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Pricing e-service quality risk in financial services

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ABSTRACT

E-service quality is crucial for differentiating e-commerce offers and gaining competitive advantage. *E-service quality risk* is the risk that a firm's e-service quality will drop, or improve, relative to competitors. There is evidence that benchmark ratings of e-service quality that are published regularly by third-parties can impact the market value of rated firms. Firms therefore continue investing in IT-related determinants of e-service quality. However, they do so without knowing: (1) the cost or return associated with a unit relative deterioration, or improvement in e-service quality ratings, and (2) how this cost or return may vary across firms. To answer these questions, we adapt a well-established financial risk pricing approach for the case of pricing a single idiosyncratic IT investment risk, where an event study is used to generate the market data needed to price risk (Thompson 1985). We then apply the approach with Keynote's bi-annual e-service quality ratings for firms in six financial services sectors. We find that firms' sensitivity to e-service quality risk depends primarily on the sector to which they belong, and also on their size and growth potential. Our results suggest a cap on the amount that different firms ought to spend to achieve a unit improvement in relative e-service quality ratings. The risk pricing approach presented can be applied for other important IT investment risks, and the risk pricing information it yields may open up new ways to approach fundamental IT investment problems.

1. Introduction

Announcements of e-service launch initiatives have been seen to benefit the market value of the launching firms (Subramani and Walden 2001, Geyskens et al. 2002, Cheng et al. 2007, Lin et al. 2007). *E-services* involve the use of information technologies (IT) via the Internet to enable, improve, enhance, transform or invent a business process or system to complete tasks, solve problems, conduct transactions or create value for current or potential customers (Sawhney and Zabin 2001, Wu et al. 2003). Using e-services, firms can provide rapid customer response, improve service quality, enhance operational efficiency, and reduce costs.

E-service quality is a crucial determinant in differentiating e-service offers and building a competitive advantage (Santos 2003, Rust and Miu 2006). *E-service quality* is determined by IT-related factors, such as website security and functionality, and by product and process factors, such as product variety and order delivery timeliness (Collier and Bienstock 2006, Rowley 2006). Superior e-service quality can improve customer satisfaction, customer acquisition, and customer retention (Boulding et al. 1993, Ranaweera and Neely 2003, Lee and Lin 2005).

With the payoff from e-service quality, however, also comes risk. *E-service quality risk* is the risk that the e-service quality of a firm will change – deteriorate or improve – relative to that of competitors. This definition recognizes that risk can be negative or positive, consistent with the way much finance research defines risk as the possibility that things will deviate from expectations (Elton and Gruber 1995).[1] Companies can develop their own measures of e-service quality, but many rely on third-party benchmark measures such as those from Keynote, Bizrate, and ePublicEye. Keynote (www.keynote.com), for example, uses its GomezPro Scorecard (GPSC) to rate companies' e-service quality based on how customers assess those companies' websites along IT-related determinants, including: functionality, content availability, accuracy of online transactions, ease of use, and security (Al-Hawari and Ward 2006). Keynote's benchmark ratings are published regularly for the top 20–30 companies in each of numerous business sectors (e.g., banking,

[1] This definition contrasts with the way much of the research on IT has defined risk as a negative loss event having a probability of occurrence and a loss amount. Instead, it follows a growing body of IT research that has been using the latter view, for example, in the context of real options analysis (Benaroch and Kauffman 1999, Benaroch and Appari 2010).

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insurance, brokerage). Firms whose benchmark e-service quality ratings showed superiority over competitors have used them to boost their strategic position (e.g., Citigroup Inc 2004), and as a result, firms whose ratings show inferiority feel pressured to invest in improving their e-service quality (Carpenter 2005, Wright and Dawson 2004). Unless specified otherwise, for brevity we will hereafter use the term *benchmark e-service quality ratings* to refer to competitive benchmark e-service quality ratings by a third-party.

The reality, however, is that most firms invest in controlling e-service quality risk without knowing what level of investment is "right" for each of them. That is, firms do not know the answers to fundamental questions: What is a suitable approach for pricing e-service quality risk? Can the approach inform the firms about the economic cost, or return, associated with a relative deterioration, or improvement, in the third-party benchmark ratings of their e-service quality? And, is the answer to the last question different for different companies, depending on their characteristics (e.g., size, growth potential, industry)?

This research seeks to answer these questions by presenting a finance-based approach for pricing risk and applying it to the case of e-service quality risk. Finance research prices risk in terms of two parameters: the *sensitivity* of an asset to a particular risk, and the *risk premium* measuring the extra return that the stock investor community expects to earn on the asset per unit exposure to that risk (Elton and Gruber 1995). By telling us the value that stock investors associate with a unit change in exposure to a particular risk, these risk pricing parameters could suggest a limit on the amount that a firm ought to spend to achieve that level of improvement in exposure to that risk. The financial risk pricing approach used to estimate these parameters works as follows. It starts with a linear multi-factor model linking the expected excess return on assets to the behavior of multiple systematic (firm-independent) risk factors,[2] and then uses *arbitrage pricing theory* to estimate the risk pricing parameters based on market data (Elton and Gruber 1995).

We will adapt this risk pricing approach for our needs because it makes some assumptions that may not apply in our context. The adapted approach starts with a single-factor model that is conditional on events reflecting the effect of a single idiosyncratic (firm-specific) IT investment risk factor. Thompson (1985) shows that such a conditional single-factor model captures the essence of the event-study methodology, which isolates abnormal stock returns reflecting the impact of unanticipated idiosyncratic economic events on the market value of firms experiencing those events. Here, the events of concern are the periodic publication of third-party benchmark ratings of e-service quality that show changes in firms' relative standing. We use five years worth of data of Keynote's bi-annually published GomezPro e-service quality ratings for firms in six financial services sectors (banking, mortgages, insurance, etc.). There is evidence that Keynote's benchmark ratings change the perception of stock market investors about firms' relative e-service quality and, in turn, about the firms' market value (Chen and Hitt 2002, Kotha et al. 2004). The adapted approach then uses arbitrage pricing theory to estimate the risk pricing parameters based on abnormal returns that firms experience as a result of changes in their relative e-service quality.

This article makes a contribution to IT and marketing research on e-service quality and firm value. It is the first to present an approach for measuring and pricing the risk associated with e-service quality. This approach goes well beyond extant research that only links individual aspects of e-service quality to firms' financial performance (Barua et al. 2004, Anderson et al. 2004, Kotha et al. 2004, Chen and Hitt 2002). Risk pricing information opens new ways to think about the economics of a firm's e-service quality falling behind, or moving ahead, of the competition. In particular, it could help firms determine how much they should be willing to invest in improving their relative benchmark e-service quality ratings. Our results indicate that firms in only certain financial services sectors have a significant level of exposure to e-service quality risk as measured by third-party benchmark ratings, and that level appears to vary across sectors. Further, our results suggest that firm size and growth potential also influence how investors react to relative changes in firms' e-service quality risk, albeit their influence is notably lesser in magnitude. The latter means that firms within a particular sector have only slightly different sensitivities to e-service quality risk as measured by benchmark ratings, due to their firm-specific characteristics.

This article makes a broader contribution to the literature on IT investment and risk management. We believe that it is the first to adapt and apply a well-established financial risk pricing approach to idiosyncratic IT investment risk. Another adaptation of the approach has been presented and applied elsewhere for the case of software development risks, a somewhat narrower application (Benaroch and Appari 2010). The approach presented here permits the pricing of a range of IT investment risks that are of prime concern to organizations, including security risks, customer adoption risks, and technology maturity risks. The significance of this contribution is also in supporting the solution of fundamental IT investment problems, including the management of IT investment risk and of IT investment portfolios.

The remainder of the article proceeds as follows. Section 2 reviews literature on e-service quality and its relation to IT investment and financial performance. Section 3 presents our adapted risk pricing approach. Section 4 empirically applies the approach in the financial services context. Section 5 concludes with a discussion of the empirical results and the reasons behind them. It also discusses the implications of our results for research and practice, and the limitations of our work along with directions for future research.

2. Literature review

This section discusses the importance of e-service quality in e-commerce, reviews research linking e-service quality to firm performance, and outlines the role that third-party benchmark ratings of e-service quality can play in measuring the risk and return on investments in e-service quality. Fig. 1 depicts the relationships between key concepts underlying the next discussion.

2.1. E-commerce and e-service quality

IT and the Internet have expanded horizons for businesses, largely through the automation of service in e-commerce. A typical example is banking and financial services. According to the Association for Payment Clearing Services, the United Kingdom payment association, online banking there increased by 174% from 6.2 million customers in 2001 to 17.0 million in 2006, and, more broadly, the number of adults shopping online increased by 158% in the same period.

The basis for competition in e-commerce has shifted towards differentiation based on e-service quality (Rust and Miu 2006). Early e-commerce businesses were focused on reducing service costs and increasing efficiency. However, most companies realized quickly that selling commodities online at low prices resulted in low profit margins. This has given rise to a paradigm of e-service

[2] Finance research distinguishes *systematic* (*macro-economic*) risks that are pervasive in the economy and affect all assets from *idiosyncratic* (*firm-specific*) risks that are unique to individual firms. Investors can diversify their investments to reduced idiosynchratic risks (Elton and Gruber 1995).