

THE PRIVACY CONCERN AS MODERATING ROLE OF CO-CREATION IN PRODUCT INNOVATION

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ABSTRACT

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The purposes of this quantitative research were to explore the social commerce constructs, social support, relationship quality and co-creation in product innovation, to compare the multiple-group of privacy concerns as a moderating effect towards co-creation in product innovation, and to investigate the factors that influence co-creation in product innovation of the customers who bought products via online business. A total of 496 customers were chosen and a set of questionnaires were used for data collection. Descriptive statistics including frequency and mean were computed and the measurement together with structural equation model (SEM) using AMOS program was also employed. The results from the data depicted the model positively. The findings indicated that social commerce constructs, social support and relationship quality had a significant positive effect on co-creation in the product innovation model ($p < .05$). Interestingly, in terms of moderator variable, the influence of privacy concern as a moderating role on the relationship between social commerce and co-creation in product innovation was an important factor. The low-privacy concern was influenced more than the high-privacy concern. Additionally, the total effects of co-creation in product innovation of all factors such as social commerce constructs, relationship quality and social support were displayed. All variables mutually predicted co-creation in product innovation at 62.20 ($R^2 = .622$).

Keywords: Co-creation in product innovation; privacy concern; relationship quality; social commerce constructs; social support

1. INTRODUCTION

As the information and communication technology and social commerce constructs are prevalent now, customers can create the marketing content and information, be the brand ambassadors of any products by themselves, and share comments and experience in using products in a social network (Cayla and Arnould, 2008; Sinha and Kim, 2012). This phenomenon ensures the importance and influence of the internet's user on the product brand in social network platforms such as Facebook, Twitter, and Instagram, etc. (Xiang et al., 2016). Like, comments, and share content are the effective ways to co-create to the product value (Liang and Turban, 2012; Wang and Hajli, 2014) in any places where customers can interact and communicate to each

other within an online community via social commerce. Definitely, the platform in a social community provides the great opportunity for each customer to share and exchange information to others all the time (Naylor et al., 2012; Smith and Anderson, 2016; Hajli, 2012). This may be achieved through ratings, recommendations, referrals and forums in the communities. Furthermore, this activity has significant influence on online business since it triggers in the co-creation brand value derived from the real customer's needs. In addition, this really distinguishes the product from the competitors. The more relationship quality that product has, the stronger social support the product gains, which eventually helps improve co-creation in product innovation (Smit et al., 2007).

However, one of the critical concerns is the privacy concern and the concern that the personal information can be revealed to public without permission. Metzger (2007) suggested that the gender difference affects the privacy concern; females have higher degrees of privacy concerns than males do and females have greater concerns of personal information disclosure before permission than males do. It is also indicated that those who have high-privacy concerns definitely have concerns of information disclosure before permission. On the contrary, those who have low-privacy concerns definitely have more information disclosure. Therefore, it is concluded that the privacy concern can be the potential problem of the intention to co-create in branding.

Social commerce constructs have been identified as an important factor in e-commerce according to recent studies. These studies revealed that the most consumers use the service of peer-to-peer recommendations when purchasing online. According to literature reviews, there is a lack of causal research on the relationship between social commerce constructs and its effects. Moreover, many previous studies concerning the online B2C consumer behaviours have been widely documented. A majority of these studies depict a strong awareness of the following problems; the lack of research information on social platform, social support, relationship quality, and especially privacy concern which plays the vital role to co-create in product innovation (Bojang, 2017; Lee and Kotler, 2012; Moshrefjavadi et al., 2012; Vakeel et al., 2016; Zourikalatehsamad et al., 2015; Zwass, 2003). As a result, to bridge the gap and to gain the advantage from digital marketing into commercial use, the researcher developed a framework to seek for the clarification of research questions by applying social commerce constructs by Hajli (2012), relationship quality by Huang et al. (2014), social support by Lakey and Cohen (2000), privacy concerns by Petronio (2002), and co-creation in product innovation by Nadeem et al. (2020).

In summary, the researcher's questions are as follows: 1) Do social commerce constructs, social support, and relationship quality have a significantly positive affect on co-creation in product innovation? 2) Is privacy concern one of the moderating factors to co-create in product innovation? In addition, the objectives of this study were 1) to study factors of social commerce constructs, social support, and relationship quality affecting the co-creation in product innovation and 2) to examine the privacy concern as moderating variable to co-creation in product innovation.

2. LITERATURE REVIEW AND THEORETICAL FRAMEWORK

2.1 Social commerce constructs

Social commerce constructs (Hajli, 2012; Sheikh et al., 2018) refers to a trade pattern developed among social network thorough the interactive conversation between buyers and buyers and between buyers and sellers via ratings, recommendation and referrals, and forums and communities (Xiang et al., 2016) such as Like, Comment, Share experience in products. These kinds of activities build the stronger reliability in product than the advertisement launched by the entrepreneur (Liang and Turban, 2012; Maia et al., 2017; Sheikh et al., 2018). The social commerce constructs which are a latent variable (ξ) consist of four observable variable (Hajli, 2015) as follows: 1) social network friends who directly recommend products (SC1) 2) social network friends whose friends reliably recommend products (SC2) 3) social network friends who reliably share experience in using products (SC3) and 4) social network friends who create reliable discussion forums (SC4).

2.2 Social support

Social support refers to the help between user and user in social network which consists of the group of people who are willing to provide the assistance and those who receive the help in terms of opinion, comment, and recommendation on products -- basic and update information, and creditability on products (Hajli and Sims, 2015; Tajvidi et al., 2017; Yahia et al., 2018) It is confirmed that the social support from social network friends really increases the reliability on products (Chen and Shen, 2015; Wang and Hajli, 2014). Basically, there are 2 types of social support -- emotional support which refers to a kind support with the people who listen to opinions, sympathize, and take care when any problems occur and information support which

refers to a support with the people who provide the information towards products as needed for making decisions (Leong et al., 2020; Molinillo et al., 2020).

The social support which is a latent variable (η) consists of four observable variables (Chen and Shen, 2015) as follows: 1) social network friends who attentively listen when any problem occurs (SS1), 2) social network friends who provide recommendations and help (SS2), 3) social network friends who provide information until issues are solved (SS3) and 4) being frequently provided the help and recommendations from friends (SS4) (Hajli and Sims, 2015). According to the literature review, the research hypothesis was established as shown below (Maia et al., 2017).

H1: Social commerce construct has effect to the social support.

2.3 Relationship quality

Relationship quality refers to the relationship between buyers and sellers in mutual trust and commitment and satisfaction before and after the transaction (Nadeem et al., 2020; Tajvidi et al., 2017). It is also mentioned that the good relationship quality between buyers and sellers definitely strengthens their business relationship. Moreover, this really helps saving transaction costs and at the same time building the customer retention and engagement (Huang et al., 2014; Narakorn and Seesupan, 2018).

Relationship quality which is a latent variable (η) consists of five observable variables (Huang et al., 2014; Wang and Hajli, 2014) as follows: 1) sellers strongly keep promise (RQ1), 2) buyers satisfy with sellers' coordination (RQ2), 3) buyers believe that sellers have strong service excellence and service mind (RQ3), 4) sellers are always customer-centric and understand each of the customer's needs (RQ4) and 5) sellers run the business fairly (RQ5). According to the previous studies, the researcher proposed the research hypothesis as follows (Huang, et al., 2014; Shi and Chow, 2015; Tajvidi, et al., 2017).

H2: Social support has positive influence on relationship quality.

H3: Social commerce constructs have positive influence on relationship quality.

2.4 Co-creation in product innovation

The concept of co-creation in product innovation by Nadeem et al. (2020) refers to the buyers' intention to propose ideas to sellers as new product development to serve the real customer's needs (Merz et al., 2018; Nadeem et al., 2020; Seesupan and Narakorn, 2018). This can also be the value creation process to customize products which changes the paradigm to the co-creation of entrepreneur and customers (Yi and Gong, 2013; Zwass, 2010). This is the highly effective method since it combines the strength of sellers into creating value to product and relatively build on value-added and higher competitive advantage (Porter and Donthu, 2008; Sorensen and Jensen, 2015; Vargo et al., 2008).

The co-creation in product innovation which is a latent variable (η) consists of four observable variables as follows: 1) buyers co-create with sellers in product innovation (CC1), 2) buyers share experiences in product innovation to friends (CC2), 3) buyers purchase products from the recommendation of social network friends (CC3), and 4) buyers ask for social network friends' opinions before purchasing products (CC4). According to the previous studies, the researcher created the research hypothesis (H4) (Nadeem, et al., 2020) and relationship quality and co-creation in product innovation (H5) (Metzger, 2007; Tajvidi, et al., 2017) as follows.

H4: Social commerce constructs have positive influence on co-creation in product innovation

H5: Relationship quality has positive influence on co-creation in product innovation

2.5 Privacy concern

Privacy concern refers to the status that buyers actually acquire without any invasion of information privacy. The personal information such as name, income, salary, telephone number, credit card number, occupation or bank saving account, shall be disclosed if it is permitted by buyers (Metzger, 2007; Wang and Hajli, 2014). The E-commerce regards privacy concern as a moderator variable whether it has influence on co-creation in product innovation. The moderator variable refers to the one that has influence on the direction and relationship between exogenous construct and endogenous construct in the opposite way. The moderator variable affects the pair of variables in terms of either scale or signs. In marketing, this is vital since this can demonstrate the drastic effect (Baron and Kenny, 1986). According to Petronio (2002), West and Turner (2004), it was found that the people with low-privacy concerns can disclose information to public whereas the people with high-privacy concerns tend to hesitate the information disclosure before permission. According to the previous studies, the researcher created the hypothesis (Jeong and Kim, 2017) as follows:

H6: Privacy concern is a moderator variable to the relation between social commerce constructs and co-creation in product innovation

3. METHODS

The quantitative data were collected by using a questionnaire to validate the hypothesis on online shopping from the sample of 496 participants nationwide.

Participants

The researcher conducted the survey by distributing the questionnaire directly to 496 online customers nationwide. This number of participants followed the SEM method. According to the studies of Hair et al. (2010), they recommended that the optimal number of the sample is 10-20 times of the observable variables, 17 items in this research; consequently, the appropriate sample would be 170-340 participants. In this case, the number of 496 followed the principle. The researcher also applied the two-stage stratified sampling scheme and simple random sampling to both Metropolitan Bangkok and four main regions-the Middle, the North, the Northeastern, and the South.

Data Collection

In this study, a questionnaire was developed referring to conceptual framework, theories, and related research to align with research objectives and cover the nationwide online users who were the target group. Accordingly, the questionnaire was verified in terms of content validity by index of item objective congruence (IOC) and Cronbach's Alpha Coefficient (α) by three professionals, and tried out with 30 non-target grouped population. The Cronbach's Alpha Coefficient (α) of all latent variables was more than .70 (.812-.841) and the corrected item-total correlation was more than .30 (Field, 2005). According to confirmatory factor analysis (CFA), convergent validity, and discriminant validity, it was found that the factor loading (λ) of each observable variable should exceed .50 and average variance extracted (AVE) of each latent variable should exceed .50 (see Table 1).

Data Analysis

The researcher collected the data from the 496 online users and analysed in terms of descriptive statistics (i.e., frequency, percentage) and measurement model, structural model, and SEM by AMOS in order to test research hypotheses. In addition, the researcher applied the Multi-Group Analysis for moderator variables which explore the significant findings and meaningful impacts.

Table 1: Content Validity

Constructs/Scale	Corrected Item-Total Correlation	Cronbach's Alpha (α)	Factor Loading (λ)	AVE	CR
Social commerce constructs					
1. Social network friends directly recommend products (SC1)	.673	.825	.757	.540	.824
2. Social network friends who reliably recommend the product (SC2)	.648		.746		
3. Social network friends who reliably share experience in using product (SC3)	.653		.728		
4. Social network friends who create the reliable discussion forum (SC4)	.628		.707		
Social support		.841		.654	.883
1. Social network friends attentively listen when any problem occurs (SS1)	.604		.873		
2. Social network friends provide recommendation and help (SS2)	.704		.795		
3. Social network friends provide information until issues solved (SS3)	.680		.764		
4. Being frequently provided the help and recommendation from social network friends (SS4)	.713		.800		
Relationship quality		.812		.541	.852
1. Sellers strongly keep promise (RQ1)	.618		.709		
2. Buyers satisfy with sellers' coordination (RQ2)	.591		.684		
3. Buyers believe that sellers have strong service excellence and service mind (RQ3)	.660		.758		
4. Sellers are always customer-centric and understands each of customer's needs (RQ4)	.558		.873		
5. Sellers fairly run the business (RQ5)	.572		.630		
Co-creation in product innovation		.824		.527	.815
1. Buyers co-create with sellers in product innovation (CC1)	.650		.774		

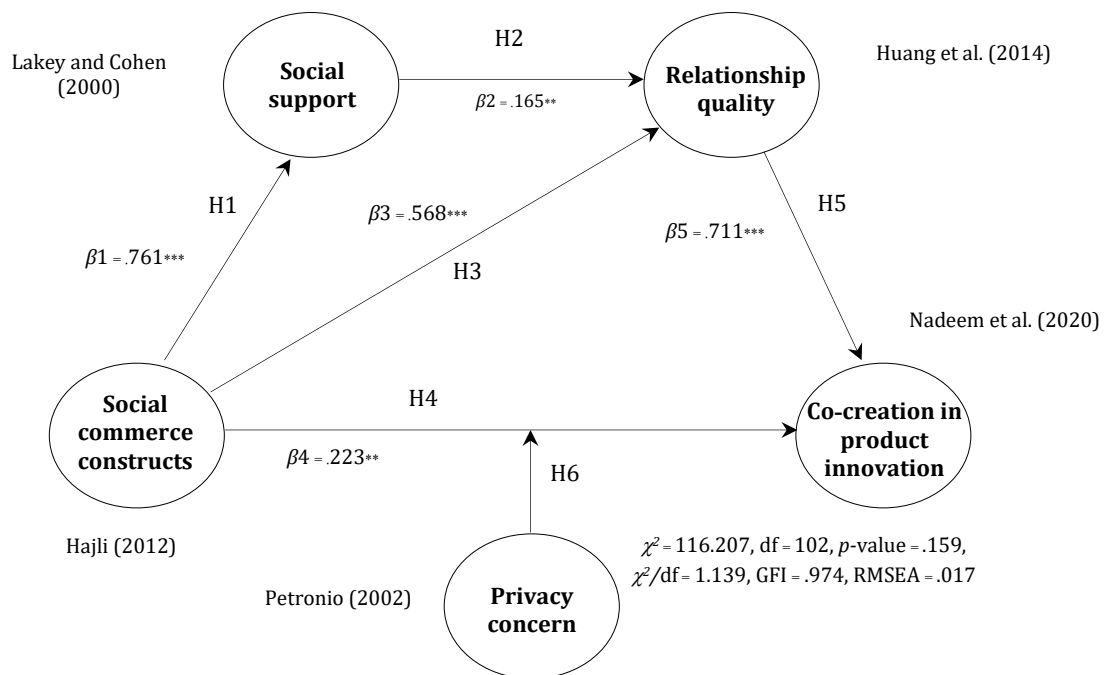
Table 1: Content Validity (Continued)

Constructs/Scale	Corrected Item-Total Correlation	Cronbach's Alpha (α)	Factor Loading (λ)	AVE	CR
2. Buyers share experiences in product innovation to social network friends (CC2)	.674		.795		
3. Buyers purchase product by recommendation from social network friends (CC3)	.658		.691		
4. Buyers ask for social network friends' opinion before purchasing product (CC4)	.623		.631		

4. RESULTS

Descriptive Statistic: According to the survey of 496 participants, the results showed that, in terms of the personal data about the gender, it was found that most respondents were female. As regards to the age, it had shown that respondents were 19 years old on average. As for the education level, most respondents were people with a master degree, and under bachelor degree, respectively. There appears to be a contrast between ages of those with a degree. In relation to the income, most respondents had a monthly income from \$315 to \$630, lower than \$315, and from \$631 to \$945, respectively. As for occupation, most respondents were students/undergraduates, followed by civil officers/governmental officers, and entrepreneurs, respectively.

According to the SEM analysis by AMOS, it was shown that the model of co-creation in product innovation (post-model adjustment) consisted of social commerce constructs, social support, and relationship quality was correlated with the empirical data at a good level ($\chi^2 = 116.207$, $df = 102$, p -value = .159, $\chi^2/df = 1.139$, GFI = .974, RMSEA = .017). Therefore, the model is aligned to the model specified by the theoretical model (Figure 1).

**Figure 1:** Model of Privacy Concern

The findings for hypothesis testing were as follows: H1 - social commerce had influence on social support ($\beta = .761$, t -value = 11.578, $p < .001$); H2- social support had influence on relationship quality ($\beta = .165$, t -value = 2.974, $p < .01$); H3 – social commerce had influence on relationship ($\beta = .568$, t -value = 8.233, $p < .001$); H4 – social commerce had influence on co-creation in product innovation ($\beta = .223$, t -value = 2.332, $p < .01$); and H5 – relationship quality had influence on co-creation in product innovation ($\beta = .711$, t -value = 5.892, $p < .001$) as illustrated in Table 2.

Table 2: Hypothesis Testing Results

	Path Analysis	β	t-value	Result
1	Social commerce → Social support	.761	11.578***	Supported
2	Social support → Relationship quality	.165	2.974**	Supported
3	Social commerce → Relationship quality	.568	8.233***	Supported
4	Social commerce → co-creation in product innovation	.223	2.600**	Supported
5	Relationship quality → co-creation in product innovation	.711	5.892***	Supported

Remark: *** $p < 0.001$; ** $p < 0.01$; $p < 0.05$

Result of analysis on privacy concerns as moderator variable by Multi-Group Analysis between the people with low privacy concerns and those with high privacy concerns: According to H6, it was found that the privacy concern is the moderator variable to co-create in product innovation at .05 of the level of statistical significance. The people with low privacy concerns had more co-creation in product innovation than those with high privacy concerns ($\beta_6 = .218$, $t\text{-value} = 1.961$, $p < .05$) as shown in Table 3.

Table 3: The Comparison of Multi-Groups Between the People with Low-Privacy Concerns (N=388) and Those with High-Privacy Concerns (N=108)

Path analysis		Low			High		
		β	t-value	Result	β	t-value	Result
H6	Social commerce constructs → co-creation in product innovation	.218	1.961*	Supported	.149	.381	Not support

Remark: * $p < .05$ and $1.96 \leq t\text{-value} < 2.576$

Table 4: Testing of Direct Effect (DE), Indirect Effect (IE), and Total Effect (TE)

Latent Variable	R ²	Effect	Antecedents		
			Social commerce constructs	Social support	Relationship quality
Social support	.499	DE	.761	.000	.000
		IE	.000	.000	.000
		TE	.761	.000	.000
Relationship quality	.672	DE	.568	.761	.000
		IE	.126	.000	.000
		TE	.694	.165	.000
Co-creation in product innovation	.622	DE	.223	.000	.711
		IE	.494	.117	.000
		TE	.717	.117	.711

According to Table 4, the results showed that the total effect of co-creation in product innovation is .717, relationship quality (.711) and social support (.117), respectively. All variables mutually predicted co-creation in product innovation at 62.20 percent ($R^2 = .622$).

5. DISCUSSION

The 6 hypotheses can be discussed as follows:

1. Social commerce constructs have positive influence on the social support. The results showed that the social commerce constructs had positive influence on the social support. This is aligned with studies by Hajli (2012), Lakey and Cohen (2000), Zhang et al. (2016) which proposed that the social commerce constructs lead to the social support from social network friends. In addition, this research showed that the direct product recommendation and the direct and reliable experience in product always gained the support and recommendation from social network friends in return.

2. Social support has positive effects on relationship quality. According to the research findings, it was found that the social support had positive effects on relationship quality. This is aligned with studies by Lakey and Cohen (2000) who suggested that support from social network friends definitely strengthen the relationship quality. Moreover, this result indicated that the continuous social support in terms of information and recommendation influenced the strong relationship quality.

3. Social commerce constructs have positive effects on relationship quality. This study argued that social commerce constructs had positive effect relationship quality. This is aligned with the studies by Hajli (2015) which indicated that social commerce constructs e.g. recommendation by social network friends and product rating positively affected the relationship quality. Furthermore, in this research, it was found that the

direct product recommendation and the reliable experience sharing in products really helped the relationship quality between buyers and sellers.

4. Social commerce constructs have positive effects on co-creation in product innovation. The results revealed that the social commerce constructs had positive influence on co-creation in product innovation. This result is aligned with studies by Hajli (2012), and Seesupan and Narakorn (2018) which indicated that social commerce constructs e.g. recommendation by social network friends and product rating positively affected co-creation in product innovation. Additionally, the results showed that the direct product recommendation and the reliable experience sharing in product really led to the intention to co-create in new products.

5. Relationship quality has positive effects on co-creation in product innovation. The results indicated that the relationship quality had direct influence on co-creation in product innovation. This is aligned with what Nadeem et al. (2020) argued that the good relationship quality between buyers and sellers which had promise and trust with each other definitely led to co-creation in product innovation. Furthermore, the results revealed that the sellers who had strong service excellence and kept promise to buyers affected co-creation in product innovation.

6. Privacy concern is a moderator variable to the relation between social commerce constructs and the intention to co-create in branding. The findings showed that privacy concern was a moderator variable to the relation between social commerce constructs and co-creation in product innovation. This is aligned with studies by Petronio (2002), and Wang and Hajli (2014) which indicated that the privacy concern is a moderator variable to the relation between social commerce constructs and co-creation in product innovation. Furthermore, this research proposed that the people with low-privacy concerns had more co-creation in product innovation than those with high-privacy concerns.

6. RECOMMENDATION FOR ONLINE BUSINESS ENTREPRENEUR

The customer's co-creation to new product development is the strategy that distinguishes the product from competitors. Also, the product is more value-added and specific to customer's needs (Nadeem et al., 2020). This can be done by social commerce constructs such as product recommendation by customers, rating and reviews, forums and communities to the customers with low privacy concerns who definitely accept the information disclosure.

7. RECOMMENDATION TO THE NATIONAL POLICY MAKERS

As for the government sectors: it is advisable that 1) the infrastructure for internet technology should be developed for the national communication and network, E-commerce, and social interactivity which can help entrepreneurs to serve the dynamic customer needs. Also, 2) the governmental agency should be established to monitor the information validity and privacy to facilitate the users in Thailand effectively.

In addition, as for the private sectors: it is suggested that 1) the entrepreneurs who have shops as the only channel should extend themselves to the online channels to reach the target customers anywhere and anytime. This can build the customer loyalty in the long-term. Furthermore, 2) the entrepreneurs should integrate knowledge and technology innovation with a government agency to gain more competitive advantage.

Further researchers could apply this research framework to small and medium sized entrepreneurs, who directly sell products and services to consumers (B2C) through click-and-click electronic only, in order to confirm the accuracy of the research.

8. LIMITATIONS

It is suggested that the researcher should apply the theory concept of co-creation in product innovation to examine with actual business to validate the accuracy of this model. All the variables of this research can be used as predictors at 62.20 percent, whereas the other 37.80 percent can be from other factors. As a result, it is recommendable for other researchers to test other constructs e.g. ease of use, usefulness, or marketing capability, which might influence the co-creation in product innovation.

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