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Modeling IT relationship quality and its determinants: A potential perspective of network externalities in e-service

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ABSTRACT

This article addresses the development of relationship quality in the service context of information technology (IT) based on the network externalities theory. The model predicates the IT relationship quality is influenced by both synchronization value and autarky value, whereby autarky value is influenced by the availability of complementary goods. At the same time, synchronization value is influenced by relationship commitment and perceived critical mass, while availability of complementary goods is influenced by perceived compatibility and overall installed base. Note that the autarky value represents the value generated by the product itself even if there are no other users (e.g., the printing and copying functions of a fax/printer machine), while synchronization value represents individuals' perceived value obtained through interaction (e.g., chatting functions of Skype). The model is examined using data obtained from employees of different companies in Taiwan. The empirical findings and their implications are discussed herein.

1. Introduction

Electronic commerce represents business activities over electronic systems (e.g., Internet or other computer networks), and such commerce has continued to penetrate the value chains of business organizations. Many business organizations have developed Internet-based initiatives to get more customers and retain them. Particularly, developing direct service to online customers via interactive information technologies (IT) is the dominant e-commerce strategy among information technology (IT) firms [91]. These firms devote a large amount of their investment to IT service (e.g., instant messaging service) and promoting users' continuous patronage with the service, because the continuance of IT service is crucial to e-commerce firms, such as ISPs (Internet service providers), online retailers, online bankers, online brokerages, online travel agencies, and so on [12]. For example, many online bankers offer discounts on handling charges or provide gift items to retain a continuance of IT users for stock trading. Nevertheless, such a continuance of IT users relies on achieving IT relationship quality [12].

Previous studies have demonstrated the importance of relationship quality and its impact on firm profitability and customer retention (for example, [17,37,82]), but the first step in effectively managing IT relationship quality in the IT service context is by identifying its antecedents. This study identifies the critical determinants of IT relationship quality based on the network externalities theory and also clarifies its importance on Internet-based service. Investigating the meaning of human–computer relationship (e.g., IT relationship quality) and presenting techniques for constructing, maintaining, and evaluating such relationship quality are important to both researchers and practitioners [13]. The overall theory that guides this study and its proposed hypotheses includes network externalities which are positive consumption externalities often seen in a society, whereby the values that users derive from a good or product increase with the number of other users of the same or similar good or product in society.

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IT relationship quality (e.g., human–computer relationship) evaluates the relationship strength or interaction between IT and its users (e.g., [36,52]) and also represents the extent to which IT meets the needs and expectations of the users involved based on a history of successful or unsuccessful encounters or experiences [17]. IT relationship quality can be conceptualized as involving users' trust on specific IT and their satisfaction with the IT. Collectively, IT relationship quality is regarded as a construct comprising at least two components: (1) user trust in the IT service (e.g., [81]) and (2) user satisfaction with the IT service (e.g., [17]). Hence, this study assumes that improved IT relationship quality is accompanied by increased IT satisfaction and trust. This study next briefly expands on these two important dimensions of IT relationship quality.

Satisfaction with IT in this study means IT users' emotional status occurs in response to an assessment of interaction experiences with their IT service [66]. User satisfaction depends directly on managing and monitoring individual service encounters—namely, the periods of direct user interaction with IT service (e.g., [74]). Trust is usually considered necessary for a successful interactive relationship between IT and its users. More specifically, trust can be viewed as users' confidence in the reliability and integrity of IT service [64].

This study differs from previous works (e.g., [62,72]) in two important ways. First, this work focuses on IT relationship quality in an intangible service rather than a tangible one such as clothing store service [85] and electrical appliance store service [61]. Intangibility is often defined in marketing as the inability to evaluate the benefit (or invisible product or service value) obtained from engaging in an activity by using any tangible evidence [87,88]. As consumers or users have more difficulty in evaluating the quality of an intangible service than they do towards physical goods prior to, during, and after consumption [32], it is important that intangible IT service is treated differently from tangible goods provided by, for example, car dealers [62] and food shops [72].

Second, this study empirically examines the causative drivers of network effects in the e-service context. Though some prior studies have employed analytical models to explore such causes (e.g., [42,68]), most prior empirical studies on network effects rely on secondary or archival data [50]. This study uses primary survey data collected from actual IT users to test the causes and outcomes of network effects. Collectively, it investigates users using an IT service and through an examination of the network externalities theory helps bring about implications for IT providers.

The rest of the paper proceeds as follows. The next section presents the theoretical underpinnings of the network externalities theory and formulates a research framework and hypotheses of IT relationship quality based on the theory. The third section describes the research methods, containing the choice of empirical context, subject sample, and instrumentation for this study. The fourth section presents data analysis procedures and test results. The fifth section outlines the implications of our findings for future IT usage research and practice and the limitations of this study.

2. Theory of network externalities

Network effects refer to the utility or benefit that a user derives from using a product or service based on the number of other users employing similar or compatible products [41]. The source of this utility (e.g., number of other users) is called a *network externality*, and products or services exhibiting such effects are called *network effects goods* [45]. The network externalities show evidence of being important in generating and diffusing technical change [40]. Such externalities are even more pervasive in IT industries, which are subject to drastic technical change.

Although classic instances exist in a social society involving physical networks, such as railroads or telecommunications, network externalities also arise in a society that does not have physical networks, such as a mobile software or wireless sensor network (e.g., [71]). Network effects goods are unique in that the value of each unit of good increases with the number of units sold. In the case of network effects goods, the demand curve still slopes down, but the entire curve shifts upward with an increasing number of units sold or expected to be sold [22]. Social networking websites are good examples in which the more IT users register onto such websites, the greater the websites' value is to its registrants [4], consequently strengthening IT relationship quality. Similarly, a survey on purchasing professionals indicates that customers base their evaluation not only on general features (e.g., compatibility), but also on network effects [89].

Katz and Shapiro [41] described two types of network externalities: direct and indirect. There is quite a distinction between direct and indirect network effects. Direct effects occur as an immediate result of participation in a network, while indirect effects are due to an emergence of complimentary products and services [33]. Whereas direct externalities result from the demand side of a network, indirect externalities stem from the supply side. These two types of network externalities are introduced in more detail below.

Direct network externalities are based on the number of participants in a given network. Typical examples include the number of sellers and the number of buyers in an online auction network such as eBay, the number of customers in a given cellular network like Verizon or T-Mobile, the number of gamers on an online gaming website like PartyPoker.com, or the number of Skype users online. As new participants enter these networks, existing users gain more choices for communicating, trading, and playing games, and thereby gain network utility. Direct network effects pertain to how properties of the customer network affect the perceived value of the service [84]. Such direct network effects are applied in both social network theory and industrial economics to explain the "bandwagon effect": the more existing customers there are for a service, the more attractive the service becomes even for potential customers [26]. Previous literature argues that the adoption of information systems requires the participation of many individuals to create a sense of collective action [54].

Indirect network externalities are ancillary benefits accruing to network participants, such as the development of complementary goods, services, formation of standards, and the lowering of prices as a network grows, but they do not directly result from other network participants. A traditional instance of complementary goods is motor oil and gasoline: if gasoline consumption falls due to a price increase, the consumption of motor oil will fall as well, because motor oil and gasoline are used