H2, the impact of reputation on trust ($\beta=0.283$, $p <$

0.000), are supported. H3 is not supported ($\beta=0.038$, $p < 0.484$), and it shows no impact of social media group on trust, H4 that shows the positive influence of sharing content on social media has a positive impact on trust, is supported too ($\beta=0.0.190$, $p < 0.011$). H5, H6, and H7 are all supported with $\beta=0.367$, $p = 0.000$, $\beta=0.457$, $p = 0.000$ and $\beta=0.396$, $p = 0.000$ respectively, which demonstrate significant impact of trust on knowledge sharing, problem solving and co-production. H8 is also supported with $\beta=-0.192$, $p = 0.022$, which indicates the negative moderating impact of competitive intensity on the relationship between trust and problem solving and H9 is supported too, with $\beta=0.240$, $p = 0.000$, which shows a positive moderating impact of technology uncertainty on the relationship between trust and co-production. Finally, to evaluate the structural model, R^2 values of the endogenous variables in the path model were calculated. The R^2 values in this model show some degree of effect with presence, reputation, group and content sharing explain the 25.9% of the variances of trust. Trust explains 15.5%, 20.7% and 13.5% of co-production, knowledge sharing and problem solving. Also, to test the magnitude of the R^2 values for its predictive accuracy, Stone-Geisser's Q^2 value was applied by using the blindfolding procedure for an omission distance $D=7$ (Chin, 1998) and as all Q^2 value for this structural model are >0 , the model is proved to have predictive relevance (Hair Jr et al., 2016) (see Table 6).

Table 6. Results of R^2 and Q^2 values

	R Square	Q^2
Co-production	0.155	0.092
Knowledge sharing	0.207	0.169
Problem-solving	0.135	0.081
Trust	0.259	0.146

Discussions

This study confirms that social media functionalities positively affect trust development. To efficiently and effectively achieve trust through social media, firms should frequently exercise activities through social media functionalities. Further, this study demonstrates that trust has a positive and significant effect on the co-

production of the value propositions. In this study, a survey conducted by authors on 358 Iranian participants working in industrial firms shows that more and more companies use social media to serve various purposes and achieve competitive advantages in this era. Theoretically, this research contributes to the existing knowledge by investigating how social media functionalities affect developing trust and whether trust results in the co-production of the value propositions. This study mainly focuses on interpreting the importance of social media functionality features (i.e., presence, reputation, group, and content sharing) in developing trust and co-production of the value propositions. Our findings show that the greater the presence of the companies in social media, the better their chances of being trusted by others, and this is consistent with the results achieved by other scholars (Hassanein and Head, 2004; de Vries, 2006; Teoh and Cyril, 2008; Turilli, Vaccaro & Taddeo, 2010). Also, social media functionalities can help companies to attract significant attention from social media users and gain reputation. It provides them with several opportunities, as the presented research results demonstrate that reputation is an essential element that contributes to developing trust. This issue is consistent with past research works (Rindova et al., 2005; Keh and Xie, 2009). Previous studies reveal that firm reputation has a positive influence on trust. Scholars have proved that firm reputation has a positive influence on customer behavior, particularly in customer trust, commitment, and knowledge (Campbell, 1999). Content content (i.e., pictures, information, links, prices lists, parts of catalog, movies, etc.) through social media is another frequently exercised activity by social media users. Therefore, a variety of content is created and shared between them on a daily basis, leading to more communication and a positive influence on building trust, as the results of the path analysis demonstrate. Content is transmitted among numerous people and its impact is inevitable; thus, content sharing and information in the context of social media leads not only to a stronger relationship, but also it would reduce the level of uncertainty and consequently lead to higher trust (Kwon & Suh 2005); that is, by increasing the content sharing by the firm in industry-related social media, interaction would increase and consequently the trust of customers and stakeholders correspondingly increase. These results support the current belief among researchers (Lee and Kim, 1999; Piderit et al., 2011; Piderit and Flowerday, 2014), 'sharing information freely between supply

chain members increases the trust levels'. Contrary to Ziegler & Golbeck, (2007) and McNab et al., (2012) studies, this study's findings prove the negligible effect of social media groups on building trust. This minor influence might be due to the fact that social media group members are from various backgrounds, so in the eyes of companies studied in this research, the social media group is considered a public place. In other words, various industry associations have not built their particular groups on social media yet, and there nospecific groups available.

The results demonstrate that the successful development of trust can directly improve the co-production of the value propositions. As the path analysis supports, trust between involving parties motivates them to share knowledge and information. It has been proved with previous research (Dyer, 1997; Levin & Cross, 2004; Cazier, Shao & Louis, 2007). Researchers have studied the role of trust as a key element in solving problems (Cross, 2001; Abrams et al., 2003), and the present research supports it, too. This work also reveals that to motivate the participants to focus on solving problems, there first must be some trust, consequently, cooperation occurs efficiently. In line with the findings of other scholars (Webber, 2008; Van de Walle, 2010; Kohtamäki et al., 2013; Kohtamäki, Partanen & Möller, 2013; Cai et al., 2015), the existence of trust is necessary to improve co-production practice. The results of this study support the hypothesis that involvement in co-production cannot ideally occur without trust. The research, however, investigates the influence of competition intensity moderators on the relationship between trust and problem-solving. As predicted, intensifying competition undermines the positive effect of trust in problem-solving; that is, as competition increases, the possibility of cooperation to solve the problem decreases. Generally, the study results indicate that today, firms operate in an environment where the intensity of competition is extremely high and new technologies are introduced to the market on a daily basis.

Furthermore, firms operating in a highly competitive business environment shall have less opportunity to solve a common problem (Abdallah, Obeidat & Aqqad, 2014). However, studies also show that the moderating effect of technological uncertainty strengthens the positive effect of trust on co-production; that is, with increasing uncertainty in technology, the possibility of cooperation for joint production increases. Further study shows that a higher degree of technological

uncertainty moderates the relationship between the development process, project organization, and time efficiency. Additionally, technological uncertainties have been proven to moderate the relationship between the development process, project organization, and new product success (Bstieler, 2005).

6-1. Implications

This study suggests some implications for managers and policymakers. In addition, it highlights the considerable effect of social media functionalities on developing trust. The effect of social media functionalities, including presence, reputation, group and content sharing, and how these functions can affect trust is highlighted. By their presence on social media, companies share contents that adds to the understanding of their clients and other social media users of their goods and services. So, a social media manager must be cautious about the content they share through social media platforms since it would be read and distributed to unknown numbers of users, which could gain users' confidence or lead to criticism. So, the way a firm's social media or IT director manages this situation is crucial and must be carefully conducted to result in trust. Also, frequently creating fruitful content and providing firms' related information and news for users (i.e., producing innovative products or gaining a particular rank within a specific business) attract users to continually visit firms' social media pages and respond to them. Ultimately, this constant presence on social media will add to the firms' reputations. It is clear that people are more likely to trust firms with a high positive reputation than those that are not famous or have a negative reputation.

Our findings highlight trust's importance in developing co-production of the value propositions. Through an atmosphere with a high level of trust, people are encouraged to share knowledge openly, cooperate to solve problems, and are ready to participate in co-production projects. This study attempts to show the necessity of social media functionalities in building trust and developing co-production of the value proposition through the above theoretical and managerial implications. Based on the achieved results, the following suggestions are proposed to the firms' directors to help them to improve their social media platforms to gain competitive advantages: As the results exhibit, the number of social media platforms has increased over the past years. People from different

countries or with varying personalities may use different types of social media (i.e., Telegram, Wechat, LinkedIn, Instagram, etc.). Therefore, business directors are highly encouraged to expand their activities through different types of social media based on their stakeholders' tastes and characteristics. For example, if a firm is going to do business with China, it needs to have WeChat as most other platforms are either banned or not popular. The way firms' social media pages respond to clients' reviews is a key matter that will greatly impact building trust, encouraging clients to share knowledge, solve problems, and co-production. Also, the findings from this study urge policymakers to consider the particularly important role of corporate social media functionalities to contribute to corporate's reputation that can be considered competition advantageous and help the firms attract more and more clients. Most social media platforms have particular analytics tools that are truly incredible, helping social media directors make sense of the actions. Also, policymakers are strongly advised to do a market study before launching new social media and use its analytics tools to analyze user feedback and understand future popularity and success.

While collecting surveys, we found that some variables can potentially have a negative impact on social media functionalities. For instance, older managers and experts are unwilling to use social media platforms since they are usually interested in traditional connecting tools; in contrast, youngsters are more interested in using social media. So, the company directors and policymakers are advised to take this note into account and hire young employees to mix their interest and knowledge with veteran IT manager experience to conduct their social media functionalities. It is also highlighted that it is necessary to have a professional social media manager in the emerging economy context (Brock 2016).

Furthermore, the findings of this paper provided researchers with several theoretical implications. First, although previous research have investigated the use of social media to improve firms service offerings, , no research focused on the influence of social media functionalities on building trust. The findings highlighted the importance of using social media to build trust with which co-production of the value proposition could be achieved. Second, this study revealed that in this competitive environment, firms that use social media platforms could efficiently interact and communicate with clients and develop trust while focusing on the

exchange of knowledge and information related to products and services. In an atmosphere with a high level of trust, clients and partners are encouraged to share more information, and it could not only improve products and services but also save time and resources. Finally, the research findings showed that a high level of trust between parties is the key component to solving problems jointly. In a low trust environment, team members do not understand the problems clearly, hurting creativity and finding realistic solutions. That is why members have to try to minimize their vulnerability and put themselves in a safe side position instead of open collaboration. In contrast, in an atmosphere with a high level of trust between a group member, the uncertainty would be much lower, facilitating collaboration and finding practical solutions for problems.

Limitations and Directions for Future Research

In different countries, people might use different types of social media, further, some countries may filter some social media; this may lead to limited access to the restricted ones in that country. For example, as our results indicate, although the FaceBook is a widely used social media platform, here, in Iran, there are a limited number of firms using official FaceBook page as it is filtered. Also, due to sanctions, some social media tools are not available for Iranian users, or they have to pay directly to use them; unfortunately, due to sanctions, Iranians could not pay, and it limits Iranian's access to social media platforms, which in turn, it may have a negative impact on using social media.

Regarding social media functionalities, to keep the number of questions in the rational count, we just investigated the relationship between four social media functionalities including presence, reputation, group and content sharing, but there is other functionality such as identity, relationship, and conversation that future researches could test.

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