

Social commerce: A systematic review and data synthesis

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ARTICLE INFO

Keywords:

E-commerce
Literature survey
Research directions
Research synthesis
Social commerce
Social media
Taxonomy
Web 2.0

ABSTRACT

Social commerce contributes multi-disciplinary knowledge concerning psychology, sociology, computer science, and marketing in business. Its development complicated due to various fields involved that range from arithmetic patterns to marketing management. In this study, we conduct a systematic review of social commerce research by synthesizing 407 papers from academic publications between 2006 and 2017. This study focuses on three overarching questions: (1) What is current social commerce research? (2) Which research methods have been used in social commerce? (3) What are some potential areas for social commerce research in the future? We delineate the various facets of social commerce – definitions, differences, types and technologies, challenges and benefits, models and frameworks – in an all-encompassing taxonomy that enables us to answering the first question. To solve the second question, we applied different methods and techniques. Finally, we offer guidelines on the directions for future research, and intend that this work will serve as a roadmap for understanding the research literature within the field of social commerce.

1. Introduction

Social commerce developed in tandem with the e-commerce evolution. It was introduced by Yahoo in 2005, and quickly became a means for adding value to commercial services through the use of customer engagement by major web companies, such as Amazon, Groupon and eBay (Wang and Zhang, 2012). In 2006, the first academic article appeared that explicitly used the term *social commerce*. In practice, the formal launch of social commerce was in 2009 when *Flowers.com* opened the first Facebook store (Busalim and Hussin, 2016). Statista (2017) reported that online orders referred through social media had an average value of US\$89 in the second quarter of 2016. By 2019, enterprise social networks are predicted to generate more than US\$3 billion in revenue worldwide (Statista, 2016).

Despite rapid growth and important influence of social commerce, academic studies of these phenomena are in an early stage (Huang and Benyoucef, 2014). Social commerce research needs a systematic way to classify the various contributions. Efforts to synthesize the social commerce research in an integrated broad-based body of knowledge have been limited, however (Shanmugam and Jusoh, 2014). To fill the gap, we synthesized current research on social commerce as a basis for creating a theory-based taxonomy in several related areas and propose a research agenda. We also propose a systematic method by adopting a synthesis and a taxonomy appropriate to study social commerce (Koufteros, 2015).

A synthesis with a wide-angled lens helped us to establish a better

understanding of social commerce. A synthesis from as many fields as possible can clarify issues and pinpoint the position of each domain on an integrative map of social commerce (Williams, 2014). Therefore, this article contributes to the social commerce literature by synthesizing past research to provide a comprehensive and structured list of elements: research theme, theories, research methods, and outcome measures.

A taxonomy is not only a neat way of leading to knowledge building and expansion, but is also a tool for dynamic and systematic storage, recall, sorting, and statistical analyses. It identifies gaps, current theoretical developments, and potential applications for existing theory (Eksioglu et al., 2009). There is thus a need for a social commerce taxonomy to be developed, employing a systematic approach, with a theoretical grounding that can be empirically tested for practical applications (Emamjome et al., 2014). Therefore, we contribute to research by developing the social commerce taxonomy with different facets: definition, types and technologies, challenges and benefits, models, frameworks, and the differences from other traditional concepts. These can be used by both researchers and practitioners.

Accordingly, the primary objectives are:

- (1) to synthesize the relevant articles from multiple elements that generate an overall understanding of social commerce; and
- (2) to present a taxonomy of the literature from several fields of study in order to identify the major knowledge gaps in the area of social commerce.

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To achieve the main objectives of this study, we propose three key research questions (RQs). Answering these questions can help the reader understand social commerce including its definition, types and technologies, the influence (challenges and benefits), models, frameworks, and the differences from other traditional concepts, explain research methods and mathematical techniques that have been used in social commerce, and detail potential areas for future research.

This research serves as a roadmap for research exploration on social commerce. It aims to improve the understanding of the state of the art of social commerce-related phenomena and to provide guidance to social commerce practice. This systematic review may offer directions for future research that will stimulate further interest in researchers and practitioners related to this emerging area.

2. Identification and collection of the literature

When employing a systematic and structured approach to identify relevant articles for literature reviews, two methods to collect academic publications have been used. One method was applied to the article which reviews the literature on *electronic word of mouth* (e-WOM) communication (Cheung and Thadani, 2012). The authors first selected a few academic databases using keywords. Then, they checked important journals to ensure there were no missing relevant articles. The other method is the conventional literature review approach to cross-check and validate the relevance of the initial set of articles (Webster and Watson, 2002).

2.1. Data collection

We searched for literature published between 2006 and 2017. The collected articles focused on academic contributions, such as books, theses, magazines, conference proceedings, as well as academic journals. We retrieved them from the following databases: Emerald, Elsevier, Wiley, Springer, EBSCOhost, Scopus, ScienceDirect, Inderscience, Google Scholar, IEEE Xplore, ProQuest, and Sage. Initially, the digital libraries, Web of Knowledge, Ingenio (university digital libraries), ACM Digital Library, and AIS Electronic Library, were used to find articles dealing with different aspects of social commerce. In this way, our literature search covered a broad range of academic publications. We retrieved those publications that contained the keywords “social commerce” and “s-commerce.”

To select all relevant articles, we manually examined each contribution regarding its title, abstract, subject terms where applicable, and full text with respect to its relevance for our research questions. The collected data were exported and parsed into a relational database for analysis. After removing duplicates, we obtained 407 unique records in total. Fig. 1 depicts the frequencies and trends of publications relating to social commerce.

After 2006, the term *social commerce* started to appear in publications (Rubel, 2006). As shown in the figure, the analysis of the overall publications revealed an upward trend from 2006 to 2017. Based on this increasing trend, the interest of the academic community in social commerce topics seems to be continuing to grow, contributing to its maturity and development.

2.2. Search process

The process involved a manual search of books, theses, magazines, conference proceedings and journal papers since 2006. The selected journals and conferences are shown in Table 1. The standard academic outlets of top journals, conferences were selected because they were known to be related to social commerce.

The table lists the main sources that have published two or more papers. By these procedures, a total of 155 journals and 69 conferences were selected for this research study. Among the journal publications, the journal containing most of the articles is the International Journal

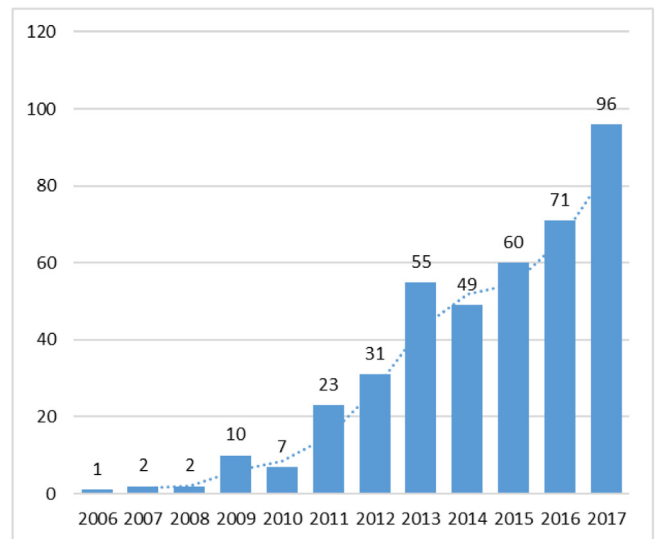


Fig. 1. Social commerce contribution trend from 2006 to 2017.

Table 1

Top journals, conferences related to social commerce publications.

Journal/Conference	Number
Proceedings of Pacific Asia Conference on Information Systems	20
Proceedings of Americas Conference on Information Systems	16
International Journal of Information Management	16
Electronic Commerce Research and Applications	14
Proceedings of Annual Hawaii International Conference on System Sciences	10
Proceedings of International Conference on Information Systems	10
Proceedings of International Conference on Electronic Commerce	8
International Journal of Electronic Commerce	6
Technological Forecasting and Social Change	6
Decision Support Systems	6
Computers in Human Behavior	5
Proceedings of Australasian Conference on Information Systems	5
Information Journal	4
Internet Research	4
Information and Management	4
Journal of Business Research	4
Proceedings of European Conference on Information Systems	3
Proceedings of Wuhan International Conference on e-Business	3
Proceedings of Special Interest Group on Human-Computer Interaction	3
Digital Intelligence Today	3
Journal of Theoretical and Applied Electronic Commerce Research	3
Information Sciences	3

of Information Management (16 articles), following by Electronic Commerce Research and Applications (14 papers), 6 articles in the International Journal of Electronic Commerce, and 6 papers in Technological Forecasting and Social Change, as well as Decision Support Systems and the Pacific Asia Conference on Information Systems ($n = 20$) is very popular among these conferences referring social commerce, followed by Americas Conference on Information Systems ($n = 16$), Annual Hawaii International Conference on System Sciences ($n = 10$) and International Conference on Information Systems ($n = 10$).

2.3. Inclusion and exclusion criteria

The choice of these keywords *social commerce* and *s-commerce*, was to highlight publications of direct relevance to social commerce. However, other traditional social commerce-related terms (e.g., *social shopping*, *collaborative commerce*, *c-commerce*, *collaborative shopping* and *social media marketing*) were exclusive. In addition, we only considered those publication outlets that have the full body of their text in English. Duplicate reports of the same study were excluded, while several

reports of a study exist in different journals were included in the review.

3. Data synthesis

Synthesis can pinpoint the position of each issue on an integrative map of social commerce (Williams, 2014). The objective of this stage is to design extraction forms to accurately record the information obtained from selected papers. We adopted Mendeley and Microsoft Excel spreadsheets to integrate the related data into several elements (research theme, theories, research methods, and outcome measures), which are from social commerce research framework proposed by Liang and Turban (2011). Research methods will be discussed in detail later. We will focus on research theme, theories, and outcome measures in the data synthesis process first.

3.1. Research themes

A research theme, the central issue that each study intends to investigate, is conducive to understanding the knowledge landscape of social commerce (Liang and Turban, 2011). In this study, the themes are: *user behavior*, *firm performance*, *network analysis*, *adoption strategy*, *business model*, *enterprise strategies*, *website design*, *social process*, *security and privacy*. In addition, we added the sub-category *overview* to be used for articles that do not relate to any specific research theme but aim at providing an overview. Fig. 2 shows an overview of the research themes by categorizing 407 papers.

The dominant theme is *user behavior* with 199 articles which cover 48.9% of past social commerce studies. The second theme is *overview*, where 11.6% of the studies classified under this theme. In addition to the user-centric perspective, around 40% of all research focuses on business aspects from a company perspective; these encompass the research themes: *business model* (11.1%), *adoption strategy* (7.1%), *enterprise strategies* (5.9%), *web site design* (4.4%), *firm performance* (3.0%) and *network analysis* (3.2%). The remaining two themes are *security and privacy policy* (2.70%) and *social process* (2.5%) with 11 papers and 10 papers, respectively.

3.2. Underlying theories

To understand consumer behavior and predict the outcomes, theories related to social interaction and social process have been adopted in social commerce research (Liang and Turban, 2011), as shown in Fig. 3. The theoretical foundations for these studies contain: *communication*, *motivation*, *social bonding*, *social capital*, *social exchange*, *social identity*, *social influence*, *social interaction*, *social learning*, *social support*, and *trust*.

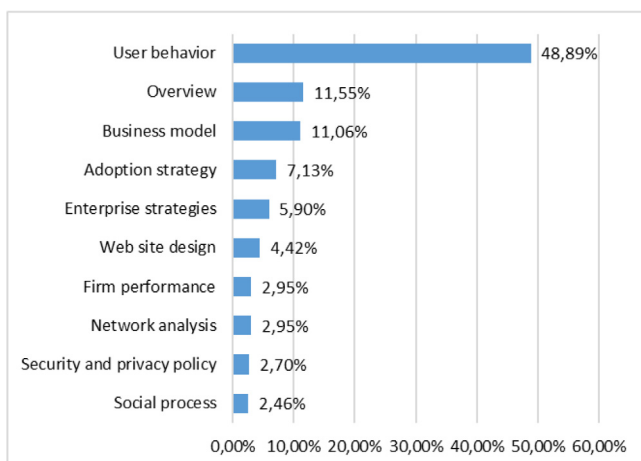


Fig. 2. Distribution of social commerce articles by research theme.

Since the number the eventual results studies intend to explore. It usually depends on the research themes in a research model (Liang and Turban, 2011). Thus, we analyzed the outcome measures with respect to the research themes shown in Fig. 4. It does not include the theme *use behavior* because it refers to 199 papers which makes other themes bars too small to see. Therefore, we introduce outcome measures results corresponding the theme *use behavior* by words: *behavioral intention* with 125 papers; *actual behavior* with 25 articles; *consumer attitude* with 15 articles; *user perception* with 8 articles; *mixture* with 6 articles; *customer satisfaction* with 5 articles; *customer loyalty* with 5 articles; *click-through rate* with 4 articles; *new products/services* with 2 articles; *web site usage* with 2 articles; *financial gains and market growth* with 1 article. From the figure, we can find the relation between research themes and outcomes measures. For instances, *behavioral intention* (125 papers) is the most popular outcome measure adopted in *user behavior*. *Web site usage* (8 papers) and *click-through rate* (4 papers) often target in *web site design*. Also, *consumer attitudes* (15 papers) are usually the outcomes for investigating the influence of *security and privacy policy*.

4. Research questions results

4.1. What are the current social commerce studies? (RQ1)

The complications of the IS field often lend itself to taxonomies, which provide ways to understand fundamental research foundations in the form of a common domain language (Nickerson et al., 2010). A taxonomy provides brief descriptions and clusters them into categories without losing the main information, and has been developed in the information systems discipline to study emerging fields (Shang et al., 2015). For example, to develop theories in the social media environment, Emamjome et al. (2014) proposed a taxonomy of social media information systems and in relation to the business use of social media.

To help readers systematically and comprehensively understand current situation of social commerce study, we use a systematic method for developing a taxonomy that delineates social commerce's facets (*definitions, differences, types and technologies, challenges and benefits, models and frameworks*) shown in Fig. 5.

Since the term social commerce is still relatively new, it is not always used with consistency. Some refer to it as a short form of s-commerce, while others use such terms as social shopping, collaborative commerce and shopping, and social media marketing interchangeably (Curry and Zhang, 2013). As social commerce involves multiple disciplines, a variety of definitions is proposed from different perspectives. We provide a list of different definitions of social commerce found in the literature. (See Appendix 1.)

In sum, most definitions refer to four components: *social media* (e.g., social networking sites); *social activities* like social interactions, word-of-mouth and user generated content; *e-commerce*; and *Web 2.0*. There are three main streams of looking at social commerce: (1) It has two elements, for instance, social commerce is generally seen as the fusion of social media with e-commerce (e.g., Hsiao et al., 2010; Kim and Park, 2013; Wang and Zhang, 2012). (2) It refers to three dimensions, including authors who look at social commerce as a subset of e-commerce using social media to facilitate social interactions and enhance the online shopping experience (Marsden, 2010; Marsden and Chaney, 2012; Stephen and Toubia, 2010). (3) Social commerce also involves four components, for example, scholars describe social commerce as Internet-based commercial application that makes use of Web 2.0 technologies and social media, and it supports user-created content and social interactions (e.g., Esmaeili et al., 2015; Huang and Benyoucef, 2013). In addition, Cohen (2011) has collected 19 different definitions of social commerce from experts who work for social commerce area.

After analyzing these definitions, we found there are few researchers who described social commerce covering the range of four dimensions. In this study, we attempt to fill the gap by defining social

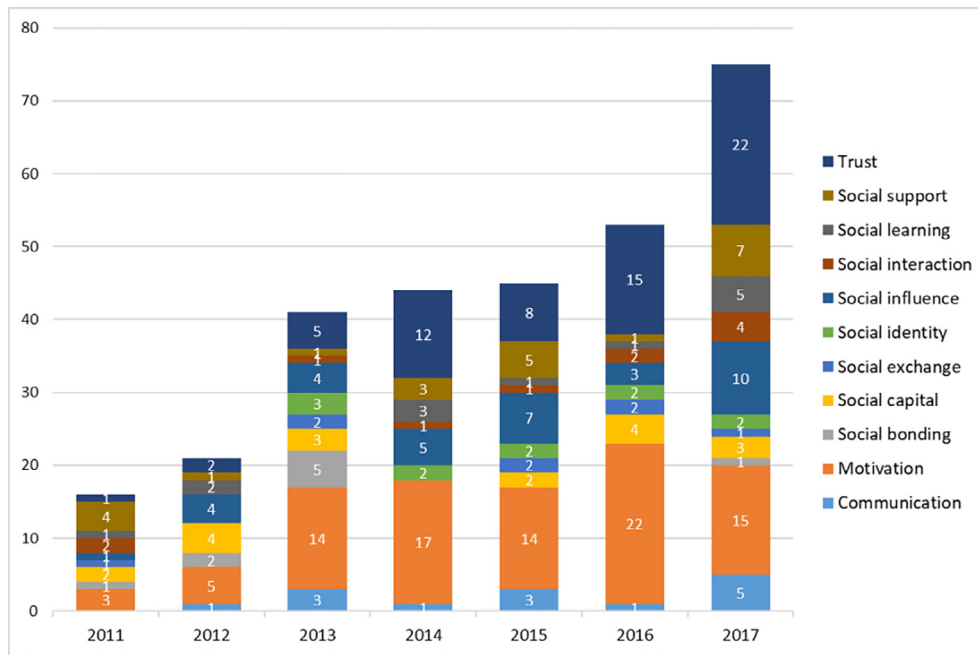


Fig. 3. The number of articles by underlying theories over time.

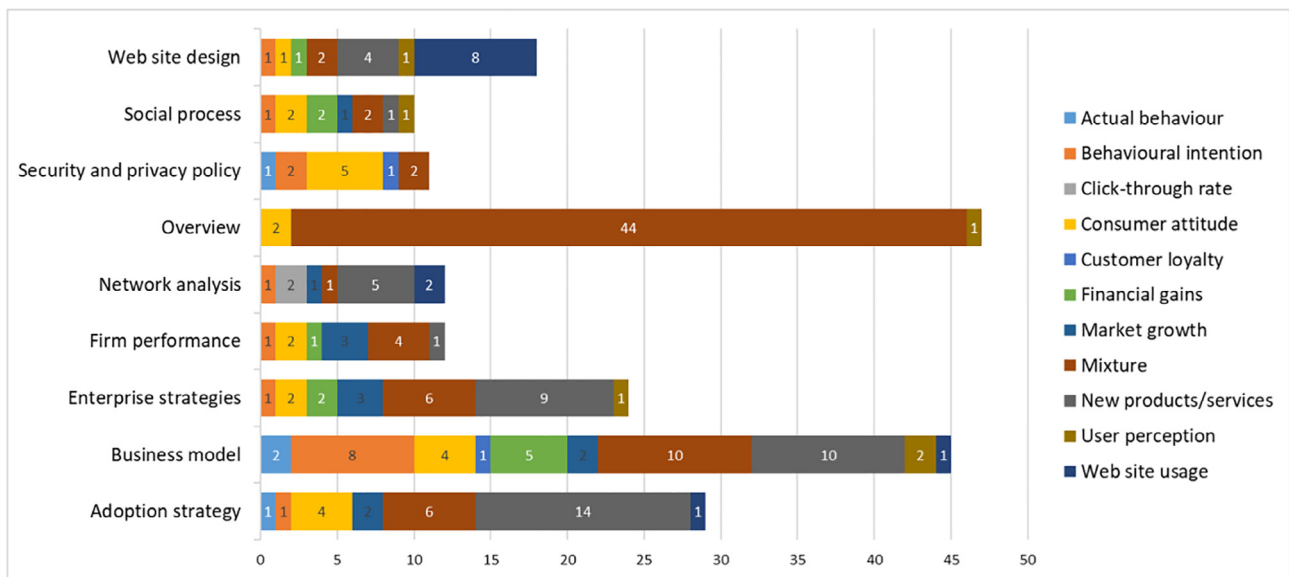


Fig. 4. Distribution of outcome measures by research theme.

commerce presented below: *social commerce* is a new business model of e-commerce, which makes use of web 2.0 technologies and social media to support social-related exchange activities (Han and Trimi, 2018).

4.1.1.1. Differences: Social shopping and e-commerce

According to Rad and Benyoucef (2010), when contrasting to social shopping and e-commerce, we believe that social commerce differs in scope, business goals, customer connection, and system interaction.

4.1.1.1.1. Differences between social commerce and social shopping. In research, the term *social shopping* has been used interchangeably with *social commerce* or considered as a subset of social commerce (Grange and Benbasat, 2013). Social shopping is an approach to e-commerce based on social networks, where the consumers’ activities are influenced by their friends (Santos and Gonçalves, 2012). Social commerce offers networks for both sellers and buyers, as well as the

platforms where shopping activities and the related social interactions take place. Thus, social commerce should be considered as being broader than social shopping (Curty and Zhang, 2013).

In detail, some use the terms *social shopping* and *social commerce* interchangeably (Wang and Zhang, 2012) or social shopping as one aspect of social commerce (Marsden, 2010), others see them as distinct terms (Stephen and Toubia, 2010). Stephen and Toubia (2010) share the opinion that social shopping only connects customers that generate content (e.g., by writing product reviews on websites such as *Epinions.com* and *Yelp.com*), while on social commerce sites, consumers can act as sellers or curators of online stores (e.g., eBay and *Squidoo.com*). Also, Shen (2012) stated that the two terms are slightly different, even though they share the same domain: social commerce is more meaningful for the strategic decisions of an online vendor. However, it is more commonly accepted that social shopping is a subset of social commerce (Topaloglu, 2013).

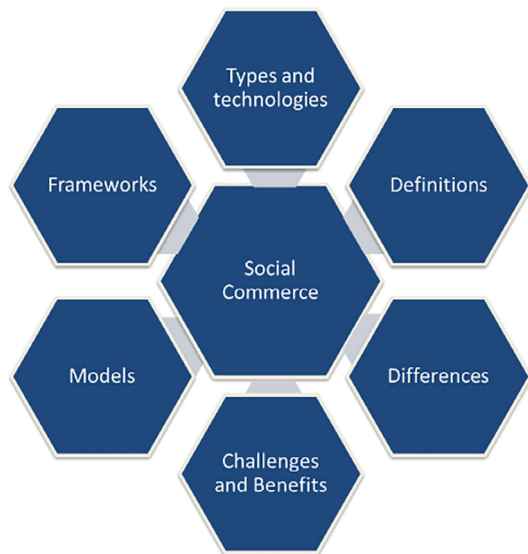


Fig. 5. Social Commerce Definitions.

4.1.1.2. *Differences between social commerce and e-commerce.* Beyond the discussion of the differences in similar terms used within the field of social commerce, there is a common sense view that social commerce is from e-commerce (Zhong, 2012). Some researchers refer to social commerce as either a subset of e-commerce (e.g., Kim and Park, 2013; H. Li et al., 2014; Ling and Husain, 2013; Salvatori and Marcantoni, 2015a,b) or an evolution or innovation related to e-commerce (e.g., Chen et al., 2014; Huang and Benyoucef, 2013; Kucukcay, 2014; Rad and Benyoucef, 2010; Salvatori and Marcantoni, 2015b).

The differences between e-commerce and social commerce can be highlighted in terms of business goals, customer connection, and system interaction (Alshibly, 2014; Huang and Benyoucef, 2013). Baghdadi (2013) presented social commerce as differing from e-commerce in many aspects, including the business model, value creation, customer connection and communication, system interaction, design, and technology platforms. Similarly, but more specifically, Lee et al. (2012) pointed out the differences from aspects of the core concept, change motive, rationality criteria, commerce platform, transaction mechanism and principal agent.

The biggest difference between social commerce and e-commerce is that in social commerce the consumers can naturally change their roles from consumers to be sellers (Jang et al., 2013). Social commerce emphasizes social activity such as collaborations of the online shopping experience and supporting social interactions (Liang and Turban, 2011), while traditional e-commerce targets maximization of efficiency by providing superior features such as product vividness and personalized shopping experiences (Huang and Benyoucef, 2013).

As for the customer connection, in the e-commerce context, customers are always independent of others and interact individually (Kim and Srivastava, 2007). Social commerce, however, involves online communities that support social connection to enhance conversation between customers. Regarding system interaction, e-commerce in its conventional mode usually affords one-way browsing, where information from customers is rarely if ever sent back to the business or shared among customers, while social commerce provides some social and interactive applications that let customers express their opinions and also share useful information with others (customers and businesses) (Gibreel et al., 2015).

4.1.2. Social commerce types and technologies

4.1.2.1. *Social commerce types.* At present, there is no clear cut way to categorize the types of social commerce (Lee et al., 2012). Table 2 gives

an overview of social commerce types that have frequently been mentioned in the research-oriented and practitioner-oriented literature. Lee et al. (2012) have identified six types of social commerce: *Flash Sale*, *Group Purchase*, *Social Shopping*, *Social Shopping Apps*, *Purchase Sharing* and *Personal Shopper*. Similarly, based on the categorization of six types, some authors divide social commerce into a different number of types (Indvik, 2013; Jang et al., 2013; Kim et al., 2014; Lee, 2015).

Almahdi et al. (2015) have used the theories of interactivity and social transparency to come up with a preliminary typology of social commerce including three main clusters: low in both interactivity and social transparency; high in interactivity and low in social transparency; high in both interactivity and social transparency.

In Asia, it is very common that social commerce properties are divided into three types. The first type is *social link commerce*; the second type is *communal purchase commerce*; the third type is *online-offline linkage commerce* (Hwang et al., 2014; Kim, 2015).

4.1.2.2. *Social commerce technologies.* Technologies are perceived as one of the central initiatives of building social commerce. Furthermore, it is emphasized that social commerce is enabled and usually even driven by technologies. Baghdadi (2013) referred technologies such as Web 2.0, cloud computing, and *service-oriented architecture* (SOA) for social commerce. Specifically, he used *Enterprise Social Interaction Manager* (ESIM) to realize social interactions (Baghdadi, 2013). Later, Baghdadi (2016) proposed a comprehensive framework to shape social commerce from both business and IT perspectives. Technologies for building social commerce infrastructures and platform are: Web 2.0, cloud computing, SOA, big data, mobile computing, positioning systems.

Friedrich et al. (2015) defined a social commerce technology to represent a class of functionally similar software products that support social commerce. They also listed the social commerce technologies that have frequently been mentioned in research-oriented and practitioner-oriented literature: activity/news feeds, ask a friend/expert tools, co-browsing/co-shopping systems, collaboration systems (e.g., blogs, micro-blogs, wikis), communication systems (e.g., text, audio, video chat), community systems (e.g., discussion boards, forums), group buying systems, like/share/follow buttons, rating and review systems, social bookmarking systems (e.g., favorites, tags, wish lists), social login tools (login and connect with social network profile), and social recommendation systems (Friedrich et al., 2015). Also, Curty and Zhang (2013) examined website technical features to depict the transformation of e-commerce into social commerce. They identified and classified a total of 174 emerging technical features.

4.1.3. Challenges versus benefits

Although social commerce presents many benefits for organizations, its implementation may involve some potential risks and possibly complex problems.

4.1.3.1. *Challenges.* The application has shown many challenges for building social commerce, from integrating with an existing social website with huge volumes of interactions and contents, to collaboration between different types of participants (Lai, 2010).

- *Control over the huge data and system.* Statista's portal provides information on the worldwide popular networks since November 2015. For instance, Facebook was the most popular social network which was first to surpass 1 billion registered accounts (about 1.55 billion today), and Instagram had over 400 million active accounts every month. In addition, it is estimated that the total number of social network users will reach around 2.5 billion by 2018 (Baghdadi, 2016).
- *Trust.* Once users register, their personal profiles and demographic information will be owned by the social networking sites. These data

Table 2
Social commerce types.

Types	Definitions	Examples
Flash sale	Products are sold online offering of high discounts within a limited time.	“Vente-Privée” is a private shopping site which provides a maximum of 70% discount, and the sales period for certain products is 2–4 days. https://secure.uk.vente-privée.com/authentication/portal/EN
Group purchase	A discounted product or service becomes available only if a certain number of people sign up for the offer within a limited time.	“Groupon” https://www.groupon.co.uk/
Social Shopping	It allows users to share information among consumers in online shopping sites.	“Polyvore” plays the role of ‘portal’ that provides a variety of information for fashion shoppers. http://www.polyvore.com/
Social Shopping Apps	Consumers can share their shopping experience from online to offline through these apps.	“Shopkick” is an app which rewards consumers “kick” when they visit stores or scan products barcodes. These kicks can be exchanged with the gift cards. https://www.shopkick.com/
Purchase Sharing	By recording consumers’ purchase information through credit card usage, it provides the information to businesses with an analyzed marketing tool and the purchasing consumers with monetary rewards.	“Upserve” is a service that sells payments, analytics, and marketing tools to local merchants. https://upserve.com/
Sharing economy	It allows individuals to exchange goods and services directly.	Owners rent out personal assets that they are not using, including cars, housing, and household items.
Social network platform sales	Users can directly purchase products on social networking sites such as Facebook.	“Buy it” button will be used by Pinterest https://about.pinterest.com/es/buy-it
Participatory commerce	Consumers become active participants in the production process, working collaboratively to design products.	Nike now allows consumers to design their own shoes.

can be used for business purposes (e.g., analyzing these data to form effective marketing strategies). In order to win customers’ trust, companies have responsibilities to maintain the security of users’ information (Farivar et al., 2016).

- **Integration.** As an application of social commerce, it is a challenging target to add enterprise social interactions to the existing system such as content management, security, performance, interoperability, and participant support (Tian et al., 2016).
- **Control over user-generated content.** consumers’ reviews on products have some influences on other consumers’ decision-making process. If there are positive comments from consumers, it will help the company to keep its reputation. But if previous users posted too many complaints, it will ruin the company’s brand influence (Janze and Siering, 2015).
- **Fierce competition.** While some social commerce activities, such as opening a page on Facebook is not expensive, easy entry into social commerce may lead to fierce competition in this emerging platform (Chen et al., 2016).
- **Intellectual property.** Among the user-generated content, one company might transform certain ideas into business operations. This may, in turn, help the company to generate higher income, reduce costs and improve customer satisfaction. For instance, IBM’s IdeaJam software offers a solution to collect customer ideas. While it is beneficial to the company, but copyright issues arise with who is the rightful owner of the idea-intellectual property (Turban et al., 2010).
- **Difficulty in measuring financial performance.** It is not easy to estimate the financial benefits brought by social commerce. For example, a company has one billion visitors to browse its website after using social commerce in its business. There is no guarantee that all visitors will turn into actual buyers (Ling and Husain, 2013).

Thus, successful adoption of social commerce is time-consuming and costly, as companies need to manage its adoption internally (due to resistant and skeptical attitudes) and keep the media stream fresh and relevant (Yuan, 2013).

4.1.3.2. Benefits. Social commerce is beneficial for both consumers and businesses (Zhou et al., 2013). The obvious benefit for consumers is a cheaper price. Also, social commerce can afford companies numerous benefits such as increasing brand awareness, bringing more profit, maintaining closing customer relationships and boosting business

opportunities (Chow and Shi, 2014).

For consumers, there are three benefits besides the monetary dimension (Menon et al., 2016). Individuals are interested in companionship, approval, and respect that they may receive from participating in a social exchange (Farivar and Yuan, 2014). What is more, taking advantage of social networking sites and social media, users are becoming more active in sharing commercial information (Liang et al., 2011). User-generated content is extremely valuable for consumers prior to making purchasing decisions (Janze and Siering, 2015).

For business, online retailers can profit from social commerce through attracting an increased number of consumers with user-generated product recommendations (Siering and Muntermann, 2013). In addition, a business may also acquire valuable input for new product development by interacting with members through online communities. Furthermore, businesses are now using social media to build relationships with their consumers (Hajli, 2014).

4.1.4. Research models of social commerce

To confirm hypotheses or find the correlation of impact factors (trust, culture, service quality, social support) with social commerce performance (consumer engagement, customer satisfaction, behavioral intention), two main research models have been applied: algorithm-based models and theory-focused models.

4.1.4.1. Algorithm-based models. Authors have created a variety of algorithm-based models for different purposes such as recommendations, co-creation, making decisions, and analyzing customer reviews. Table 3 shows the most frequent purposes of algorithm-based models and the corresponding algorithms that have been used in each study.

Analyzing the purposes of algorithms used in social commerce research reveals that analyzing consumer online behavior ($n = 7$), usability measurement ($n = 7$) and product recommendation ($n = 5$) are the main reasons. In addition, our analysis of the research contributions regarding the employed research algorithm shows that collaborative filtering ($n = 4$) is the most popular algorithm used by scholars, following by text mining algorithm ($n = 2$) and analytic hierarchy process ($n = 2$).

Hooda et al. (2014) presented a new social hybrid algorithm to make product recommendations in the online environment. Their social hybrid product recommender algorithm unifies the similarity matrices obtained from both user-item rating network and friend’s network. In

Table 3
The literature on the algorithm model.

Studies	Purposes					Algorithm Models
	PR	UM	RT	DMS	ACOB	
Jiang et al. (2014)				x		Evolutionary game
Holsing and Schultz (2013)		x	x			Apriori algorithm
Y.M. Li et al. (2014)	x					Jaccard similarity measure
Liu et al. (2012)					x	K-means algorithm
Todri and Adamopoulos (2014)					x	Text mining algorithm
Hooda et al. (2014)	x					Collaborative filtering
Xu (2014)	x				x	Eigenvector centrality
Zheng et al. (2013)					x	Online review quality mining
Ronca et al. (2013)	x					Collaborative filtering
Consoli (2009)				x	x	Text mining algorithm
Lee (2013)			x			Linear regression
Xiao et al. (2015)				x	x	Layout algorithm
Cho et al. (2013)		x				Collaborative filtering
Yang et al. (2012)					x	Mutual top-K filtering and thresholding
Wu et al. (2014)		x				Analytic hierarchy process
Kim (2014)		x				Static Nash equilibrium
Stephen and Toubia (2009)				x		Power-law degree distribution
Jing (2014)	x					Analytic hierarchy process
Stephen and Toubia (2010)			x			Autoregressive distributed lag
Kim and Lee (2015)		x				Voluntary ad dissemination
Noorian et al. (2014)		x				SocialTrust mechanism
Cho (2013)		x				Collaborative filtering

Notes: PR: Product recommendation; UM: Usability measurement; RT: Revenue tracking; DMS: Decision-making support; ACOB: Analyzing consumer online behavior.

2009, Stephen and Toubia empirically compared a set of edge formation mechanisms (including preferential attachment and triadic closure) that may explain the emergence of network power-law degree distribution (Stephen and Toubia, 2009). Holsing and Schultz (2013) used the *apriori algorithm* to analyze the usability and revenue effects of Web site features, which provides insights for both researchers and management.

4.1.4.2. Theory-based models. A lot of researchers have focused on the constructs and related theories which explore the relationship of social commerce participation, because refined theories that explain the behavior of people have practical implications. For instance, the theory of planned behavior model has been used to explain consumer online preferences (Shanmugam et al., 2015). Fig. 6 presents the relationship between underlying theories (e.g., motivation, trust and social support) and various dependent variables (e.g., behavioral intention, consumer attitude and actual behavior) in the research literature.

To interpret the results, we provide details on the identified dependent variables. As illustrated in the figure, adoption of theory models is predicted by different intentions and behaviors (Friedrich, 2015). Most studies ($n = 138$) have focused on consumers' behavioral intention. 34 studies observed consumer attitude, while 32 studies addressed new products and services brought by social commerce and 26 studies on consumers actual behavior. However, there were only 3 articles on click-through rate.

Referring to theories, various studies have demonstrated that motivation theory and trust theory play a critical role in the identified

dependent variables. Motivation theory suggests that a consumer's intention to shop and intention to spread e-WOM in the context of social commerce may be determined by utilitarian (e.g., perceived effectiveness, usefulness and ease of use of using a social commerce website) and hedonic (e.g., perceived enjoyment of using the website) motivations (Zhang and Benyoucef, 2016). It accounts for a largest proportion of studies involving behavioral intention ($n = 46$), new products and services ($n = 8$), actual behavior ($n = 8$) and user perception ($n = 6$), respectively. Trust theory is used in interpreting social behavior and may be able to shed light on issues in social commerce research (Liang and Turban, 2011). It also seems to play an important role in behavioral intention ($n = 37$) and consumer attitude ($n = 16$).

4.1.5. Social commerce frameworks

Formally, a framework can be very “helpful in organizing a complex subject, identifying the relationships between the parts, and revealing the areas in which further developments will be required” (Watson et al., 1991). Therefore, a framework that guides the adoption of social commerce in terms of technologies and architectures, process design, engineering requirements, and realization of a platform that enables enterprise social interactions, taking into account their inherent issues, is needed (Baghdadi, 2016). Table 4 classifies the three main kinds of social commerce frameworks proposed by scholars.

- **Classification 1.** Liang and Turban (2011) looked at social commerce from a framework with six key elements: research themes, research methods, underlying theories, outcomes, social media, and commercial activities (the last two being fundamental elements). They divided social commerce activities into four main categories: social media network marketing; enterprise social marketing; technology, support and tools; and management and organization.
- **Classification 2.** While Zhang and Benjamin (2007) constructed an *information model* (I-Model) which has four fundamental components: people, information, technology, and organization /society. According to the I-Model, Wang and Zhang (2012) summarized the organization / society component under the *management*, using a similar four-component (people, information, technology, and management) framework. In addition, Zhou et al. (2013) proposed a research framework with an integrated view of social commerce that consists of four similar key components: business, technology, people, and information.
- **Classification 3.** Looking for the design of social commerce perspective, Huang and Benyoucef (2013) proposed a conceptual framework with four layers: individual, community, conversation, and commerce. They proposed dividing the design of social commerce into the design of common features for all of the layers of social commerce, and exclusive features for each layer. Wu et al. (2015) combined this framework with an information model to come up with a new framework that adds a management layer to the four layers.

Finally, other scholars have proposed frameworks with only three elements. For example, Leitner and Grechenig (2009) defined the following three different main entities for their framework to include consumers, merchants, and products. Also Curty and Zhang (2013) developed a conceptual framework to capture three emphases of e-commerce that focus on transactional, relational and social aspects.

4.2. Which research methods have been used in social commerce? (RQ2)

Base on the framework proposed by Liang and Turban (2011), we provide an overview of the main research methods to explore the phenomenon of social commerce in previous studies. These methods are presented in Fig. 7. They include technology design, conceptual development, case study, empirical survey, experimental study, and longitudinal study methods. In addition, we added mathematical modeling,

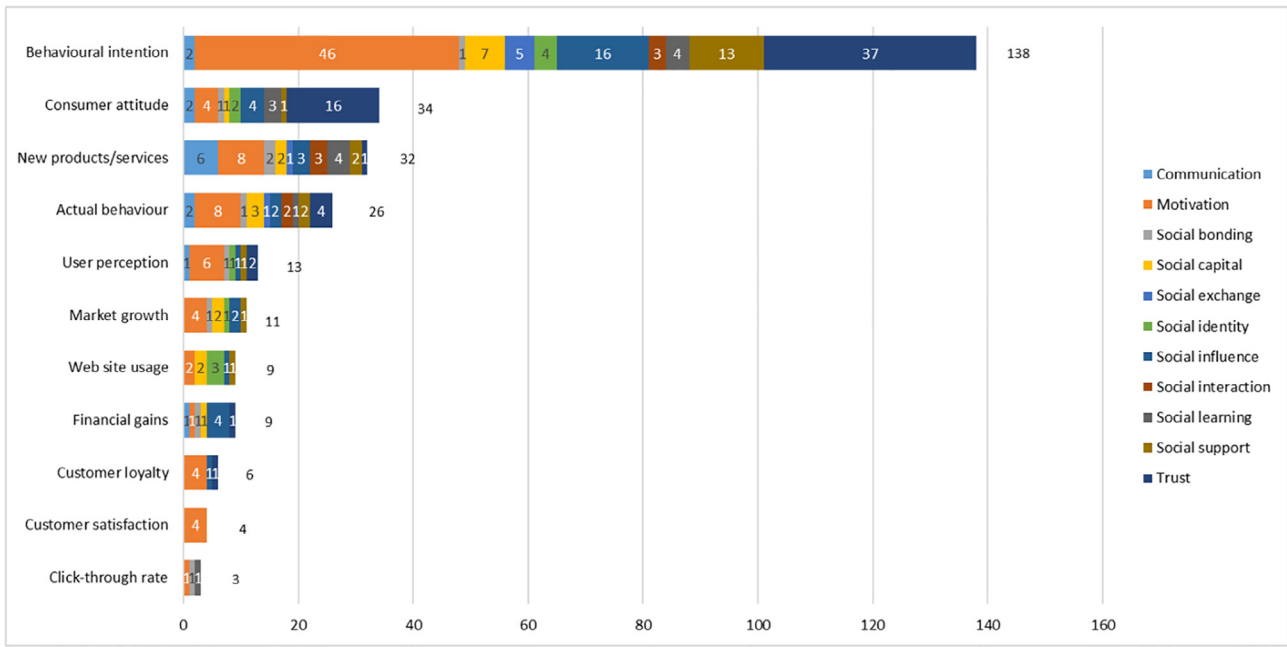


Fig. 6. Distribution of outcome measures by theory model.

reviews, mixed methods and narrative analysis. All of them represent the major methods in social commerce research.

As can be seen, the majority of the studies used quantitative methods (e.g., survey and experiment), and around 50.1% ($n = 204$) of the studies adopted empirical surveys, which dominated the research methods in social commerce studies, followed by mathematical modeling ($n = 35$). A few studies applied qualitative methods, such as conceptual development (11.8%), review (5.7%) and narrative analysis (1.2%). The distribution shows that 34 papers used case studies and 11 articles applied mixed methods, which both involve quantitative and qualitative methods.

In the following, we introduce the mathematical tools and techniques for the contexts of social commerce: mechanisms for algorithm-based models and statistical methods to test hypotheses in the theory-based models. (See Fig. 8.)

Different mechanisms for designing algorithm models, have been proposed, such as the merchant-driven collaborative decision model, Cox’s proportional hazard regression model, the network closure model, an adaptive trust-oriented incentive mechanism, context-aware recommendation systems, and FIRE (from “fides” and “reputation”), atypical model solved trust and reputation problems. Software has also

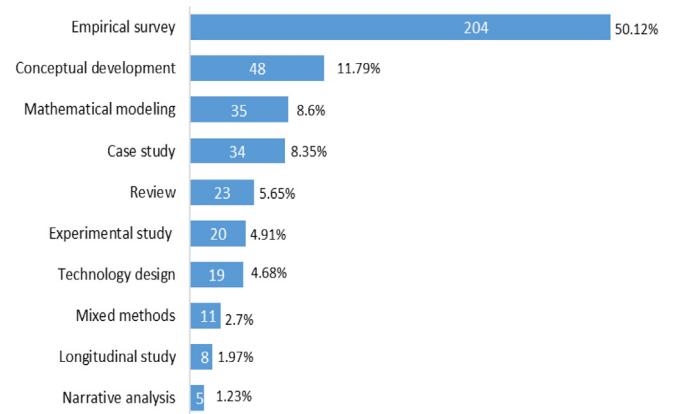


Fig. 7. Number of articles by research methods.

been applied in algorithm-based models for *natural language processing* (NLP) and a *general architecture for text engineering* (GATE).

For the theory-based models, hypotheses are tested by the following

Table 4
Social commerce frameworks.

Studies	Dimensions (or components) of Social Commerce Frameworks					
Classification 1						
	Research themes	Research methods	Underlying theories	Outcomes	Social media	commercial activities
Liang and Turban (2011)	x	x	x	x	x	x
Turban et al. (2010)					x	x
Yadav et al. (2013)			x	x		
Classification 2						
	People	Information	Technology	Organizational	Management	Business
Zhang and Benjamin (2007)	x	x	x	x		
Wang and Zhang (2012)	x	x	x		x	
Zhou et al. (2013)	x	x	x			x
Classification 3						
	Individual	Community	Conversation	Commerce	Management	Content
Huang and Benyoucef (2013)	x	x	x	x		
Wu et al. (2015)	x	x	x	x	x	
Baghdadi (2016)	x	x	x			x

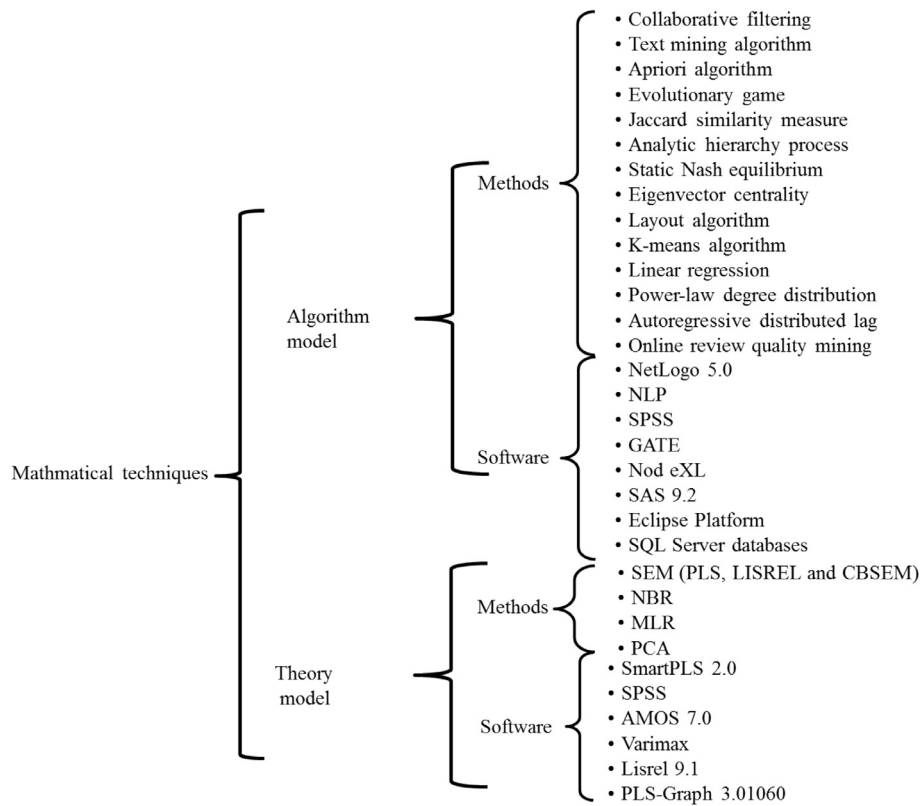


Fig. 8. Mathematical techniques used for social commerce.

statistical methods: *structural equation modeling* (SEM) which includes *partial least squares* (PLS), *linear structure relations* (LISREL), and *covariance = based structural equation modeling* (CBSEM); *negative binomial regression* (NBR); *multiple linear regression* (MLR); and *principle component analysis* (PCA). Correspondingly, the software often used by scholars include SmartPLS version 2.0, SPSS, AMOS (analysis of moment structures) 7.0, Varimax, Lisrel 9.1, and PLS-Graph version 3.01060.

The specific techniques used relies on a variety of elements, such as the nature of the problem, availability of data, familiarity with existing techniques, or trial with emergent tools/techniques, and compatibility between the analysis of previous works and techniques envisaged. Moreover, computer programming tools, software packages, and spreadsheets are used to analyze the collected data.

4.3. What are potential areas for social commerce research in the future? (RQ3)

Based on the analysis of the systematic review work, we outline novel areas for future research that may yield interesting insights into the field but have not been covered yet. Moreover, we provide a novel research agenda comprising promising questions for future research raised in existing contributions as well as new questions derived from our analysis. (See Table 5.)

4.3.1. Implications for social commerce definitions

We collected 22 different definitions of social commerce from academic publications. (See Appendix 1.) Cohen (2011) summarized 19 different definitions from practitioners who work for social commerce area. After analyzing these definitions, we found that authors emphasize different perspectives when they define the social commerce concept. In this study, we propose the social commerce definition within a broad domain. It includes social media (e.g., SNSs), social activities (e.g. WOM, social interactions), e-commerce and Web 2.0. However, social commerce involves more and newer architectures and

technologies such as *electroencephalography* (EEG) (Bai et al., 2015), SOA, cloud computing, Web 2.0, smartphones and pads, positioning systems, networked RFID, big data, and the *Internet of things* (IoT) (Baghdadi, 2016). Therefore, it needs scholars to update definitions stemming from new research streams and technologies. Except for social media, social activities, e-commerce and Web 2.0, what other components or dimensions should be included in social commerce definitions with the advent of new technology? Future research should extend existing theory to a broader domain which includes Marketing, Information Systems, Economics, Management, Behavioral Science, Psychology, Computer Science, Technologies, and Sociology.

Although several efforts have been made to understand what the term *social commerce* represents, there is still a lack of clarity in the literature regarding the meaning and scale of social commerce (Baghdadi, 2016). In an editorial in a special issue on social commerce in the *International Journal of Electronic Commerce*, Liang and Turban (2011, p. 6) summarized the state of research on social commerce and noted that “there is no standard definition.” Thus, another research question that needs to be explored is: “What is the standard definition of social commerce?” Answers to these questions have implications for our understanding of the domain of social commerce.

4.3.2. Implications for differences in related terms

Although we have distinguished between *social commerce*, *social shopping* and *e-commerce*, there is more work needed to deepen our understanding of other similar terms such as *collaborative commerce*, *collaborative shopping* and *social media marketing*. A promising line of future inquiry is to explore the differences among them. We found that the most popular research theme in social commerce is to analyze user behavior, while researchers prefer to offer enterprise strategies when they study social media marketing. So, the different terms that the research themes focus on can be studied. In addition, researchers can switch to the technology side and analyze what are the differences between social media and Web 2.0.

Table 5
Research agenda.

Systematic Review	Questions
Definition	<ul style="list-style-type: none"> • What components should be included in s-commerce definitions with the advent of new technology? • What is the standard definition of social commerce?
Differences	<ul style="list-style-type: none"> • What are differences between social media and Web 2.0? • What differs social commerce from other terms (social shopping, e-commerce, collaborative commerce/shopping, and social media marketing“)? • How classify these terms (social e-commerce, social e-business, online social shopping, collaborative e-commerce, collaborative online shopping, social media shopping, social e-shopping and socially shared consumption)?
Types and Technologies	<ul style="list-style-type: none"> • Which types of social commerce should choose for different companies? • What are functions for different types of social commerce?
Challenges and Benefits	<ul style="list-style-type: none"> • How should companies face these challenges and successfully engage in social commerce? • What are the essential value drivers in social commerce applications?
Models with Research Methods	<ul style="list-style-type: none"> • Which factors may be more critical for influencing different consumers' activities in social commerce? • How are more than one dependent variables influenced by different factors? • What are research methods will be adopted for future study?
Frameworks	<ul style="list-style-type: none"> • How social commerce frameworks guide companies to apply social commerce?

Through the process of reviewing social commerce research, we found some researchers use terms, instead of social commerce, that include: *social e-commerce*, *social e-business*, *online social shopping*, *collaborative e-commerce*, *collaborative online shopping*, *social media shopping*, *social e-shopping* and *socially-shared consumption*. It is necessary to distinguish among them to avoid unnecessary confusion. So, a classification map is needed to properly define them for future research.

4.3.3. Implications and challenges for social commerce

With the rapid development of social commerce, it has become more difficult to select the related types of services that are suitable for different kinds of companies. There has been little research that examines the efficiency and business impacts brought about by different social commerce types. This leaves open the question of which of the proposed types a company should focus on (Friedrich et al., 2015). What should be the functions of the different social commerce types that are needed?

How should companies face the challenges and successfully engage in social commerce? One big challenge is to control the huge amount of data and complex systems that are used. Baghdadi (2016) suggested that firms should invest in big data projects and arrange for cloud computing services to store the enormous amount of data. In addition, building consumer market share means winning their trust. So it is worthwhile to apply security instruments and privacy protection strategies in social commerce sites to ensure consumer privacy (Lu et al., 2016). In addition, user-generated content is crucial for social commerce applications. In order to encourage customers to recommend and share information with each other, companies should engineer easy-to-use platforms, and invite or hire domain experts as premium users on the website to support customers (Saundage and Lee, 2011).

4.3.4. Implications for research

This study has demonstrated that research on consumer intentions and behavior has examined a broad variety of factors (Friedrich, 2015). However, there is little research on the relative importance of the different factors. For example, if a company wants to increase consumer intention and information sharing, the influential factors seem to be trust, commitment, satisfaction, and relationship quality. But which factor is most influential? Further research may analyze, for example, which factors are most effective in terms of some relevant performance metrics. To derive additional information about the weights and directions of the impacts, other meta-analysis techniques, such as sign tests, can be applied.

As illustrated by the dependent variables that we identified, consumer adoption of social commerce has been explained in terms of different intentions and behaviors. Most research has focused on only one dependent variable with several influenced factors though. Future

research should consider examining more than one dependent variable, including sharing intention and behavior, as well as continuance intention and behavior.

Our findings indicate that quantitative research methods have been used extensively, and a majority of the empirical studies adopted the survey method. In contrast, research methods such as qualitative methods have been relatively less well adopted in prior research. We suggest that various research methods in future studies may be useful to acquire more empirical evidence with respect to new behavior in social commerce context. In addition, adopting mixed methods can minimize common method bias and provide more rigorous and convincing findings. Another possible direction for future research is to adopt predictive models to uncover consumer behavior patterns, identify complex relationships between variables, and develop new theory for social commerce. Predictive analytics of users' participation behavior may help companies to estimate user engagement levels after they conduct marketing campaigns on social networking sites (Baethge et al., 2016), for example.

4.3.5. Implications for social commerce frameworks

Research that offers framework designs for social commerce is still scant (Baghdadi, 2013). On the one hand, there is a lack of successful cases to show that major social media providers have been able to bring commercial transactions directly to their social media sites. On the other hand, very few studies focus on designing comprehensive frameworks which can guide the implementation of social commerce in the context of enterprise business processes (Baghdadi, 2016).

Future research should continue in this area. Because social commerce is a new area, existing theories are still insufficient to provide an accurate and complete understanding of the complex issues involved. As confirmed by the literature review, there is only a limited academic understanding of the main issues, and an even less substantive empirical grounding on how social networking and social media can be leveraged to enhance e-commerce (Zhou et al., 2013). Thus, we suggest that future research should create value by designing new business frameworks, which not only guide the description of social commerce as a business model, but also guide the process of implementing social commerce for business enterprises.

5. Conclusion

Over the last decade, social commerce has developed with increasing social and economic impact around the world. The goal of this research has been to provide a systematic literature review based on the analysis results of 407 academic publications on social commerce since 2006. We proposed a systematic method by using a synthesis and a taxonomy of social commerce for this study. In order to understand

social commerce, we laid out three research questions: What is social commerce (RQ1)? Which research methods have been used in social commerce (RQ2)? And what are potential areas for social commerce research in future (RQ3)?

For RQ1, we used a taxonomy to delineate the different facets of social commerce: definitions, differences, types and technologies, challenges and benefits, models and frameworks. We also defined social commerce with several broad dimensions. For RQ2, we found that quantitative methods have been the prevalent research methods used in social commerce research. They include: surveys, 50.1%; math modeling, 8.6%; experiments, 4.9%; and longitudinal studies, 2.0%. Qualitative methods were less used but still present. They include:

conceptual development, 11.8%; reviews, 5.7%; and narrative analysis, 1.2%. Some other methods have also been used including: technology design, 4.7%; case studies, 8.4%; and mixed methods, 2.7%. Finally, for RQ3, on the basis of our systematic review, we proposed a future research agenda on social commerce. We hope this will guide researchers going forward.

Acknowledgement

This work was supported by National Natural Science Foundation of China (71672136).

Appendix. A

Appendix 1

Literature on social commerce definitions.

Authors	Dimensions				Definition
	EC	SM	W2	SA	
Dennison et al. (2009)	x			x	The concept of word-of-mouth, applied to e-commerce.
Hsiao et al. (2010)	x	x			A new e-commerce method combining social networking with shopping.
Marsden (2010)	x	x		x	As a subset of e-commerce using social media to facilitate social interactions and enhance the online shopping experience.
Rad and Benyoucef (2010)	x			x	Refers to both networks of sellers and networks of buyers; it is the evolution of “e-commerce which is based on one-to-one interactions, into a more social and interactive form of e-commerce.
Stephen and Toubia (2010)	x	x		x	Internet-based “social media” that allow people to participate in marketing, selling of products and services in online marketplaces and communities.
Liang and Turban (2011)		x	x	x	Using Web 2.0 social media technologies to support online interactions and user contributions to assist in the acquisition of products and services.
Costa and Tavares (2012)	x	x		x	Enhance collaboration and trust relationships in e-business, integrating and adapting common social network collaborative tools and emphasizing the role of SCM in e-business.
Marsden and Chaney (2012)	x	x		x	The fusion of social media with e-commerce, or in the words of IBM, social commerce is basically the concept of word-of-mouth applied to e-commerce. More fully, social commerce is a subset of electronic commerce that uses social media, online media that supports social interaction and user contributions, to enhance the online purchase experience.
Shen (2012)		x		x	Technology-enabled shopping experience; online customer interactions while shopping provide mechanism for social shopping activities.
Wang and Zhang (2012)	x	x			As a form of commerce that is mediated by social media and is converging both online and offline environments.
Baghdadi (2013)	x	x		x	As doing commerce in a collaborative and participative way by using social media through an enterprise interactive interface.
Huang and Benyoucef (2013)	x	x	x	x	An Internet-based commercial application, leveraging social media and Web 2.0 technologies which support social interaction and user generated content in order to assist customers in their decision-making and acquisition of products and services within online marketplaces and communities
Kim and Park (2013)	x	x			A new business model of e-commerce driven by social media (e.g., SNSs) that facilitates the purchasing and selling of various products and services
Ng (2013)	x	x			The online buying and selling activities initiated via social media, which entails business transactions through either social media (e.g., on a Facebook store) or other e-commerce sites.
Shin (2013)			x	x	Limited to a Web platform that connects users to other people online and leverages those connected networks for business, education, and services by facilitating customer interactions and participation in ways that will result in measurable results.
Yadav et al. (2013)	x	x		x	Refers to exchange-related activities that occur in, or are influenced by, an individual's social network in computer-mediated social environments, where the activities correspond to the need recognition, pre-purchase, purchase, and post-purchase stages of a focal exchange.
Chen et al. (2014)	x	x		x	As business and commercial activities, which exploit social media to support social interactions and promote user contributions in assisting online transactions.
Gatautis and Medziausiene (2014)	x	x		x	The integration of social networking capability into e-commerce sites, which include, but are not limited to, product reviews, rating, videos, blogging, live chats and online forums. It involves using social media, online media that support social interaction, and user contributions to assist in the online buying and selling of products and services
Noor et al. (2014)	x	x			A new business model of e-commerce driven by social media (e.g., SNSs) that facilitates the purchasing and selling of various products and services
Esmaeili et al. (2015)	x	x	x	x	As an Internet-based commercial application that makes use of web 2.0 technologies and social media, and it supports user-created content and social interactions.
Baghdadi (2016)	x			x	New way of doing commerce in a collaborative and participative way, involving interactions among all the actors of the value chain.
Hassan et al. (2016)	x	x			Online selling/buying activities using social media technologies, platforms.

Notes: EC: E-commerce; SM: Social media; W2: Web 2.0; SA: Social activities.

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