

Group formation in reverse auction service e-commerce

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Abstract

The study of group formation has begun in the sixties and is still the locus of much research. Few studies have studied the determinants of group formation. However, as group formation is setting-specific, many important settings have been left unstudied. One such setting is e-commerce, particularly in a service context. In this paper, we fill this gap by making two main contributions; first, we synthesize the literature on the determinants of group formation, and second, we develop hypotheses aiming to explain group formation in group reverse auction service e-commerce.

1. Introduction

The service sector accounts for about 80 percent of the gross domestic product (GDP) in North America and other developed economies, and a growing percentage of the GDP of other countries around the world – its importance is emphasized by virtually any economic measure chosen (Menor et al. 2002; Bitner et al. 2008). Because of the intangible nature of many services, compared to products, those services can be shared by a group of people (Fitzsimmons & Fitzsimmons 2011). For example, in most cases, educational classes, travel, and entertainment, to mention a few, are shareable. In fact, in the case of many services, sharing enables feasible economics for service delivery. In that sense, forming groups of consumers become critical for the production and consumption of services. This paper investigates the determinants of group formation in service e-commerce. The preponderance of this prior research on group formation focuses on describing a stage-based process for the life cycle of a group. A relatively small body of work, however, aims at understanding the determinants of group formation in settings other than e-commerce such as group therapy, group training, and natural and laboratory groups, to mention a few. With regards to this paper, e-commerce in general and service e-commerce in particular present unique characteristics that warrant a test of existing hypotheses about the determinants of group formation. That said, we make two contributions in this paper; first, we synthesize a research model of the determinants of group formation from the extant literature and synthesize the underpinning theoretical development of these hypotheses. Second, we develop hypotheses about other determinants to reflect the unique characteristics of service e-commerce vis-à-vis other settings with respect to group formation through this guiding research question: what are the factors that lead individuals to join service e-commerce groups? This paper is organized as follows: Section 2 summarizes the literature on group formation in service commerce in general and service e-commerce in particular. Section 3 details our theoretical development of the hypotheses and research model that aim at addressing the research question in this paper. Section 4 outlines the research design and methodology. Section 5 presents a summary and plan charters our plan for future research.

2. Literature Review

2.1 Early Research on Group Formation:

In 1965, and to address the then relatively new academic discipline, Human Resource Development, Bruce W. Tuckman formulated a stage-based model to explain the development process in small groups. This model includes four stages: forming (creating ground rules and

establishing relationship), storming (a time of intergroup conflict and emotional responses), norming (the development of cohesion and the establishment of roles and norms), and performing (the development of functional role relatedness) (Tuckman 1965). In addition to this model, Tuckman also outlined contingencies that are essential in understanding group formation, which require delineations based on “(a) the setting in which the group is found, (b) the realm into which the group behaviour falls at any point in time, that is, task or interpersonal, and (c) the position of the group in a hypothetical developmental sequence (referred to as the stage of development)” (p. 384). A few years later, a fifth stage, adjourning (or separation), has been added to the model (Tuckman & Jensen 1977). Tuckman’s seminal model became “a simple means of discussing and exploring team dynamics” (Rickards & Moger 2000). Team formation and development would become so popular in the 1970s that Drucker would conclude that they are in danger of being damaged by becoming fashionable (Drucker 1974). Tuckman’s model continued to be widely used as a starting point in practice in the 1990s, especially in light of the importance of teams for organizational success (Bonebright 2010).

2.2 Reverse Auction:

In recent years, internet technologies have yielded a suite of tools to manage sourcing between industrial buyers and their suppliers. One such tool in e-commerce is online reverse auctions (Jap 2003). Auctions have been dubbed “reverse” because in those dynamic biddable events, sellers bid instead of buyers, and prices are bid down instead of up (Jap, 2003, 2007), or until the best offer is reached (Schoenherr & Mabert 2007), for the purpose of leveraging buying power and perpetuating a power-based bargaining relationship (Emiliani & Stec 2005). We extend this notion of reverse auction to consumers in a service setting. Because of the importance of sharing for the economics of services, we further consider the buying side to comprise groups, not individuals. In this model, an individual perceives the need for a given service, which would require a group in order for the service to be delivered economically. That individual, whom we call the “primary agent” is the one who initiates the group by putting out a call for others to join that group for service. Thereafter, other individuals whom we call “secondary agents” join the group and become members. As such, the group is self-organized in the sense that new members join the group without being assigned to it. No one has predetermined conception of the number and identities of those who will eventually join the group. Consequently, group formation is driven both by the group members and by external forces that either initiate or facilitate group formation (Arrow et al., 2000).

The advent of the web 2.0 and associated online social networks has created a platform for sharing, innovation, and user-created content (Lai & Turban 2008). Consequently, and due to the growth of online communities and social networking sites, internet users have become increasingly autonomous and prominent in creating and pursuing new ideas individually and/or in groups (Backstrom et al. 2006). Thereby, in this paper, we are interested in a pull model (consumers forming the group) over a push model (a service provider forming the group). We illustrate the difference by means of two contrasting examples. Following a pull model, a handful of interested students would form a group and hire a math tutor (potentially by means of competitive bidding). Contrastingly, in a push model, the math tutor would advertise her service and students sign up individually. Once the minimum number of registrants required to run the class economically is reached, the tutor begins the service.

A reverse auction model has especially useful features for the procurement of services. First, it enables consumers to dictate their custom requirements in the scope of needed services. This ability becomes nearly non-existent in a push model where the service provider is the one who dictates the scope of the service offered, and the consumers can only adjust. Unlike in product settings, services entail a high degree of customization which is consumer-specific. In that sense, a reverse auction model enables service innovation—creating a need for services that are not readily available. Second, online reverse auctions enable temporal and geographical conveniences (dictating

time and location that are suitable for consumers), reduce cost, provide instant feedback, and provide privacy (Jap 2003).

2.3 Determinants of Group Formation:

Groups are formed for different reasons and purposes, and their members differ in the needs they seek to fulfill via group membership. For example, groups are formed to provide enjoyable activities, to complete projects, to create political solidarity, to make money, or to enhance the status of their members (Arrow, McGrath, & Berdahl, 2000). There is an identifiable moment in which a group comes into being and is formed, a process that later goes into phases of growth, development, change, and, in many cases, to the group ceasing to exist (Beebe & Masterson 2015). In the first phase, which is the focus of our interest in this paper, various determinants affect group formation. The determinants of group formation in reverse auction service e-commerce have not been previously studied, which is a gap in the current literature that this paper aims to fill. Nonetheless, determinants of group formation in other settings than e-commerce have been subject to some research. The determinants that have been studied and which we include in our research model for group formation in the service e-commerce setting are as follows, organized in four categories by whether they are related to the primary agent, the group as whole, the secondary agent, and the service itself.

2.3.1 Determinants related to the primary agent:

Credibility. Studying wine blogs, Consenza et al. (2015) argued that information is at the heart of decision making, and that a positive evaluation of credibility, or believability, plays a role in the consumer decision process (Consenza et al., 2015). The perception of credibility could be evaluated based on three distinct dimensions: first, source credibility (i.e. the perceived credibility of the person/author of the blog); second, message credibility (of the content/information residing on the blog); and third, site credibility (the technical/aesthetic features) (Consenza, Solomon, & Kwon, 2015). Thus, trust is built on both the individual level, and on evaluating the online site as a whole, the latter including an assessment of the message and the website. Credibility, trustworthiness, and appeal will be therefore employed as control variables of the primary agent.

Innovativeness. One of the key social factors influencing the adoption of innovativeness decision—in either a social group or organization—is the opinion leader, whose topic-specific opinions are often followed; in this context, opinion leaders are usually more innovative and knowledgeable about technology adoption than their followers (Lin, 2003). This study will use the variable of the primary agent's innovativeness based on Lin's tested proposition (the strength of opinion leadership is predictive of adoption tendencies) after applying to it the e-commerce setting.

2.3.2 Determinants related to the group

Homophily. Homophily, in sociology, reflects an individual's tendency to form connections with others based on similarities in characteristics such as socio-economic status, values, beliefs or attitudes. Studying organizational founding teams in an entrepreneurial setting, Ruef et al. (2003) argued that the mechanism of homophily explains group composition in terms of the similarity of members' characteristics, mainly "ascriptive" characteristics, or social identities that are attached externally to individuals, such as gender, ethnicity, race, or age. Thus, all-male and all-female teams will be more common than will gender-mixed teams, and ethnically homogeneous teams will be more common than will mixed-ethnicity teams. Other issues affecting the growth of networking groups include the cultural identities and hierarchies, tolerance, and anonymity of organization members (Lai & Turban 2008). Focusing on task-oriented groups in organizational settings, Arrow et al. (2000) and Ruef et al. (2003) describe the act of being drawn together on the basis of shared identity as a "cognitive integration" that is driven by similarity, or interacting with others who share their opinions, beliefs and/or values, and reinforce their interpretation of issues. Homophily, therefore, implies that individuals sharing a common identity also tend to share values, beliefs, or

norms. These supporting evidences, of the hypothesis that homophily drives group formation, are not naturally transferrable to an e-commerce setting, because the process of group formation is setting-dependent (Tuckman 1965; Tuckman & Jensen 1977). This study, therefore, will include homophily as a control variable in our model since the e-commerce setting is different from those tested in the above studies. **Diversity.** Group formation, and consequently the interaction within the group, is affected by a collection of attributes of its members, such as age, tenure, gender, race, cultural background, and their array of individual skills (Arrow et al. 2000). Since we are using two samples of undergraduate students, we will borrow two variables to use in our model: (1) gender and (2) race. Unlike Ruef et al. (2003) who focus on gender and ethnicity from the point of view of homophily (“one of the most widely studied ascriptive characteristics driving homophily is gender . . . a second ascriptive dimension that generates strong network homophily is ethnicity”), we will test them as variables of diversity.

2.3.3 Determinants related to the secondary agent

Innovativeness. In 2003, Lin studied the factors that help shape adoption decisions of various communication technologies and the potential impact of technology adoption on the social system, audiences, and use patterns. She argued that the adoption of innovativeness, or technology products and/or services, is affected by: (1) pre-disposed personality traits that makes one receptive to the idea of innovation adoption, such as risk tolerance; (2) self-actualization need for self-adoption, such as for work or pleasure; (3) the belief in one’s ability to adopt and use an innovation; and (4) the beliefs and attitudes about the rationale for innovation adoption. Moreover, one’s self-confidence in evaluating technology innovations also influences adoption decisions, therefore, individuals with higher self-efficacy will also be more confident in making an adoption decision and less deterred by any number of potential barriers (e.g., complexity involved in mastering the technical skills needed to operate the technology). To Lin, the belief and attitude about a technology are predictive of adoption tendencies. In 2016, Kaushik & Rahman developed a self-report scale measuring consumer innovativeness towards self-service technologies (SSTs) in different industries, banking, retail, and hospitality. This study will include the secondary agent’s innovativeness as a control variable in our model since the e-commerce setting is different from those tested in the above studies.

Interpersonal Attraction. Interpersonal needs are one of the reasons behind a secondary agent’s taking part in group formation. In a broad sense, in the field of psychology, such needs could be organized into Maslow’s Hierarchy of Human Needs (1999), which starts from physiological (such as, food, shelter, sleep, and sexual needs), to safety (security from crime and stability of the current life style), to belongingness (family, friends, and intimate partners), to esteem (respect, praise, and self-worth), and finally, on the top, to self-actualization (the desire for self-fulfillment). In a broad sense, common goals are not the only reason behind group formation, for people’s need for inclusion (to be both recognized and able to include others, especially at the initial stages), control (varying needs to control or be controlled) and affection (giving and receiving emotional support) influence such formations. Moreover, there is a strong link between the need for gratification and the likely adoption of online services (Lin, 2001). In some cases, attraction is the reason why a secondary agent would join a group. This could be a group attraction when group activities and goals coincide with that of the group, or when group membership becomes a reward in itself, like having prestige or status (Beebe & Masterson, 2015). Based on Freudian assumptions, group formation could be also affected by circulating ideologies when the individual puts the leader in the place of the former’s ego ideal (Bettenhausen, 1991). This interpersonal attraction—to the primary agent (Hogg 1985) or the secondary agents who have already joined the group—is based on four significant factors: (1) similarity of needs or personality (Chen & Kenrick 2002); (2) complementarity (Thibaut & Kelley 1959); (3) proximity, contact, and attraction, a physical availability that breeds familiarity and positively influence interpersonal attraction (Kramer 2002); and (4) physical attractiveness (Shaw, 1971). Since our setting of a group purchase model in e-commerce is a new setting to be tested, we

include the secondary agent's interpersonal attraction as a control variable, testing the secondary agent's attraction to the primary agent and the other group members' based on similarity, complementarity, proximity contact and interaction, and physical attractiveness.

3. Hypotheses Development

Sparse research studies have started a path of inquiry to understand the determinants of group formation in the early stages, albeit in a limited number of settings. Many idiosyncratic settings where group formation is paramount have been left unstudied. Key among them is the e-commerce setting, and in particular, service e-commerce, which heavily relies on groups to maintain economic feasibility. Accordingly, in this paper we develop hypotheses on determinants of group formation in service e-commerce. We operationalize group formation in service e-commerce as an individual's intention to join an existing group that aims at creating a demand for a given service in an e-commerce setting. This is consistent with existing definitions (Grefen & Karahanna 2003) of behavioural intention in the information systems literature as a strong predictor of behaviour. We divide the determinants of group formation into four basic categories: 1) primary agent (group initiator) related, 2) group related, 3) secondary agent (decision maker) related, and 4) service related.

3.1 Hypotheses related to the group

Group Fill. Group fill here refers to the extent to which the group is full with signed up members with respect to its intended size. Studying group formation and how groups develop and evolve in large-scale social networks, Backstrom et al. (2006) concluded that people's tendency to come together and form groups is inherent in the structure of society, and that the probability of joining a new community depends on the number of friends already in that community. Under diffusion growth, a group attracts new members through the friendship ties of its current members to outsiders (i.e. users may be influenced to join due to the behavior of their friends), while in non-diffusion growth, individuals without pre-existing ties to any group members join a group (i.e. user may join because there is a feature of the group itself, such as a common interest, which appeals to them) (Kairam et al. 2012). Extending this logic to a group service e-commerce, we expect that group membership will be more likely as the group size increases. Accordingly, we hypothesize that H1: Group fill is positively related to an individual's intention to join a service group in an online reverse auction setting.

Group Engagement. A widely accepted definition of engagement in the marketing literature is a consumer's cognitive, emotional and behavioral brand-related activity during, or related to, specific consumer-brand interactions (Hollebeek et al. 2014). In an online group service setting, this could be through interacting with group members by commenting, sharing audio/visual information, ensuring group members' preferences are incorporated in the service scope, actively engaging with other group members in discussing existing bids, inviting new bids, and selecting the best service provider. Such engagement with community members has been coined by (Chua et al. 2013) as social correlation, which aims at developing online purchase decisions. This can be thought of through the lens of social presence theory which suggest that in performing a task, engagement through a given medium allows users to establish personal connections with others involved in performing that task, to experience others as being psychologically present, and to feel a sense of human contact via that medium, which ultimately results in increased use of that medium (Xu, Ryan, Prybutok, & Wen, 2012). In further empirical support, Lin and Lu (2011) found that ties related to social interaction (structural dimension), shared values (cognitive dimension), and trust (relational dimension) play important roles in users' continued intention to use Facebook fan pages. Such interactive ties influence the perceptions of trust and reliability which end up influencing the use of SNS. In making adoption decisions, users who are socially related tend to rely on one another to organize the complex information on the web and to make similar choices, which is evident from the

abundant amount of user-generated content, such as tags, ratings, and reviews, all of which collectively aim to allow items to be more easily discovered by other users (Chua et al. 2013). By the same token, in an online group service setting, we expect that group members' engagement would likely attract more members to join. Thus, we hypothesize that H2: Group engagement is positively related to an individual's intention to join a service group in an online reverse auction setting.

3.2 Hypotheses related to the secondary agent

Perceived Usefulness. Usefulness is defined here as "the degree to which a person believes that using a particular system would enhance his or her job performance." This follows from the definition of the word useful: "capable of being used advantageously." (Davis, 1989; p. 320). Usefulness is one of the two main determinants of adoption in the widely accepted technology acceptance model (TAM) (Davis, 1989; Komiak & Benbasat, 2006; Venkatesh et al., 2003). Dimitrova & Chen (2006) extended the notion of perceived usefulness by developing two dimensions of this construct: perceived need, which focuses on the current need or relevance of adoption, and perceived benefit, which deals with the future outcome or benefit from adoption. Among the several psychological factors that influence technology adoption, Lin (2003) identified the perceived need for adoption as a driver resulting from self-actualization. In an e-government service setting, it seems plausible that unless citizens perceive personal need to use e-government services, they are not likely to change their behaviour. For instance, the need to file taxes quickly may serve as motivation to start using online government services. Furthermore, the uses and gratifications theory emphasizes how social and psychological needs drive audiences to make use of different media to obtain gratifications (Rubin 1994). Through this theoretical lens, (Zhu & He 2002) find a positive relationship between an individual's perceived need for the internet and his likelihood of adopting and using it. So the perceived need for the new service may be an important determinant of group formation. Also, Bretschneider, Gant, & Ahn (2003), in their empirical exploration of e-government service adoption, identified perceived benefit as a main driver of adoption in an e-government services setting. The perceived benefit construct is closely related to perceived usefulness of technology in the TAM theoretical model - Raman and Leckenby (1998) used the concept of utilitarianism to explain online behaviour and found a positive relationship between utilitarianism and duration of visit of web ads. Thus, we hypothesize that H3a: Perceived usefulness is positively related to an individual's intention to join a service group in an online reverse auction setting; H3b: Perceived need is positively related to an individual's intention to join a service group in an online reverse auction setting; H3c: Perceived benefit is positively related to an individual's intention to join a service group in an online reverse auction setting.

Prior Social Capital. Social capital theory establishes that social capital, the relationship network possessed by an individual or a social network and the set of resources embedded within it strongly influence the behavior of interpersonal resource exchange and combination (Nahapiet & Ghoshal 1998). In an online group buying setting, (Chen, Wu, Peng, & Yeh, 2015) found that social capital among group members drive their active participation. They reason that in an online group buying setting, social interaction create intensive and sophisticated channels for information and resource flows, which result in active participation triggered by an individual experiencing a generalized mood state characterized by positive social interactions (Tsai & Pai 2013). In a service retail setting, interaction and participation engenders social influence among group members, which in turn positively influences consumer intentions to adopt retail service innovations (Chiu & Hofer 2015). Thus, we hypothesize that H4: Prior social capital is positively related to an individual's intention to join a service group in an online reverse auction setting.

3.3 Hypotheses related to the service

Innovativeness. A fundamental characteristic of any innovation is its newness, which can be perceived as a reward/risk by users (Wells et al. 2010). Innovativeness is defined here as the degree

of newness of an innovation, which is a widely accepted definition (Garcia & Calantone 2002). While there can be multiple perspectives toward newness (e.g. firm, industry, market), we consider the perspective of consumers (Atuahene-Gima 1995). From a reward perspective, marketing research has argued that the novelty of an innovation or product can foster positive affective reactions such as excitement (Cox & Locander 1987) and interest (Mukherjee & Hoyer 2001). Seminal psychology literature asserts that the essence of novelty stimulates affective reactions—be it positive or negative. Based on earlier work that studied reactions to novel stimuli (Berlyne, Graw, Salapatek, & Lewis, 1963), later research found that novel stimuli caused strong arousal or emotion, which are highly affective reactions (Mandler 1982). Such affective reactions were explained by individual's perceptions of novel stimuli as either something they've never experienced before or as previously experienced attributes that are presented in unfamiliar combinations (Berlyne, 1971). Accordingly, innovativeness (newness) has been established in the adoption literature as a significant predictor of adoption (Venkatraman 1991; Wells et al. 2010). In the context of group service e-commerce, we build on these earlier empirical findings in predicting that higher levels of service innovativeness are positively related to an individual's intention to join the group to try it. However, from a risk perspective, beyond a certain threshold, higher levels of innovativeness (newness) engender excessive levels of innovation resistance. Ram & Sheth(1989) identify five barriers that explain consumers' resistance. These barriers includes usage (an innovation is not well-suited with existing practices), value (performance and monetary value of an innovation relative to its substitutes), risk (degree of perceived risk, which can be financial, psychological, physical, or social, of an innovation), tradition (resulting from the incompatibility of an innovation with an individual's existing values, norms, and past experiences), and image (associated with the innovation resulting from its origins be that the brand, country, product category, for example). In a recent study, Laukkanen(2015) established empirical evidence for the hypotheses that all five barriers causing resistance lead to uncertainty avoidance when making adoption decisions of innovations. Drawing from this empirical research to apply in our realm of group formation in service e-commerce, too innovative a service would likely engender uncertainties that would result in avoidance. Accordingly, we hypothesize that H5: Service innovativeness has an inverse U relationship with an individual's intention to join a service group in an online reverse auction setting; initially, the higher the innovativeness of a service the greater an individual's intention to join its group up to a certain level where excessive levels of newness of the service would be associated with lower levels of an individual's intention to join its group.

Complexity. Because of users' intense involvement in the production and consumption of services (Fitzsimmons & Fitzsimmons 2011), we can think of a service as a task. Thus, we define service complexity along established lines of task complexity. Task complexity or difficulty is one of the most essential factors affecting task performance as observed in psychological experiments (Wood et al. 1987). Difficulty can arise from the depth and breadth of the service scope and/or the number of process steps required to experience the service. Prior empirical research (Byström & Järvelin 1995) shows that as task complexity increases, the complexity of information needed increases, the needs for domain information and problem solving information increase, the share of general-purpose sources increase and that of problem and fact-oriented sources decrease, the successfulness of information seeking decreases, the internality of channels decrease, and the number of sources increase. Higher levels of task complexity places higher cognitive demands, where the overload may exceed the cognitive capacity of the individual. This can cause an increased perception of uncertainty resulting from the difference between the amount of information required to perform a specific task and the amount of information readily possessed by the individual (Galbraith 1977). As a result of the associated need for information processing and cognitive demands, the individual may lose interest, motivation, and enjoyment in performing the task (Morgeson & Humphrey 2006). In a crowdsourcing context, Zheng, Li, & Hou (2011) find that task

complexity has negative impact on the intrinsic motivation of individuals to pursue the task. Scope broadness is one of the dimensions of complexity and it necessitates greater need for information to deal with and prepare for various unexpected events that more complex tasks typically involve. Bringing clarity and simplicity to a task increases the odds that someone will want to participate (Howe 2008). By the same token, a complex service may trigger users' resistance to join its group. Therefore, we hypothesize that H6: Service complexity is negatively related to an individual's intention to join a service group in an online reverse auction setting.

Convenience. Service convenience is defined as consumers' time and effort perceptions related to buying or using a service (Berry et al. 2002). Consumers' time and effort perceptions of convenience span multiple dimensions, including, decision convenience (consumers' time and effort expenditure in deciding which service to purchase and which supplier to use), access convenience (consumers' time and effort expenditure in initiating service delivery), transaction convenience (consumers' time and effort expenditure in starting and completing purchase transaction), benefit convenience (consumers' time and effort expenditure in experiencing the service's core benefits), and postbenefit convenience (consumers' time and effort expenditure in reinitiating contact with the service provider). These convenience types reflect stages of consumers' activities related to buying or using a service. (Berry et al. 2002) assert that Consumers' perceptions of convenience will have a positive influence on their evaluation of the service. In a follow-up study, Seiders, Voss, Godfrey, & Grewal(2007) established empirical evidence that different combinations of these four dimensions of service convenience directly influence not only consumers' behavioral intention toward a service, but also their repurchase visits and spending. This relationship spans not only the physical store experience, but also the online experience (Yang et al. 2003). In their study of the consumers' attitudes towards e-service, Zhang et al. (2005) found that service convenience is a significant indicator of website service quality, for it affects consumers' level of satisfaction, which in turn affects their behavioral intention. In a service e-commerce setting, service convenience in terms of time and effort expenditures will likely motivate individuals to join an online group for service. Owing to the autonomy consumers have in a reverse auction model, a service group can negotiate and enforce terms that are of convenience to its members, which would attract group membership. Therefore, we hypothesize that H7: Service convenience is positively related to an individual's intention to join a service group in an online reverse auction setting.

Scope flexibility. Customization is one of the key characteristics of the production and consumption of services, which is a key differentiator from standardized products (Fitzsimmons & Fitzsimmons 2011). Service customization refers to personalize and individualize the production and consumption of services (Rust & Chung 2006). Mathwick et al. (2010) established that customization is associated with greater overall value, convenience, and usefulness. In the context of business-to-business (B2B) e-services, Oliveira and Ruth (2012) found that customization in service e-commerce results in customers perceiving greater control and influence over the process, which leads to satisfaction and increased odds of repeat website visits. Such customization entails tracking customers' explicit and implicit preferences and providing unique responses to customers' requests based on their preferences. In a group service e-commerce setting following a reverse auction model, the service group has the autonomy to customize the service scope to suit the needs and preferences of its members. As such, potential group members' perception of control and influence of the service scope will likely motivate them to join. Therefore, we hypothesize that H8: Scope flexibility (i.e. customizability) of the service is positively related to an individual's intention to join a service group in an online reverse auction setting.

Perceived Price. Karmarkar et al. (2015) assert that price is a key factor in most purchase decisions. Perceived price is defined as the consumer's perceptual representation or subjective perception of the objective price of the product (Jacoby & Olson 1977). When making purchase decisions, consumers often compare objective price with internal reference price, which is the overall

price level or range the consumer perceives (Winer 1986). Consumers' perceived price has been found to be negatively related to their perceived value, which in turn positively influences their behavioral intention (Chang & Wildt 1994). Perceived value here represents consumers' overall economic assessment of their purchase based on their perceptions of what they receive compared to what they give (Zeithaml 1988). In an online reverse auction model of services, buyers are able to enforce more favorable prices than in traditional purchasing models where price negotiation is likely less effective. The term "reverse auction" emphasizes that sellers rather than buyers bid and that the goal of the auction is to drive price down rather than up (Jap 2007). Such a shift in the negotiating power of pricing creates a relatively greater perception of control over the eventual transaction price. Perceptions of control over pricing can in turn create greater perception of value and accordingly greater intention toward the service. Therefore, we hypothesize that H9: Perceived price of the service is positively related to an individual's intention to join a service group in an online reverse auction setting.

4. Conclusions and Future Work

Group formation has a lively research area since the sixties. The study of group formation is setting-specific. Only a few settings have been subject to research aiming to understand the determinants of group formation. One of the important settings that have not been studied in this literature is e-commerce. In e-commerce, there is a growing interest both in research and practice circles in group e-commerce models. This warrants an understanding of the determinants of group formation in e-commerce, which is currently a gap in the research literature. This paper is a first attempt to focus the light on e-commerce in trying to understand the determinants of group formation. In this paper, we developed hypotheses aiming to understand group formation in group reverse auction service e-commerce. This builds on a synthesis of the literature that resulted in identifying a list of determinants that have been argued to drive group formation, albeit in other settings. Building on the development of theoretical foundations in this paper, our future work will conduct an empirical investigation to test existing hypotheses as well as the newly developed hypotheses in a group service reverse auction e-commerce setting.

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