SOCIAL PRODUCT CONFIGURATION: REFLECTING ON THE GAP BETWEEN USERS' MOTIVATIONAL DRIVERS AND AVAILABLE ONLINE SALES CONFIGURATOR – SOCIAL SOFTWARE CONNECTIONS

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Abstract: *E-commerce is taking a more social, creative, and collaborative approach with customers in online marketplaces that engender social commerce (SC), an online commercial application that implements social-technology features to enhance customer involvement at different levels of the online shopping experience. SC is new but fast growing—it is spreading to the majority of e-commerce activities. Companies that sell customizable products through online-sales configurators (OSCs) can start implementing SC using mass-customization systems that incorporate social features through social product-customization systems. Complementing an OSC with social software (SSW) renders the configurator a highly interactive medium that is able to support a user's digital interactions. Although recent studies have addressed OSC-SSW connections, prior research on social customization systems has not explored to what extent social-interaction features that are currently incorporated into OSCs respond to users' actual need to engage in human-assisted interactions with their contacts during their configuration experiences. The present paper helps address this gap by adopting a theory-driven approach to compare the findings from the literature on this topic. A multistage analysis was adopted to empirically respond to the research question that the present study addresses—how to implement a product-configuration environment with social interactive features for users and their contacts. Following the analysis, we describe the design of a new connection between OSCs and SSW with the ability to meet user demand for digital social interaction (DSI) with contacts. This paper aims to provide insights to enhance the personalization of customers' experience via OSCs by allowing users human-assisted interactions with their contacts.*

Key Words: Social Configuration, Online-Sales Configurator, Social Software, User Experience

1. INTRODUCTION

Social commerce (SC) refers to a more social, creative, and collaborative approach used in online marketplaces [1], which transforms a market for goods and services into a socially centered, user-driven marketplace. SC is defined as an exchange made through an Internet-based commercial application leveraging Web 2.0 technologies, such as social software (SSW), and tools, such as social media (SM), which support social interaction and user-generated content (UGC) in order to assist consumers in their decision-making within online marketplaces [2].

The adoption of SM is having a revolutionary impact within and outside of companies [3–4]. For instance, SM is fostering new collaboration opportunities between companies and outside parties (e.g., suppliers, vendors, customers) [5] and is changing relationships among consumers themselves [6]. Customers often share their purchases through Facebook, Instagram, Pinterest, Twitter, and YouTube.

Mass customizers (MCs) have started integrating SM in order to interact with their customers and foster interactions among consumers while they use an MC system [7]. MC research has recognized the role of online social influence in self-customizable products [8–12] and highlights the need for research on socially enriched variants of such systems.

Online-sales configurators (OSCs) are connected to SM through SSW [13]. Each connection supports OSC users in digitally interacting with others. These connections also help a user share configured products using their SM accounts (e.g., Facebook) and acquire

feedback from their contacts and other platform users [13–14].

Previous research on socially enriched mass-customization systems describes how companies that adopt this process for business-to-consumer purposes are incorporating SM [7–9]. For example, Porsche and Audi have developed community-based mass-customization systems and have embedded them in Facebook. The LEGO Group and Threadless offer highly sophisticated toolkits for individuals to actualize designs; these companies encourage consumers to post their designs and comment on others' designs within company-led communities. In short, MC companies are selling customizable products via OSCs that are increasingly adopting SSW technology to increase OSCs' social presence and influence. That said, research on social customization systems has yet to determine to what extent social-interaction features incorporated into product self-customization processes respond to users' need to digitally interact with others.

By adopting a conceptual analytical method that compares results and conclusions from previous studies, the present study addresses the connection between social support provided to configurator users and their demand for digital interaction with trustworthy referents (friends).

This analysis enables the present study to determine to what extent social-interaction features enabled by OSC-SSW connections are consistent with what drives users to interact digitally with friends. As a result, the present study provides insights to aid in implementing a configuration environment featuring SC capabilities, which connects users in one-to-one social interactions with their personal contacts while they shop for self-designed products via OSCs.

2. THEORETICAL BACKGROUND

2.1. Social Commerce

In offline shopping environments, social shopping has been conceptualized as "the enjoyment of shopping with friends and family, socializing while shopping, and bonding with others while shopping" [15 p. 80]. Since 2006, social-shopping websites have allowed shoppers to share shopping ideas, giving rise to social shopping as an evolution of e-commerce [16].

Huang et al. [2] proposed a generic set of individual, conversational, community, and commerce principles to guide high-level SC design. Each principle is linked to a number of SC design features.

The *individual* principle refers to providing a sense of self-identification and awareness that can be recognized by others. The features corresponding to this principle include displaying a user's legal name alongside their personal picture, allowing a user to create and access their own profile, building a social experience, and providing social information.

The *conversation* principle refers to providing a variety of interaction features among participants in order to establish collaborative, bidirectional communication. Its corresponding features include information sharing and encouraging participants to provide feedback.

The *community* principle refers to building a community based on groups of people who can support each other's decision-making processes. Its corresponding features include offering appropriate support, connecting people, and updating social activities to maintain relationships.

The *commerce* principle refers to engaging participants with services and applications provided by online businesses. Its corresponding features include shopping with like-minded people, informational social influence, and providing social applications that make expert advice available to customers, allow them to ask questions online, and facilitate listening to and observing people's experiences and feedback [2].

2.2. Customers' social browsing on Facebook

Most studies on consumer behavior within a social-networking site use Facebook because it is a large SM platform that offers a range of features for publishing and sharing brand-related UGC [17–19]. Facebook is now creating change in social networking by implementing features that allow consumers to complete transactions without leaving the platform [18]. The implementation of these new features indicates that the potential power of social networking is increasing—it has consumers' attention and trust.

Within the context of Facebook, brand-related UGCs have a positive influence on consumer decision-making, especially when participants encounter them while browsing. In addition, they include information and emotional content that is viewed positively in terms of enjoyment and perceived information quality. Brand-related UGCs act as informational stimuli (e.g., visual stimuli) to activate consumers' emotional and cognitive responses, because they are transmitted by a trustworthy source embedded in an individual's personal network. UGCs therefore produce information that has the potential to influence consumers' decision-making within online marketplaces [20].

2.3. Digital social interaction features via online sales configurators

Previous studies have addressed the phenomenon of mass customization and SM [9–12] and have introduced the connections between OSCs and SM [14]. A recent report evaluated the incorporation of SSW into OSCs by detecting and describing the connection modalities [13].

The connections between OSCs and SSW support users during different steps of the configuration/shopping process. Consequently, they also support OSC users by showing them the decision-making process of potential customers.

In Engel et al. [21], a customer's decision-making process was structured according to the following steps: (a) need recognition, (b) alternative evaluation, (c) purchase, and (d) post-purchase. Following Franke et al. [12], the configuration process has been divided into the following steps: (a) initial idea generation, (b) intermediate evaluation, and (c) final-configuration evaluation.

By following the parallel between the configuration-and-shopping-process step and the customer-decision-making step, then combining these processes with the characteristics of co-located and integration-based connection modalities, it is possible to determine which modalities support OSC users in each step.

Co-located connection modalities (see Table 1) are connections between the SSW and online configurators enabled outside of the configuration environment [13]. Integration-based connection modalities (see Table 2) are connections between the SSW and OSCs enabled within the configuration environment [13].

Co-located connection modalities (M1, M5.1, M5.2, M6, and M7.2) and integration-based modalities (M2.1, M3, M4, and M8) support a user during the information-seeking step, when the customer researches the product to be configured. In this step, the customer decision-making process corresponds with the initial idea-development step, when a user looks for information about the product to be configured.

Table 1. *Co-located connections between the online sales configurators and social software*

Connection Modalities and Variants		
Name	Description	Positioning
M1	Icons on the company's website connect a configurator user to the company's SM profile(s).	Co-located
M5.1	A company blog provides the user with content published by company representatives (e.g., information about brands, events, and sponsorships).	Co-located
M5.2	A company blog post provides the user with additional information not available in the configurator environment, provided by the company itself and/or by other blog users.	Co-located
M6	A company discussion forum connects the configurator user to their online contacts.	Co-located
M7.2	The company's e-mail is used as a customer-service channel	Co-located
M2.1	SM icons enable the user to automatically publish the configurator link to their social profiles.	Integrated

Note. "M" stands for modality. Adapted from Grosso et al. [13].

Table 2. *Integrated connections between the online sales configurators and social software*

Connection Modalities and Variants		
Name	Description	Positioning
M2.1	SM icons enable the user to automatically publish the configurator link to their social profiles.	Integrated
M2.2	SM icons enable the user to automatically share a complete configuration to their social profiles.	Integrated
M2.3	SM icons enable the user to automatically share a partial configuration to their social profiles while the configuration is in process.	Integrated
M3	Enables direct browse/upload of the configurator's files, which can be shared to the user's SM profiles.	Integrated
M4	A simplified configurator is embedded into the company's SM profile.	Integrated
M7.1	The complete configuration is sent via e-mail to the user's online contacts.	Integrated
M8	Instant-message services connect the user to a company representative.	Integrated

Note. Adapted from Grosso et al. [13].

2.3.1. How modalities respond to Social-Commerce principles

The SC-SSW connection modalities correspond to and implement some features of the SC principles identified by Huang et al. [2]. Some modalities correspond to an individual principle. Specifically, M3 allows a user to select personal items from their SM profiles and include them in their configured product. In addition, M2.1, M2.2, M2.3, and M4 correspond with the principle of individuality, because a user can share their activities with their online circles.

Both modality types—co-location based (M5.2, M6, and M7.2) and integration based (M2.1, M2.2, M2.3, M4, M7.1, and M8)—correspond to the conversation principle in different manners. In particular, M8 allows for real-time two-way communication between the configurator user and a company representative through a chat, thus providing the user with expert advice. In M2.1, M2.2, M2.3, and M4, this is achieved by linking the user to a social environment where they can collect information and acquire feedback from different people (e.g., online circles, peers, company representatives) during the configuration process. M5.2 and M6 support the user in conversing through blogs and forums, whereas M7.2 enables conversation between the user and the company through e-mail.

Some modalities correspond to the community principle—specifically, M5.2 and M6—which links the user to an environment where they can receive support from other people (e.g., blogs, forums). In addition, M2.2, M2.3, M4, and M7.1 support the user in interacting specifically with their online circles—that is, with people from their online communities.

All identified modalities correspond to the commerce principle by supporting SC design's social-application feature. Moreover, M5.2 and M6 enable a user to listen to and watch other people.

2.4. Users' need to digitally interact with real persons

A recent study [22] addressed the implementation of social interactivity into the product-configuration environment by exploring the configurator user's need for digital interaction with real persons. A description of the results and conclusions is provided in this section and the following subsections.

As detected by the study [22], a typical OSC user definitely experiences a need to engage in human-assisted interaction during their configuration/shopping process. As reported in Figure 1, in the majority of configuration experiences (88%), the user experienced a need for social interaction. Further, only 4% of participants did not experience the need to interact with real people in any form (2% completely disagreed and 2% disagreed), whereas 8% did not provide a definitive answer regarding whether they perceived this need to be relevant.

Notably, Figure 1 [22] implies that most configurator users experience the need to consult with or be advised by someone, instead of facing the configuration experience by only interacting with the system's

computer-assisted features. This shows that almost all configurator users need social interaction [22].

The same study characterizes this need by detecting factors that impact the extent to which an OSC user needs to interact with real persons. Based on the findings, the need varies depending on such factors as "with whom"—more precisely, the type of referent with which the user intends to interact (Fig. 2). The "which step" factor varies depending on the step of the configuration/shopping experience at which the user intends to engage in DSI (Fig. 3). Finally, the need for DSI varies depending on the "when" factor, which refers to the timing (in real time or not) at which the user intends to interact with real persons (Fig. 4). The influence of each factor is detailed in the following paragraphs.
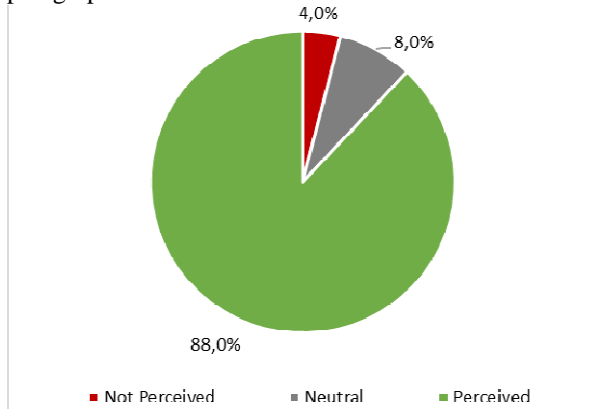
Fig. 1. Configurator users' need for digital social interaction. *Source: reprinted from [22]*
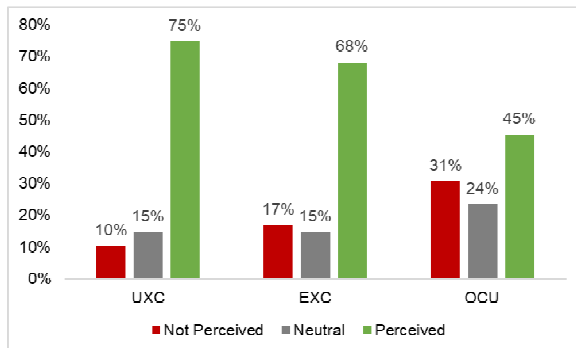

Fig. 2. The With Whom factor of users' need for digital social interaction. *Source: reprinted from [22]*
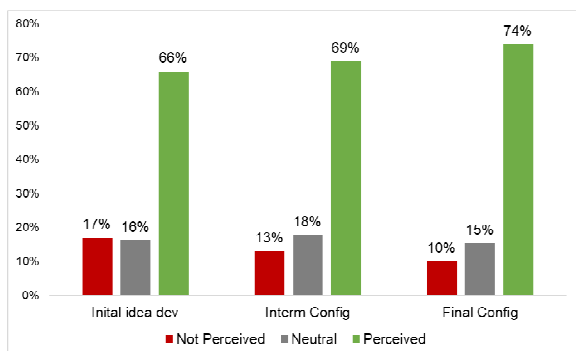

Fig. 3. The Which Step factor of users' need for digital social interaction. *Source: reprinted from [22]*

"With Whom" factor. The results of the influence of this factor, regarding a user's need to interact with different actors, showed that the need varies depending on whom a user needs to consult during their configuration process (Fig. 2). This is not surprising, given that different referents (i.e. users' contacts UXC; expert from the company EXC; other configurator users OCU) provide different kinds of information and support during a user's shopping experience via OSC. The need to interact with a user's contacts, which was reported in 75% of cases, underscores the OSC user's demand for consulting trustworthy referents who know their tastes and habits and can therefore make recommendations [22].

"Which Step" factor. This dimension refers to an OSC user's need for social interaction during each step of their configuration process (Fig. 3). The findings showed slight differences from step to step, and in particular, the need for social interaction was perceived as more relevant during the final-configuration stage, when the user evaluates their design and wants to integrate external feedback into their problem-solving process [22].

3. RESEARCH AIM AND METHOD

The present study aims to answer generic questions about how to implement the product-configuration environment with social interactive features between users and their contacts. To achieve this goal, the first step was to acknowledge the advancement in literature on configurator users' need for DSI. To this end, we adopted a theory-driven methodology through which we first reviewed the literature from the theoretical background section on users' need for DSI. Subsequently, based on the findings from the literature, we conducted an analysis to determine how to overcome any gaps. Finally, as result of our theory-driven analysis, we have provided a description of a possible OSC-SSW connection and its ability to respond to a user's need to interact with their contacts.

The present study focuses on a user's need to engage in human-assisted interactions with this specific type of referent because of the key role that others who are meaningful (e.g., family, friends, colleagues) and those an individual considers as major decision-process influencers play as referents with major emotional significance [23].

During the first empirical stage, we reviewed state-of-the-art technology for the implementation of both the OSC-SSW connection and the social interactive features enabled by each connection, as well as the findings on OSC users' need for DSI.

During the second stage, we conducted an analysis to match the findings from the literature on users' need for DSI with the characteristics of the available OSC-SSW connections to determine to what extent the interactive features enabled by OSC-SSW connections fulfill this need. To this end, we evaluated contributions from co-shopping features proposed in the literature [24] and insight from social interactive features currently implemented in e-commerce platforms for "take it or leave it" products (i.e., the Got.it application).

3.1. First atage of analysis

The findings from the considered study—the only one currently available on configurator users' need for DSI—show that users need to interact with their contacts in the majority of cases (75%). These results underscore the OSC user's demand for consulting with others who are meaningful to them, who know their tastes and habits and can therefore give them recommendations [22]. The findings related to the "at which step" dimension also showed that users sought out social interactions, but that there were slight differences during each step of the configuration process—particularly, at the final-evaluation stage for the completed product configuration.

When comparing these results with the currently available OSC-SSW connections, there is a lack of features that fulfill a user's need for DSI, such as real-time interaction with their contacts during the configuration process. More specifically, the connection modalities that support a user in interacting with their contacts (M2.1, M2.2, M2.3, and M7.2) enable one or more interaction features, but only outside the configurator environment. It follows that the user has to suspend their configuration to be redirected to an external environment where they can interact and be advised by people they trust. In retail shopping, this would be similar to a customer being forced to leave a shop by the shopkeeper in order to obtain the support they need from a preferred referent.

To overcome this gap, we embarked on the second stage of our analysis, regarding how to fill it by finding a possible solution that could provide users with social interactive features that respond to their need to interact with their contacts.

3.2. Second atage of analysis

The Got.it e-commerce software application (app), which provides its users with an e-commerce environment that includes multiple merchants and enables social interaction between its users and their friends, provides interesting insights on the design of co-shopping experience.[1] This app (fig.4-6), which is available for download in Google Play and the Apple Store, incorporates social features to connect its users with their friends and allows them to start conversations via chat during the shopping experience to replace "in-person shopping" interactions.

The platform indicates that friends are a trusted source for recommendations (Fig. 4).

Fig. 4. *Got.it App*
Source: reprinted from Gotitapp.net.

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[1] Available at www.gotitapp.net.

The Got.it app leverages an overwhelming amount of information and the importance of social influence during the customer decision-making process, and it provides customers with a platform featuring many online retailers. The Got.it app allows users to:

- create a wish list of items to buy later and/or suggest possible gifts to friends,
- receive special offers from a retailer,
- gain followers and help influence their friends' purchasing decisions, and
- be rewarded for their influence.

Fig. 5. *Example from the Got.it App*
Source: reprinted from Gotitapp.net.

The Got.it app is one example of the adoption of social interactive features for co-shopping. The service of it is to connect its users to their friends. It highlights the importance of providing trusted recommendations to customers. In brainstorming how to implement human-assisted interactive features specifically into the e-commerce domain for customizable products, we found the study by Krumar et al. [24], which shows how to implement real-time interactions between a web user and their friends to share in the online shopping experience.
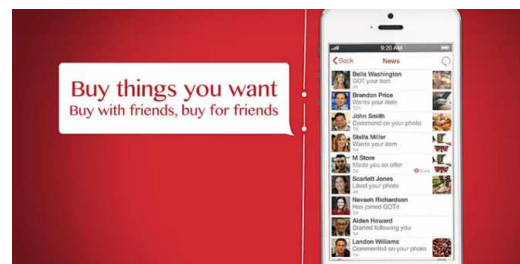

Fig. 6. *Shopping with friends on Got.it*
Source: reprinted from Gotitapp.net.

As described in the study [24], real-time online co-shopping can be implemented using Ajax Push technology. As the authors explain [24], this is because, PUSH AJAX uses a technique called Long Poll to update server data to clients. "Once a client establishes the connection, the server holds back the connection until the data is available, at that time the server sends the data through the held connection. Once, the co-browsing ends, the server closes the connection. This way, real-time communication is achieved from server to client" (p. 474).

4. RESULTS AND DISCUSSION

Following our analysis, we hereafter our proposal for an end-user interface that would enable one-to-one or

one-to-many social interactions between a user and their friend(s) during product configuration.

4.1. Proposal for end-user interface to support human-assisted interactions between users and their friends

The proposed interface, referred to as the "K-interactive feature," defines K as the key role connecting an OSC user with relevant others. The feature consists of sending an e-mail, link, or Facebook Messenger invitation from within the configuration environment to someone outside of it; once the invitation is accepted, the user and the invited person(s) can start a real-time conversation. The feature's innovative characteristics are: (1) an OSC user can select whom to invite from their contacts, and they are not limited to only interacting with other customers; (2) a user is encouraged to invite friends from their social networks to share in the configuration environment; and (3) the DSI supported by the proposed feature can be enabled "on demand," implying that an OSC user can invite friends when needed during the configuration.

Once a user (leader) decides to invite a person from their network of friends, the environment provides options for offering an invitation (see Figures 7–8) for implementation examples). The interface described as follows shows a simulation of its usability and features.

Following the instructions for the Ajax Push implementation and enhancement for the co-shopping environment described in Kumar et al. [24], our speculation on its implementation into an OSC environment is provided. The implementation of the real-time co-shopping design proposed in the Kumar et al. study [24] into a configuration environment requires:

- a client-side collaborative window with HTML iFrames,
- an Ajax program,
- a server-side Ajax Push implementation, and
- a chat service.

The client-side (leader-side) collaborative window consists of three HTML frames: (1) the first iFrame loads the pushed URL from the server and has provision to share the configurator URL with friends (e.g., via e-mail, link, or Facebook Messenger); (2) the second frame has provision to invite a user's friends; and (3) the third frame has a chat window. In Kumar et al.'s [24] co-shopping environment design, all the communications from client to server happen via Ajax routines. The server-side Ajax Push is implemented using Ajax Push APIs, where Ajax Push empowers the server to push data from server to client and update any part of the client's page at any time.

An overview of collaborative co-shopping designed by Kumar et al. [24] is reported in Figure 7. Examples of how the K-interaction-feature graphics could appear to the configurator user are provided in Figures 8–13.
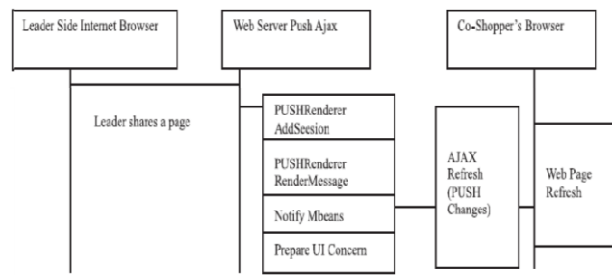

Fig. 7. *Overview of collaborative co-shopping designed by Kumar et al. [24]*

Figure 8 depicts how an invitation button could be visually represented in the configuration environment. The configurator user initiates an invitation to their friend by clicking on the "invite a friend" button (Fig. 9). An Ajax request then goes to the server. The Ajax request contains the e-mail address of the friend to be invited (for invitation via e-mail, as in Figure 10) and the URL of the configurator page (for invitation via link, as in Figure 9).
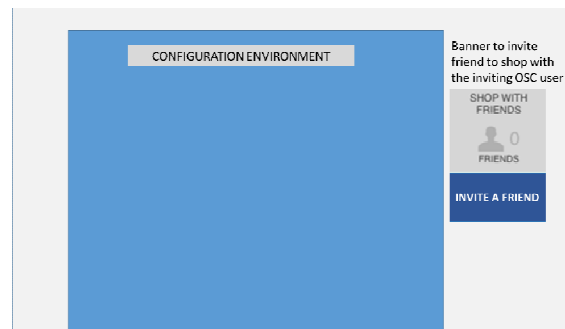

Fig. 8. *Configuration environment containing an "Invite a friend" button*
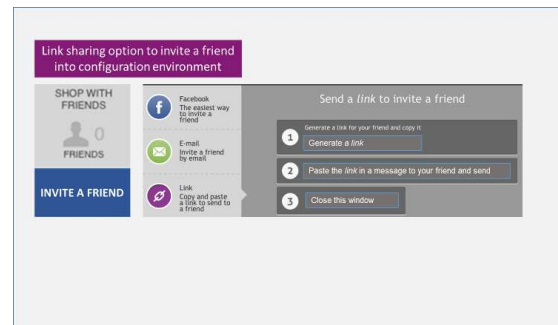

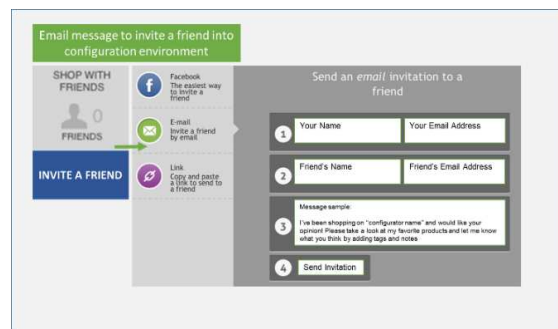Fig. 9. *User invitation via shared configurator link*

Fig. 10. U*ser invitation via e-mail*

To invite a Facebook friend, the Ajax request contains the Facebook ID of the friend to be invited via Facebook Messenger. The server manipulates the request by pushing the URL on the HTML frames of the friend in an asynchronous manner using Ajax Push [24]. Sending the configurator URL via Facebook Messenger allows the user's Facebook friend to join the configuration environment (Fig. 11).
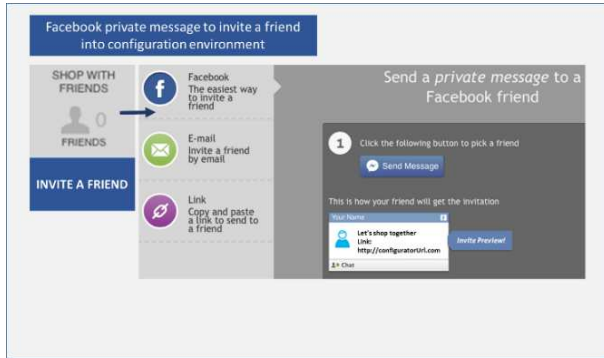

Fig. 11. *User invitation via Facebook private message*

Facebook was chosen for both because it enables a large number of social relations within its platform and because it provides multiple ways for online retailers to offer a more social purchase experience by either integrating Facebook features into an independent retail site or (increasingly) by allowing a retailer to operate within Facebook itself [17–19]. Facebook's new features enhance social networking inside and outside of the platform. A Facebook user can make a purchase using their Facebook credentials and can finalize the purchase without any other form of registration. These trends indicate that the potential power of interaction is now being elevated to a new level as the attention and trust of consumers have shifted toward social networks.

All invitations enable a screen-sharing option and a chat room where the user and their friends can interact in real time, as shown in Figure 12. The initial banner providing the invitation also provides the user with information about when the friend has joined the configuration environment to start their DSI.
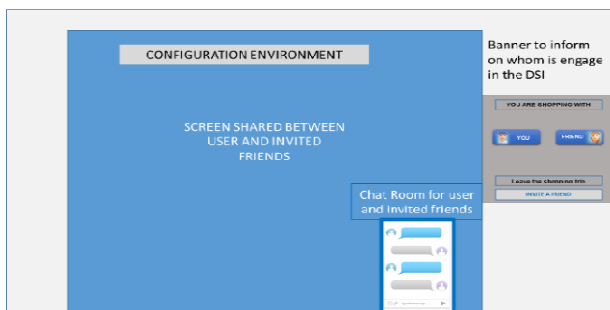

Fig. 12. *Example of a social-interaction interface after inviting a user's contacts*

After logging in, a configurator user and their friend(s) can see a user interface that consists of the two frames mentioned previously—the URL of the configurator page to be joined and a chat window where they can communicate with each other in real time. As

designed by Kumar et al. [24], Ajax Push can push a message to a group of clients asynchronously. Collaborative multiuser applications for the web can be easily built using the Ajax Push technique. Figure 14 depicts an example of an active apparel configurator implemented with the K-interactive feature.
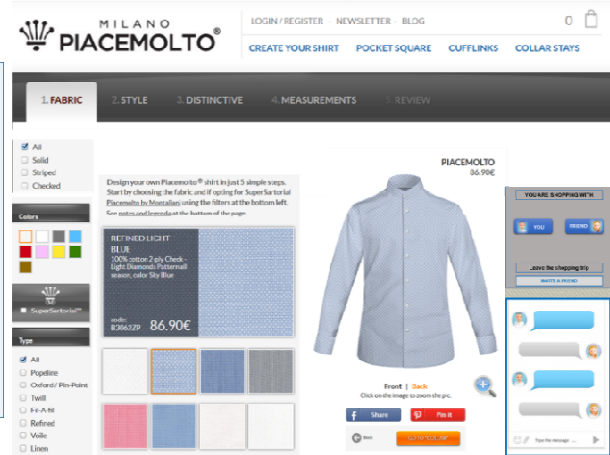

Fig. 14- *Simulation of the integration of the K-Interactive feature on an active OSC*

5. CONCLUSIONS

Few studies on configuration systems with user communities investigate how OSCs incorporate social features. The present study is the first in this field to investigate how integrated social features support users in digitally interacting with their personal contacts. Moreover, the present study provides insights into the implementation of SC features in configuration environments.

Although the proposed OSC-SSW connection has not yet been deployed by an actual sales configurator, its aim is to provide both innovative features that respond to the individual and conversation principles detected as drivers to design the SC environment [2]. Finally, the proposed K-interaction feature aims to fulfill users' need for social interaction by incorporating a friend-referral option that allows a user to invite friends into configuration scenarios.

This paper contributes to the debate on MC social-configuration systems by proposing an idea for a social-interaction feature to enhance the social presence of product-configuration environments. From a managerial point of view, this study provides companies with insight into how to satisfy customers' higher□level needs, such as personal interaction [25]. This could mean that, in practice, MCs link customers to trustworthy sources of information and support decision-making while they shop via OSCs.

Noticeably, the present study was conducted from the perspective of scholars who investigate the user experience on configurators connected to social software. Consequently, the proposed idea of an interactive feature would greatly satisfy OSC users, but the proposed technology has not yet been developed nor tested. This development can be addressed in future research on the feasibility of the proposed K-interaction feature.

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