Effective Use of Systems Beyond the Firm's Control: The Case of Online Review Systems

Emergent Research Forum

Introduction

The world is changing, and companies are becoming more exposed to systems beyond their control. Nowadays, hotels and restaurants main communication channels are online review platforms (e.g., TripAdvisor, Yelp), newspapers share news on social media (e.g., Facebook, Twitter) and merchants compete on shopping comparisons websites (e.g., Google Shopping, Nextag). Online reviews systems are the starting point of customers' research, social media are the medium to acquire news and information and shopping comparisons websites are the place that helps consumers to decide where and when to make the next purchase. In 2017, TripAdvisor reported a portfolio of 1.9 million accommodations and 4.3 million restaurants listed (*TripAdvisor 2017*). 67% of U.S. adults stated that they access news from social media (Pew Research Center 2017) and more than 30 million people access Nextag every month (Nextag 2018). These numbers show how these systems are intensively used by consumers and companies every day.

The majority of small and medium companies use these systems to compete online, but they have no control over them. We define systems beyond firms' control as any information systems neither designed or commissioned by a company, that the firm must use to compete (Lui et al. 2018). While these systems are imposed from the outside they can't be neglected. Not being listed on Trip Advisor, Nextag or on Facebook translates to scarce visibility compared to competitors. For example, online review systems are superimposed on hotels. Hotels have no power on how reviews are organized, what elements of the hotels are evaluated or on how they can respond to customer's reviews. Systems beyond the firm's control are surprisingly understudied in the Information Systems literature (Lui et al. 2018), despite their importance and increasing prevalence.

According to effective use theory, the ability of a firm to effectively use IS can result in performance improvements (Burton-Jones and Grange 2013). In this paper, we will narrow the focus of the study to only one type of these systems, online reviews systems.

Previous researchers defined an online review system as "an IT-enabled customer service systems that because of the reach capability of information technology has the characteristics of a broadcast communication medium" (Lui et al. 2018). We define it as the socio-technical artefact that enable and virtualize the communication between customers and the companies. Where the online reviews represent the message, the customers send to the hotels, and the managerial response constitutes the companies' answer. IS researchers studied the online reviews effect on trust, helpfulness, customer perception, consumer decision process, and customer service measurement among the others. While the message component attracted the majority of attention up to now, recent studies started to focus also on hotels' responses impact on trust (Sparks et al. 2016) and performance (Lui et al. 2018). Studies also focused on the design of online review systems features and their impact on current and future customers (Jiang and Guo 2015). But what happens when the design is not under companies control? In an online review system, hotels are only empowered to provide a textual answer to a customer's feedback. We argue that since hotels are not involved in the designing and building of the online review information system they can only adapt to it. Yet, an effective use of the communication channel is critical for hotel managers to enhance hotel performance (Lui et al. 2018). Therefore, our research question is:

RQ1: What determines effective use of information systems beyond firms' control?

Theoretical Foundation and Model

Representation Theory and Effective Use Theory

Representation theory (Wand and Weber 1995) states that the purpose of an IS is to enable humans in understanding and representing the world. Representation is the core of any IS. IS "track states of and state

changes in other systems. By observing the behavior of an information system, we obviate the need to observe the behavior of the system it represents" (Weber 2003, p. viii). In this theory, the nature of an IS is composed of three structures (Wand and Weber 1995). The physical structure, machinery components that support the other structures; the surface structure, user interface that enables the interactions with the representation; and the deep structure, specification of the domain that provides the meaning of a representation (Burton-Jones and Grange 2013). In short, the objective of an IS is to faithfully represent real world domains.

In this conception, the faithfulness of a representation only depends on the deep structure. In fact, in representation theory traditional use researchers focused only on the internal view that considers IS as "independent artifacts that are built to achieve certain requirements" (Wand and Weber 1995, p.205). A recent study extended representation theory beyond its traditional use to develop a theory of effective use (Burton-Jones and Grange 2013). Effective use identifies the "type of use that helps users attain desired goals" (Burton-Jones and Volkoff 2017). In this work, the focus is both on the internal and the external view, and the IS are not considered independent of their use or social context. The theory objective is to determine how to improve effective use of an information systems and what are the resulting effects on performance (Burton-Jones and Grange 2013).

Effective use includes three different dimensions organized in hierarchical levels (Burton-Jones and Grange 2013). The first dimension "transparent interactions" enables the users to access the representation. The second dimension "representational fidelity" assures that the representation is faithful to the domain. The third dimension "informed action" empowers users to take action based on the information obtained from a faithful representation. So, systems use involve user, system, and task (Burton-Jones and Straub 2006). Each of these elements has a different emphasis on the different levels of effective use. While the system plays a central role to guarantee a transparent interaction and a faithful representation, it doesn't per se determine the ability to take informed actions.

For this reason, we argue that the capability to take educated actions is the critical element in information systems that are beyond companies' control. In fact, since the system is imposed on companies, they can only work on the user and task components. In this situation, companies can't act on two of the dimensions of effective use, transparent interaction and representational fidelity. For example, hotels using online review systems can improve neither the access to the system nor the faithfulness of the representation but can enhance their improved ability to take informed actions. The only actions that hotels are allowed to perform on that system is to write managerial responses. Under these constraints, hotels' capability to respond to online reviews is critical to effectively use the information systems that are beyond their control.

Hypotheses Development

Following the theory of effective use, in systems outside firms' control, the only dimension on which it is possible to act in order to improve effective use is informed actions. So, the capability to respond depends on how much the action is informed. Systems are effectively used if we are able to improve hotels ability to respond. We then hypothesize that:

HP1. The hotel response capability determines the effectiveness of use of online reviews systems.

However, it is still unclear what can enhance the ability to take the informed actions. We argue that in order to respond effectively, hotels need to understand the reason why customers shared their feedback in the first place. A coping strategy is defined as the variety of responses customers generate due to their satisfaction/dissatisfaction perception (Gyung Kim et al. 2010). The customer complaint behavior literature has defined four different coping strategies, namely inertia, negative word of mouth, direct complaining to the service provider (voice) and complaining to a third party (Gyung Kim et al. 2010). Hotels using online reviews systems have to deal with online reviews shared on third-party platforms. In this case, customers' comments are not shared among a small group of people but rather can affect future potential customers. At the same time hotels can't anymore address those comments in person with the customers, they are already available and visible online. Hotels' ability to respond is critical because it will not only affect the satisfaction of the reviewers, but it will also show hotels' modus operandi to potential customers.

However, what does enhance hotels' ability to respond? The customer complaints literature highlights three elements to address comments, namely empathy, problem paraphrasing and speed of response (Min et al. 2015). The first two elements suggest that if responses are customized to customers' comments they will be perceived as more helpful and effective. In particular, while empathy requires the hotel to provide

individualized attention and care, problem paraphrasing demands the hotel to understand and elaborates on the content of the feedback. Based on these two elements we argue that responses that are related to customers' comments content are more impactful than standardized responses. Customers will perceive that the hotel is providing to them individualized attention and is trying to understand their state of mind. So, responses that contain topics discussed in online reviews will be perceived as more empathetic and will show to customers, current and potential, that the company really care about their opinion. In fact, it is the tailoring element of the response that determines its effectiveness (Min et al. 2015). Responses are tailored when their content is congruent to the content of the reviewer's message. Only an analysis of the textual content of the review/response pair can tell how much the latter is pertinent to the former. We argue that a measure of the congruence between the content of the review and its response is necessary to establish whether a certain type of responses determines a more effective use of the system. For this reason, we believe that the congruence between review and response is the measure that can enhance the informed action in systems beyond firms' control. Moreover, we argue that congruent responses will improve hotels' performance. In fact, hotels that respond to online reviews have a better performance, measured in terms of RevPar, than hotels who don't respond (Lui et al. 2018). These findings should be amplified if responses are congruent. So, we hypothesize that:

HP2. High congruence results in a good performance.

In fact, if the quality of the response is higher, more congruence with the review, we expect the performance improvements to be higher. If the congruence is the measure that enhances the ability to respond, and the ability to respond in this context improve the effective use of systems beyond firms' control, we can then expect it to leads to performance improvement (Burton-Jones and Grange 2013). In online reviews systems hotel can only reply to reviews, so the congruence of the responses is then the informed action.
At the same time, the presence of a response provides more information related to the experiences described by other customers. The content of the responses should help and facilitate future customers to formulate an opinion about hotels service quality. So, the presence of the response can increase the helpfulness of a review for potential customers. Congruent responses will further reduce information asymmetry between customers and companies The more the response is congruent to the original comment the more capable is the hotel to provide useful information to customers. We then hypothesize:

HP3. High congruence translates into good helpfulness.

In fact, since responses already have an impact on helpfulness, the more their content is congruent to the review the higher will be the number of helpful votes received (HP3). If the content of the response is congruent to the experience described, instead of being a standardize automatic response, the information asymmetry between companies and customers will be significantly reduced. The company provides more valid information on which customers can evaluate the hotel's service quality. In this case, the content of the response will be more helpful for potential customers to make a decision.

Methodology

In order to test our research hypotheses, the first step is to develop the congruence measure. Considering that the congruence depends on what the response reports given what the reviewer discussed. We will use text mining, topic models, to extract topics from each review/response pair's textual content. Since the objective is to study the congruence of hotels, we aim to extract only hospitality related topics. Weakly supervised topic models enable researchers to provide a seeding to the topics to be extracted. In a scenario when the researchers know what are the aspects commonly discussed in a specific context this technique results superior to unsupervised topic models. More specifically, the hospitality related aspects that we want to identify in the text are the following: service, location, room, food, hotel amenities, value, and greetings and salutations.
Before moving into the analysis, we also want to validate the ability of our algorithm to correctly identify and label the topics. Meanwhile, the code will run on all the reviews/response we have available in our dataset (>30k review/response pairs) we will manually label 500 of them. The validation will consist in comparing the topics identified by the weakly supervised topic models with those manually identified by us on the same subset of review/response pairs. The final parametrization of the algorithm will be the one that

provides the highest agreement with the subset manually labeled. Once we have established the accuracy and reliability of our methodology we can move to the next step.
It is, in fact, necessary to convert the list of topics available in each review/response pair into two numeric vectors in order to measure the congruence of their content. By doing so we will be able to use cosine similarity to calculate the congruence between them. Cosine similarity is a commonly accepted measure of similarity among vectors (Huang 2008).
Once the measure is created, the research hypotheses will be tested using TripAdvisor data. In particular, we will use mixed models to study the effect of congruence on performance (HP2). RevPar will be our response variable and congruence with other control variables (e.g., hotel affiliation, guest to staff ratio, review rating, response speed) will be our predictors. Finally, we will assess the effect of congruence on helpfulness (HP3). More specifically, we will use logistic regression where helpful votes will be our dependent variable and congruence with other control variables (e.g., review length, review rating, response length, response speed) will be our independent variables.

Conclusion

When an information system is beyond firms' control, it is not possible to adjust the system, but companies have to completely adapt to it. According to the theory of effective use, if companies don't have any control over the system, they can only work on user and task. This implies that firms have less degrees of freedom to improve effective use. They can only improve their ability to perform informed actions. In the case of an online reviews system, hotels do not have any decisional power over the system's design. The only action they can perform is to provide a response. For this reason, the capability to write responses is critical to enhance effective use. We argue that in this context congruence is the informed action. If that is true we expect big differences in terms of helpfulness and performance between hotels that respond congruently compared to those who don't (HP1). To extend the generalizability of the study we will replicate it to different systems beyond firms' control (social media, shopping comparisons websites, etc.). This study is necessary to understand how companies can be good in using systems outside of their control.

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