

# **P2P Collaborative Consumption: Towards Sustainability in the Virtualization Processes of Knowledge Sharing Firms**

*Completed Research Paper*

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## **Abstract**

Some business processes do well when activities remain physical; for others, there must be a balance between the physical and virtual process for them to survive. Virtualization does not imply the use of technology because some processes like catalog sales can be virtual but are not IT-enabled. For the virtualized process that is IT-enabled – such as the P2P collaborative consumption or the sharing economy phenomenon – it is important to theorize their sustainability because their characteristics may differ. This research interrogates the underlying notion of amenability in process virtualization theory (PVT) and suggests that understanding process virtualizability must go beyond the amenability of a physical process (as posited by PVT) to the sustainability of the IT-enabled virtual process. Based on our investigation of online learning platforms, we provide empirical support that network effects and scalability are necessary, but not sufficient, for the sustainability of knowledge sharing firm's virtual processes and that aligned motives play a compensatory role in the sustenance of a knowledge sharing firm's virtual process.

## **Keywords**

Sustainable process virtualizability, process virtualization theory, sharing economy, network effect, knowledge goods

## **Introduction**

The term “sharing economy” (Benkler 2004) or “P2P collaborative consumption” (Botsman and Rogers 2010) has gained a great deal of recognition over the past few years, thanks to the recent shift in today's global business environment. This shift is epitomized by sharing firms or platforms such as Airbnb and Uber. Much of the continuous capability offered by the sharing economy can be argued to be enabled by the quality of the firms' virtual processes aided by the internet and the increasing utilization of innovative information and communication technologies (IT). Although research has highlighted several success factors, commensurable failures of hundreds of sharing firms, if not thousands, have also been reported. Tauscher and Kietzmann (2017) report that the success of sharing firm depends on the application of a strategic business model at the right time, but their argument offers no empirical evidence for their illustration. The sharing economy phenomenon is made possible by the massive technology-enabled virtual transactions that connect service providers and users. If a virtual process defines a process in which physical interaction between people and/or objects has been removed (Fiol and O'Connor 2005), then sharing economy or peer-to-peer collaborative consumption is a prime context.

The literature is replete with the positive role of effective virtual work processes or virtualization of work organization in the global business environment (e.g. Barth and Veit 2011; Overby and Konsynski 2008). Knight (2018), CEO of Federos – a service management firm –, reports that a neglect of the necessary shift to virtualization can stall business operations, delay new service offerings and cause lags in customer service response times. However, as argued by Overby (2008), not all business processes are amenable to process virtualization. Organizations therefore ought to know more about their business environments, their users' characteristics and the strategic level of virtualization required in order to properly adapt to the virtual

business climate. Thus, to understand the failures or successes of sharing firms is to understand their processes of virtualization and to a larger extent, the sustainability of the virtual processes.

External managers can then explore how various facets of a sharing process for the successful firms combine to inform the levels of users' adoption or engagement with the virtual processes of that sharing firm or platform. The process of virtualization in a sharing firm may vary because different categories of sharing-enabled firms would have different characteristics. In their taxonomy of peer-to-peer sharing and collaborative platforms, Chasin et al. (2018) argued the need for researchers to specify the category of sharing firm being investigated so to situate research contribution properly. Their study however excludes consumption of digital goods which is argued as a key constituent in the sharing economy (Belk 2007; Tauscher and Kietzmann 2017). This study focuses on the collaborative consumption of digital goods, specifically knowledge goods. The nature of the sharing economy also means that two major virtualization processes ensue. One at the provider end (supply side) and the other at the consumer end (demand side). The interplay between these two processes are vital for the success of sharing firms. In this study, however, we focus on the demand-side of the knowledge sharing phenomenon.

Overby (2008) argues that an entity's process virtualizability can be measured by two outcomes – adoption and service quality outcome. Since sharing economy ensures that technology is at the heart of every process and virtualization seems to be ingrained, much of the focus of knowledge sharing firms would not, necessarily, be on dreading whether a physical process would be amenable to virtualization or not. Rather sustaining the virtual process would be the focus of most sharing platforms and hence our research focus. We seek to (1) *identify which factors inform the amenability of virtual business processes for a P2P knowledge good sharing firm* and (2) *explain how these factors combine to drive the sustainability of virtual business processes for a knowledge good sharing firm*. Based on analyses of survey data on users of virtual learning platforms, the study finds that one's aligned motives to consume knowledge goods has a compensatory relationship with network effect. Thus, a firm cannot rest on their network penetration to sustain their IT-enabled virtual business processes. The theorized model explained 78% of variance in the dependent variable - sustainable process virtualizability (SPV) – indicating a strong theoretical support for our investigation.

The rest of the paper is organized as follows. In the next section, related literature on digital goods and process virtualization theory is explored. The conceptual model is posited after hypotheses development, explaining what factors impact SPV. Results and discussion are presented. We conclude with implications, limitations and directions for future research.

## **Related Literature**

### ***Sharing Economy***

Varying definitions of sharing economy have been used, but the consideration of which activity should be considered as part of the sharing economy is dependent on the purpose and specific circumstances (Hamari et al. 2016; Hawlitschek et al. 2016). This study adopts Belk's (2007) underlying definition as “the act of and process of distributing what is ours to others for their use and or act and process of receiving or taking something from others for our use” (p. 127). Some studies in the sharing economy have sought to explain success factors or failures in the sharing economy. For instance, Tauscher and Kietzmann (2017) who argued for hybrid business model to sustain sharing economy firms state that the virtuous cycle of attaining scalability and network effects may not be enough for sustainability of sharing firms.

### ***Digital Goods in the Sharing Economy***

Existing literature on the sharing economy have studied different products – such as house sharing (e.g. Airbnb) and ride sharing (e.g. Uber) in the sharing. For instance, Zervas et al. (2017) studied the industry impact of the multisided nature of the sharing firm and argued that the differential effect of Airbnb activities on the hotel industry and affiliate industries like air travel based on the location of operation. Cramer and Krueger (2016) studied the relative market advantage of Uber's innovative matching technology which maximizes capacity utilization for ride sharers. Thus, literature have largely focused on physical experiences

in the sharing economy with little attention on the unique dynamics of digital goods (e.g. music, online courses or knowledge goods, etc.). Digital goods (also known as *antirival* goods) generally describes goods that are stored, delivered and used in its electronic format and shared through the internet via downloading or live streaming (Kim et al. 2014). An example of a sharing economy firm dealing with such digital goods is Udemy (Tauscher and Kietzmann 2017). This sharing economy firm provides a web-based learning platform (www. Udemy.com) where instructors can share their unique skills through short courses that individuals sign-on to and pay for these skills. Tauscher and Kietzmann (2017) assert that scalability and network effects are characteristics of the sharing economy but fail to provide any empirical assessments to validate their claims. However, their work provides a solid base for considering sharing of knowledge goods via virtual platforms. Their work is in stark contrast to Chasin et al.'s (2018) taxonomy on sharing economy, which excludes analyses of sharing of digital goods. Flexibility in usage and low marginal cost in production also characterizes digital goods which means that theorizing this phenomenon is essential in broadening our horizon on sharing economy. This study therefore seeks to address some of these inherent gaps by focusing on knowledge goods sharing phenomenon.

### ***Process Virtualization Theory (PVT)***

In the business context, process virtualization theory (PVT) (Overby 2008) explains business processes regarding their extent of amenability or resistance to them being conducted virtually (in virtual forms). Overby (2008) asserts that not all processes are easily amenable to virtualization and argues that certain requirements when not adequately met reduces amenability of a process to be conducted virtually. PVT assumes that process virtualizability (which depicts how well a traditional business process does as a virtualized process) is negatively influenced by the sensory requirements of the process, the relationship requirements of the user, synchronism requirement of the process, and identification and control requirements. These relationships are moderated differently by the technology in terms of richness, reach and monitoring capability of the IT. Essentially the theory helps to explain how advances in technology are enabling new generation of virtual process. This perspective is taken to understand the sustainability processes of a sharing economy firm.

There is the notion that virtualization is synonymous to the use of an information technology which is not the. Overby (2008) argues that several processes are virtual and yet do not require information technology to remove the physical barriers of interaction between the virtualization participants. For instance, catalog sales and correspondence courses are virtual processes but non-IT based Overby (2008). This argument is critical in our consideration of knowledge sharing economy. The sharing economy phenomenon is essentially an IT-oriented phenomenon which implies that without a digital platform there will not be the sharing economy. Consequently, we extend technology is treated as context for understanding virtualization instead rather than the moderating role it plays in PVT (Overby 2008).

### **Hypotheses Development**

Virtualization has been shown to drive returns and so understanding the factors that make a process more virtualizable is vital. This study identifies two main areas of extension of PVT. First, we consider situations where virtualization processes are the characteristic feature of the phenomenon, the question then is how to sustain this virtualization. PVT assumes that processes are in a state where one can choose between going for virtualization or not. While this assumption is vital for business decision-making, it only explains the degree of amenability of a process to virtualization. It does not adequately provide explicit explanation of antecedent factors influencing already-virtual business processes where the focus is not so much on the degree of amenability, rather the sustenance of it. PVT however maintains that the process of virtualizability can be measured in terms of the adoption and quality of the process. We note that sustainability requires adoption, but adoption as predicted by the antecedents of PVT does not fully measure sustainability of a process. Secondly, the phenomenon of sharing economy is made possible by the explicit use of the digital platform provided by the sharing firm. Therefore, IT plays a contextual role and not a moderating role. In this case, even when new business processes (not already virtualized by the sharing firm) come up, their amenability would be explored with the IT as a contextual factor and not as a moderating factor. In the

context of P2P collaborative consumption of digital goods, we extend our understanding of PVT guided by the two broad arguments made above.

The present study redefines process virtualizability in terms of the sustainability of the process and assume that the adoption of the process is an inherent quality of the sustainable process. Therefore, in our context, *sustainable process virtualizability (SPV) encompasses how a process is to be amenable (that is how the process is to be conducted without physical interaction between people) and how ensuing virtual processes enable the continual use of goods and services over a long-term by adopters*. We explore the factors that enable the adoption and continuity of a digital goods sharing firm via the influences on the IT-based virtual processes. It must be noted that our sustainability conception is distinct from the innovation diffusion theory which seeks to understand how and why a feasible virtual process as identified by PVT would be adopted (Rogers 1995). Our conception assumes an IT-based business process virtualization at play. Two main IT contextual factors that have been advanced as necessary but not sufficient characteristics of a successful sharing economy firm are network effects and scalability (Tauscher and Kietzmann 2017). Network effect theory (Katz and Shapiro 1986, 1994) explains how the benefits derived by adopters from a network technology (Udemy digital platform for learning) positively influences the size of the network (growth in the usage of the network). Tauscher and Kietzmann (2017) describes network effect as how a firm's offering becomes more attractive to users as the network of users and suppliers grows. For digital goods consumption, network effects are in terms of the general perception of value in having certain knowledge stock or skills set. The value may be weighed by its relevance in the business environment and associated pay grade. Currently Udemy liaises with firms such as Apple and Lyft to provide educational needs for affiliates and employees of these firms because of the perceived quality of benefits (i.e. knowledge quality) gained by using the services provided by the digital platform. Zhu et al. (2006) succinctly puts it, network effect is a determinant of network adoption. Thus, the integrating virtual processes of a business have a higher chance to increase market share and remain sustainable as network effect increases. Notably our contextual assertion of the technology and the underlying theses of network effect embodies the construct IT 'representation' and IT reach as moderating factors in PVT. The above discussion underscores the two conceptions of network effects: vertical *trading community influence* and the horizontal *peer adoption* (Zhu et al. 2006). These are operationalized as first order constructs for measuring network effects as a second order construct. Trading community influence is the extent to which a firm's customers, suppliers, and other vertical partners in its trading community are willing to use or support online learning platforms. Peer adoption is the extent of online learning diffusion among horizontal peers (business and professional colleagues, and fellow students) in similar industries.

Prior studies have also identified the impact of switching cost on network effects such that a higher switching cost will influence users to remain with the network thereby sustaining services provided to these adopters. Consequently, we posit the following hypotheses.

**H1a:** *Adopters' perception of network effects of the sharing firm's digital services will positively influence sustainable process virtualizability of the firm.*

**H1b:** *Perceived switching cost to the adopter will positively moderate the relationship between perceived network effect and sustainable process virtualizability.*

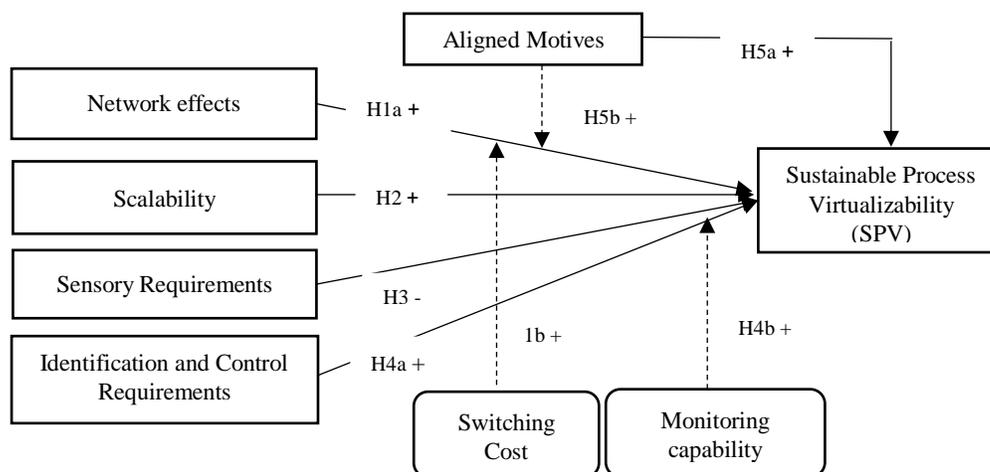
Scalability refers to the flexibility in the virtual process that allows the firm to increase its service offers to more users without a proportional cost buildup (Tauscher and Kietzmann 2017). Digital goods are easy to assess, and their experiential nature can be easily and quickly assessed. Overby (2008) explains that digital goods can easily be downloaded which makes the barrier of synchronism to the virtual process less important because of less delay in interaction with process objects. For sharing firms dealing with peer-to-peer digital goods, the same goods can be made available to additional users at a next- to-nothing marginal cost and at any time. It is also this higher economy of scale that is required for online platforms to survive and for their digital product offerings to reach as many people in the shortest possible time for higher realization of value. For instance, the more skill set in Python NLP module are taught, the more its use received by relevant industry and the greater the value realization or perception for users. In the same vein, effective virtual classrooms and student discussion boards facilitate scalability expansion for the sharing

firm. Firms are also able to increase the capacity of taking more students online with increased instructional resources at a marginable cost due to powerful cloud computing services without compromising the quality and performance of the virtual process (Laurane and Lesot 2009; Tauscher and Kietzmann 2017). In sum, high scalability for knowledge sharing firm are necessary for sustaining the virtual business processes.

PVT also argues that when processes require high synchronism, they tend to be less virtualizable because these processes would introduce delay when abstracted away from process objects. Synchronism requirement is “the degree to which the activities that make up a process need to occur quickly with minimal delay” (Overby 2008, p. 281). However, the characteristics of business processes that share digital goods or services enable them to thrive with less or no synchronism requirements. This affords the opportunity to explore PVT further in such contexts. In reality, it is rather the asynchronous nature of knowledge sharing firms such as Udemy that make their process more virtualizable and sustainable. Again, for online platforms, users have the flexibility of using purchased digital goods multiple times at any time without incurring additional consumption costs. For instance, when one buys or registers for a course, the course content is made available perpetually for that user on the sharing firm’s cloud resource. Users only have to log in and access the course, even after course completion. This phenomenon implies if users have need for business processes to quickly occur, online learning platform serves as a quicker channel. Alternatively, users have the flexibility to control the pace of the business process delivery. This explains why in most cases asynchronous requirements have advantages over synchronous requirements (Overby 2008). Taken together, the study asserts that synchronism requirements are negligible for adoption and sustenance of virtual processes that involve the sharing of digital goods hence the omission of this construct in our theorization. Adopters will also perceive the nature of the goods to be easily accessible by other adopters. This experiential note also increases scalability perception. Consequently, a higher scalability perception will erode the barriers of synchronism requirements. Therefore, we posit the following:

**H2:** *Adopters’ perception of scalability of the sharing firm’s digital services will have a positive relationship with sustainable process virtualizability of the firm.*

The effect of an online learning interface cannot be overstated in terms of how it influences the virtual processes. Many studies (e.g. Alavi and Leidner 2001; Kumar et al. 2019; Wijesooriya et al. 2018) on e-learning or online learning platform and the broader literature on human-computer interaction have indicated that better aesthetics and ease of use for interface designs can make it easier for users to engage with the technology platform. PVT (Overby 2008) argues that since people may not be able to taste, smell or feel



**Figure 1: Conceptual Model**

physical objects after virtualization, a process that requires high physical interaction would be inimical to virtualization (Apte and Mason 1995). High requirement for physical manipulation implies that conducting

those business processes in virtual (globally disaggregated) settings would be difficult. We add that when users perceive that the experience of engaging in the digital goods (knowledge) sharing would be better served by traditional settings such as physical classrooms, they would gradually disengage from the use of the learning platform thereby affecting the adoption and sustainability of the business process. Therefore, we posit the following:

**H3:** *The greater (lessor) the sensory requirements of the process, the less (more) amenable the process is to be sustained virtually.*

PVT (Overby 2008) explains that virtual processes are susceptible to identity spoofing because participants cannot physically inspect others to confirm their identity. Thus, some processes may require greater identity and control requirements, and this would negatively influence process virtualizability. This study argues that the context of application may call for a different interpretation to the identification and control requirements of the virtual process. In the sharing economy, participants expect higher security provision regarding their personally identifiable information and the payment information from the digital platform provider to ensure trust in the business process. Generally, online users should feel more protected with perceptions of high requirements for identification and control because these perceptions influence trust in the virtual processes of the digital platform. Existing users shall continue their relationship with a virtual process if such requirements are high. Thus, a perception of high identification and control requirements in an ongoing virtual process is vital for sustaining process virtualizability. That notwithstanding, during the process of learning, the participants may not be so bothered about who does what on the platform or in a virtual classroom since the learning and knowledge acquisition process is a strong motivation for engaging the online learning platform. For users, this would reduce the reservations they may have about the strictness of the online platform which would reinforce a positive outlook towards the virtual processes of that platform. We expect that this will be positively moderated by the monitoring capability of the digital platform. Monitoring capability describes the ability of the system to track and analyze virtual process participants in a systematic, detailed and automated way (Overby 2008). It instills positive perceptions of the information security capabilities of the digital platform's virtual processes and hence a trust in the sharing firm which leads to continual use of the services enabled by the virtual processes. Consequently, we posit the following hypothesis:

**H4a:** *The greater the identification and control requirements, the more sustainable the adopted virtual process is.*

**H4b:** *The monitoring capability of IT positively moderates the relation between identification and control requirements and the sustainable process virtualizability.*

PVT argues that relationship requirement which describes the need for process participants to interact with other participants reduces the amenability of a business process to be virtually successful because of the knowledge acquired and the trust built over the process. In the sharing economy, this study assumes that relationship requirement will not have an impact on process virtualizability at the consumer end because underlying relationship-building factors such as trust have been shown to have no significant impact on users' propensity to participate in a sharing economy (Hawlitshcheketal et al. 2016). Although process risk was significant in their study (which explained the insignificance of trust), this paper argues that accessing digital goods for the consumer provides next to no risk in the virtual process. We therefore exclude this construct in our context because it would have no influence on the sustainability of a virtual process.

Motivation is defined as the energy or the force that stimulates a person to act towards the fulfillment of one's desired goal. Thus, a person's utilization of the externalities created by network effects would be influenced by the relevant motives that the phenomenon provokes. Hawlitshcheketal et al. (2016) argue that motives are key driving forces behind one's participation in the sharing economy. If the motives of an adopter is not met with positive virtual experience in using the knowledge goods, the user is unlikely to continue the usage of the services. In our context, it is easy for an adopter to quickly experience the product and give feedback. On an online learning platform, the courses and instructors have associated ratings and reviews which serve as electronic word of mouth (eWOM) for adopters buying motives (Cheung and Thadani 2012; King et al. 2014) . Adopters can therefore leverage the eWOM to make informed choices on which digital product or service to purchase that also suit their realistic motives. Aligned motives can also

be conceived as the expected benefits that users perceive (Zhu et al. 2006) in taking the course. Users may also feel positive about platforms that are associated with key industry partners and business organizations. Thus, platform with high network effect will be related with one's aligned motives. This relationship will be substitutive in that when the network effect is so strong an adopter will engage in the virtual process although the aligned motives may be weak or not well developed. Conversely as aligned motives become strong the impact of network effect should wane. Taken together we hypothesize that motives will combine differently to influence process virtualizability, directly and indirectly, through its perceptive impact on network effects.

**H5a:** *Adopters' aligned motives positively influence sustainable process virtualizability*

**H5b:** *Aligned motives will compensate for the impact of network effects in positively influencing the sustainability of the virtual learning process.*

## Research Method

A survey was conducted with users of online or virtual learning platforms through a market recruitment firm. The survey targeted 180 subjects of which 149 valid responses were used in the final analysis. Common method bias (CMB) was assessed through reverse coding of measurement items. Items were dropped for failing CMB checks and non-response bias. The Harman's single factor test was used to assess CMB in the final sample and showed that CMB was not an issue. Smart PLS 3.0 was used to test the measurement and structural models (Hair et al. 2018; Ringle et al. 2012). We conducted an exploratory factor analysis on newly developed scales – aligned motives and scalability. The development of new scales followed guidelines set forth by Mackenzie et al. (2011). Discriminant validity, convergent validity and construct reliability were validly assessed. Results are displayed in table 1.

**Table 1. Discriminant validity, correlations, and composite reliability**

| Variable                                      | Mean | SD   | CR   | 1            | 2            | 3     | 4            | 5            | 6            | 7             | 8        |
|---|------|------|------|--------------|--------------|-------|--------------|--------------|--------------|---------------|----------|
| 1. Network Effect (NE)                        | 5.04 | 1.57 | 0.93 | <b>0.78*</b> |              |       |              |              |              |               |          |
| 2. Switching Cost (SC)                        | 4.08 | 1.52 | 0.81 | 0.56         | <b>0.58*</b> |       |              |              |              |               |          |
| 3. Scalability (SY)                           | 5.53 | 1.10 | F    | 0.43         | 0.03         | --    |              |              |              |               |          |
| 4. Sensory Requirements (SER)                 | 4.62 | 1.74 | 0.93 | 0.51         | 0.68         | 0.07  | <b>0.91*</b> |              |              |               |          |
| 5. Identification & Control Requirement (ICR) | 4.50 | 1.88 | 0.91 | 0.42         | 0.47         | 0.42  | 0.48         | <b>0.65*</b> |              |               |          |
| 6. Aligned Motives (AM)                       | 5.87 | 1.12 | 0.93 | 0.44         | 0.17         | 0.83  | 0.20         | 0.39         | <b>0.83*</b> |               |          |
| 7. Privacy Concerns                           | 3.97 | 1.87 | 0.93 | 0.40         | 0.76         | -0.22 | 0.54         | 0.29         | -0.41        | <b>-0.05*</b> |          |
| 8. Virtual Experience (VE)(single factor)     | 3.57 | 1.63 | 1    | -0.43        | -0.39        | -0.27 | -0.39        | -0.33        | -0.31        | -0.03         | <b>1</b> |

\*AVE's are shown in diagonal

Our conceptualization of scalability was influenced by Laurane and Lesot (2009) study. Scalability can mean different things for different people, from a more technical view to a broader business process view. We adopted a broader view that entails the performance of the entire information system (people, environment and the technology). "Scalability is the ability of the [information system or the P2P phenomenon] not only to function as the size of the problem and context increases but to even take advantage of that increase in size and volume, for instance, to provide more adequate results" (p. 215). Our context is the perception of a sharing firm dealing with knowledge goods (i.e. P2P sharing of online courses) and the volume of heterogeneous platform users. Measurement items for individual's aligned motives were based on Efklides and Moraitou's (2012) discussion on motive congruence and stakeholder discussions. Efklides and Moraitou (2012) assert one's implicit motive as a decisive component of the individual's true self and connotes one pursuit beliefs (influenced by their sociocultural context) and satisfaction leading to

the pursuit of goals and attainment of a psychological state of well-being. The pursuit of goals may also construe hedonic motivations or pleasurable experience for the individual.

We run exploratory and confirmatory factor analysis on the adapted dependent variable – sustainable process virtualizability (SPV). SPV's adaptation was based on Barth and Veit (2011) and Overby (2008). The factor analyses extracted two principal factors with four in one component and two in the other. The two were dropped because their latent factor loadings in the measurement model was below 0.4. Identification and Control Requirements (ICR) scale was adapted from Overby and Konsynski (2008). Network effect (NE) and switching cost (SC) scales were adapted from Zhu et al. (2006) and were operationalized as second order formative constructs. Community influence and peer adoption were used as first-order constructs for network effect. Scalability (SY) was operationalized as first order formative construct. A factor analysis extracted one component and all the latent items loaded well on the measurement items. In all our factor extractions, the KMO values were between 0.75 and 0.92. These indicate extremely good data structure for component analysis (Kaiser and Rice 1974). Switching cost was also a second order construct measured via financial cost, managerial complexity, legal barriers, transactional and other risks (the latter was dropped based on our multicollinearity diagnostics for the formative constructs). Monitoring capability was also dropped from the model for not being discriminately valid.

Of the respondents 71.3% were male, and 28.7% were female. Mean age of respondents was within 33 years. Over 71% of respondents had internet experience of more than five (5) years and over 55% had used virtual platform between 2 to 5 years, 16% for more than five(5) years and 17% within a year. The majority of respondents indicated that they were motivated by job requirement or personal ambition to use the virtual learning platform. Over 71 percent have virtual experience (VE) for more than two years and the rest within two years. The mean VE is 3.57 years. The final model (model 3) explained 78% of variance in the dependent variable.

## Results

Table 2 illustrates the results. Model 1 shows the results without substitution effect of AM and NE on SPV. Model 2 incorporates the substitution effect and model 3 is our choice model with the control factors.

**Table 2. Models Tested and Results**

| Description         | Constructs                     | Model 1             | Model 2             | Model 3             | Hypotheses                       |
|---------------------|--------------------------------|---------------------|---------------------|---------------------|----------------------------------|
| Main Effects        | NE                             | 0.241***<br>(0.082) | 0.301***<br>(0.085) | 0.295***<br>(0.078) | <b>H1a: Supported</b>            |
|                     | SC x NE                        | -0.051<br>(0.060)   | -0.018<br>(0.063)   | -0.009<br>(0.062)   | H1b:<br>Not Supported            |
|                     | SY                             | 0.601***<br>(0.111) | 0.497***<br>(0.117) | 0.436***<br>(0.115) | <b>H2: Supported</b>             |
|                     | SER                            | 0.028<br>(0.069)    | 0.024<br>(0.068)    | -0.006<br>(0.066)   | H3:<br>Not Supported             |
|                     | ICR                            | 0.069<br>(0.062)    | 0.085<br>(0.060)    | 0.089*<br>(0.059)   | <b>H4a: Partially Supported</b>  |
|                     | MOC<br>(Dropped)               | -                   | -                   | -                   | H4b: Not Valid<br>Discriminately |
|                     | AM                             | 0.055<br>(0.097)    | 0.075<br>(0.092)    | -0.090<br>(0.086)   | H5a:<br>Not Supported            |
| Substitution effect | AM x NE                        |                     | -0.128**<br>(0.032) | -0.149**<br>(0.07)  | <b>H5b: Supported</b>            |
| Control Factors     | PC                             |                     |                     | -0.189**<br>(0.089) | Significant                      |
|                     | VE                             |                     |                     | -0.122<br>(0.056)   | Significant                      |
| DV                  | <b>SPV (Adj R<sup>2</sup>)</b> | <b>0.76</b>         | <b>0.76</b>         | <b>0.78</b>         |                                  |

\* $p < 0.1$ , \*\* $p < 0.05$ , \*\*\* $p < 0.01$ . beta coefficients are shown in parentheses.

The study controlled for respondents' virtual experience in using the platform, their occupation, internet usage, perceived ease of use, perceived usefulness, privacy concerns, age and gender. Only virtual experience and privacy concerns were significant and are shown in table 2.

## **Discussion and Implications**

Four out of the eight hypotheses were supported. However, these factors in addition to control factors explained nearly 80% of the variance in sustainable process virtualizability (shown in Table 2). The negative coefficient of the interaction between aligned motives and network effects supports our assertion that users' aligned motives may play a substitutive role in the sustenance and moderate the relationship between NE and SPV. We found support for our control factors: privacy concern (PC) and virtual learning experience (VE). We found support for H4a which shows the influence of ICR on SPV. This influence could be explained by the fact that users who use platform longer (Higher VE experience) would want more protection and would be careful to observe identification and control requirements of the platform in a bid to protect their identity. Less experienced virtual users may not have formed much of these opinions since their turnaround times may be shorter and platform usage may be highly disparate. The knowledge of this control regime would make users feel monitored which negatively impacts on SPV. The reasoning also explains the negative coefficient of the control factor, VE on SPV. Additionally, it may explain why monitoring capability construct was not discriminately valid. Future studies would be required to explicate these dynamics.

This study extends process virtualization theory in the context of predominant IT usage and model the dependent variable as not just capturing amenability of a process but sustaining an already virtualized process. This study also contributes to the literature on network effects. We have shown, empirically, that network effects and scalability are necessary but not sufficient factors in the effective sustenance of a firm's virtual processes which the sharing economy phenomenon rides on (Tauscher and Kietzmann 2017). Liu et al. (2012) argue that network effects of digital goods may be weakened by the impact of low-cost conversion technologies. The weakening impact may be a reason why attaining high network effect is not a sufficient factor for successful sustainability in sharing economy firms, and for that matter knowledge sharing firms. Organizational managers need to go beyond efforts that seek to entrench network effects to exploring how discrepancies between their product offerings and the aligned motives of the targeted users can be reduced. With the high variance explained in our model, this study provides a theoretically-supported effect that can inform market surveys. Hawlitschek et al. (2016) posited an elaborate scale for estimating usage in the sharing economy. They showed that motivation influences the sharing economy activities. Their context of empirical assessment, though, was limited to the hotel or physical goods P2P sharing. However, in a knowledge sharing economy, motives would be somewhat different because the nature of sharing is characterized by absorptive capabilities (Zhang 2017) and secluded usage - one can be in the comfort of their homes and engage in knowledge sharing. Moreover, it is difficult to adapt the items they proffered. Additionally, the scale development focused on both supply and demand of users in the physical goods sharing phenomenon. In this research, a new scale was developed for the demand-side only and to measure sharing dynamics related to knowledge goods. In summary, we contribute to the literature on sharing economy by focusing on the demand side dynamics of knowledge sharing.

## **Limitations, Future Research, and Conclusion**

This research focused on process virtualization in the context of knowledge sharing economy. Sharing economy phenomenon exists because of the IT-enabled virtualization processes that connects consumers to service suppliers via a technology medium. This study focused on only the demand side (consumers) of the P2P phenomenon. Future studies may combine the supply and demand side in exploring the sustainability of virtual process of a sharing firm. Caution must be exercised though in leveraging our findings for further research because of some limitations to our investigation. First, our sample size may not be ideal for generalization. In advancing the study, an elaborate analysis with a much larger sample size would be done to assess model robustness. The development of scalability and aligned motive scales serve

as another important contribution of this study and can be used in future studies. A combined scale for supply and demand users can also be developed relative to the knowledge sharing context. Finally, future studies may employ a longitudinal approach to explore the time point factors leading to increase in user dynamics (aligned motives) when the impact of network effect is waning.

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