1-2001

A Framework for Performance and Value Assessment of E-Business Systems in Corporate Travel Distribution

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A FRAMEWORK FOR PERFORMANCE AND VALUE ASSESSMENT OF E-BUSINESS SYSTEMS IN CORPORATE TRAVEL DISTRIBUTION

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Last Revised: November 29, 2000

ABSTRACT

This chapter proposes and illustrates a framework that the authors call the *value life cycle for e-commerce systems*. Based on recent research results that relate to technology investments in the corporate travel industry and related theoretical and empirical perspectives, the authors lay out the corporate travel e-commerce system solutions value life cycle. The perspective involves estimating the maximum value that that an organization can obtain by implementing an e-commerce system in a specific industry and competitive environment. It also considers multiple factors that act as value contingencies for the implementation process. These create barriers to value accrual and to the post-implementation performance assessment. The analytical perspective emphasizes the importance of comparing the *expected value* from the evaluation stage with the *realized value* from actual system usage. The authors highly a key finding for corporate travel procurement specialists: the value of e-commerce systems infrastructure is surprisingly dependent a variety of factors in the implementation environment of the organization, and as a result, the authors suggest that investments in this kind of technology be made with considerable caution and a clear sense of the potential pitfalls that may lead to insufficient value accrual.

Note: The findings that are presented in this chapter are based on a large corporate travel industry research project conducted through the MIS Research Center at the Carlson School of Management, University of Minnesota. A presentation related to this research was given by Robert J. Kauffman at Abteilung für Wirtschaftsinformatik, Wirtschaftuniversitaet Wien, Vienna, Austria, May 15, 2000. We thank the participants of that seminar for comments and suggestions on the specifics of that research.

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"Like an earthquake, deep within the earth, many of the forces reshaping business today are happening out of sight, and often don't register on corporate Richter scales until they erupt violently on the surface. The Internet is just such a force. The rapid emergence of e-commerce has shaken business to its core, forcing managers to streamline their processes ... expand the markets in which they compete ... and continually rethink their strategies"

From a speech by George H. Conrades,
Chairman, Akamai Technologies

1. INTRODUCTION

E-commerce (**EC**) technologies are hypothesized to impact business interactions at the individual, organizational and industry level in ways no other *information technology* (**IT**) application has done before. But industry leaders recognize that the focus of EC is not on simple implementation of Internet technologies, but instead, it is on the total transformation of traditional business processes into e-business processes. E-business, in this context, describes how EC technology starts to permeate all aspects of business interactions and creates new value.

One of the industries having a significant amount of experience with the challenges of implementing EC technologies and transforming traditional businesses into e-businesses is the corporate travel industry. EC innovations in this industry range from the first introduction of Internet-based travel reservation systems for business travel in the early days of Internet in 1995 to the very recent attempts to establish online B2B e-marketplaces that directly connect buyers and sellers of travel services. All players in the industry – including corporate travel buyers, travel services providers, and travel intermediaries – are attempting to implement EC technologies in a desire to streamline processes and reduce their costs. (The interested reader is encouraged to see Werthner & Klein (1999), who provide the fullest treatment of the IT issues in travel and tourism that we have seen to date.)

However, as it is often the case, not all industry players benefit from the same EC innovations the same way. Some established players – traditional business travel agencies and even powerful aggregators such as computerized reservation systems (**CRSs**, also called global distribution systems in the industry) – have witnessed their traditional sources of revenue drying up, and even have experienced the threat of being pushed out of their traditional market niches due to the introduction of EC innovations for corporate travel distribution.

Travel purchasing is particularly suitable for automation through EC technologies since information about travel services – and not a *physical* product – is what is handled through the industry value chain. Business travel currently represents about 40% of the entire travel market (Thompson, 1999), and is positioned, according to Forrester Research, to experience the highest growth rate among business services predicted to move online by 2003 (Putnam et al., 1999). Harteveldt et al. (2000) predict that online business travel purchases will grow to $20.4 billion in sales by 2004. In spite of such predictions, the EC-enabled corporate travel industry transformation has really just begun. All industry players still experience the pressure of determining their e-business strategy when faced with ever-evolving technological standards, competitive conditions, and unexpected implementation and adoption problems. Managers making EC investment decisions still have no clear benchmarks for determining what EC technologies will ultimately be successful in the marketplace and deliver value.

Based on our previous research results with respect to technology investments in the corporate travel industry and related theoretical and empirical perspectives, we propose a more general yet integrated view

of the *value life cycle for e-commerce systems*. This view describes the corporate travel EC system solutions value life cycle, from determining the maximum value of an EC system that an organization can obtain by implementing the system in a specific industry and competitive environment, to the contingencies of the implementation process that create *barriers* to value accrual, and to the post-implementation performance assessment that compares the *expected value* from the evaluation stage with the *realized value* from actual system usage.

In the next section, we provide a more detailed background on several major e-business system solutions in the corporate travel industry. We then introduce a new framework that can help us understand how e-business solutions provide value and what are the factors that impact this value. We continue by discussing the individual elements of the framework as they apply to the corporate travel industry, the theories that inform our understanding of each framework element, and the managerial recommendations stemming from our own research. Finally, we will end with a brief discussion of the contributions and implications for future research.

2. E-BUSINESS SYSTEMS SOLUTIONS IN CORPORATE TRAVEL DISTRIBUTION

In this section, we discuss the traditional industry structure in corporate travel before the advent of e-commerce, the intermediation attempts made by EC system providers and the disintermediation threats they posed to traditional industry players, as well as the traditional players' efforts to reintermediate and strategize around the new technologies of the Internet.

2.1. Industry Background and the Systems Solution Setting

Business travel, the third largest controllable corporate operating expense, significantly impacts a company's bottom line (Johnston & Sherlock, 1998). Together with other operating resources such as office and computer supplies, and maintenance, repair and operations (**MRO**) supplies, business travel is often purchased by individual employees, on an a*d hoc* basis without the proper controls in place (Kalakota & Robinson, 1999). Operating resources can cost as much as 30% of total company spending, but the traditional phone and paper-based purchasing methods that are still used in the majority of companies make controlling these costs very difficult. In addition, many companies have difficulties preventing "maverick buying," where employees bypass the preferred suppliers and select their own purchasing outlets. This is especially true for business travel, and more and more, companies now attempt to reduce their travel costs through negotiations with preferred suppliers and corporate travel policies mandating the use of these suppliers and certain travel reservation rules (Hjermstad, 1999). To understand the forces shaping the EC-enabled transformation of the corporate travel industry, one must first understand the current structure of the business travel industry. (See Figure 1.)

Traditionally, companies have used *corporate travel agencies* to purchase travel services from their preferred airline, hotel and car suppliers. These suppliers have listed, in exchange for a fee, their process and availability information in CRSs that any agency may access through dedicated connections. With the advent of e-commerce, however, *Internet-based electronic travel reservation systems* for corporate travel, also called *online booking* (or *self-booking*) *systems*, are expected to partially, or, in some cases, even totally replace the traditional travel agents. To obtain travel supplier information, these systems have initially established electronic connections to the traditional CRSs, and, more recently, to the actual suppliers through direct connections. In general, after a firm's employees make reservations using these systems, the details are sent to that firm's corporate travel agency, which then fulfills the transaction by checking the quality of the reservation and issuing tickets.

Generally, companies pay their travel agencies either a transaction fee for every travel transaction, or a management fee that covers the cost of the travel agents and all the transactions performed by the

company. Transaction fees have become increasingly popular among travel agencies lately, especially after the introduction of new kinds of fares. In exchange for these fees, the travel agency agrees to meet specific service levels both in terms of promptly responding to company employees' phone calls and providing the lowest available prices for their specific travel requests, based on the company's negotiated rates with suppliers. Table 1 presents a summary of the top 5 U.S. travel agencies whose revenues are primarily generated by business travel. (See Table 1.)

However, with the advent of electronic reservation systems for corporate travel such as GetThere.com (recently acquired by Sabre), Sabre BTS or e-Travel (now owned by Oracle), companies now have another, potentially less expensive, choice for corporate travel purchasing. Many third-party electronic travel reservation system providers exist, but few have managed to successfully capture major corporate customers and help them achieve high online adoption levels among their travelers. (See Table 2.). At present, all major travel agencies offer their customers the option of reserving travel online through third party or proprietary system implementations.

While many knowledgeable industry observers recognize that huge opportunities for online business travel purchases exist, they also point out that we are still witnessing the early stages of the EC-enabled industry transformation. The implementation of online systems is still fraught with problems, and the adopting companies soon realize that significant resources are required to enable successful implementations in light of complicated corporate travel policies, negotiated rates agreements, and traveler needs. Then there is the problem of system usage – without which the companies cannot start seeing the promised savings.

Indeed, the reader should note that the patterns emerging for online business travel reservations are very different from the ones for online leisure travel reservations. As Table 1 showed, two online leisure travel agencies are already ranked in the top 10 U.S. travel agencies, confirming a trend indicating that more leisure travelers than business travelers currently make their reservations online (Gartner Group, 2000).

2.2. Disintermediating Systems Solutions

The travel industry has been buffeted by a number of forces, affecting travel agents and travel providers, as well as the traditional intermediaries (e.g., the CRSs) that characterize the industry marketplace (Clemons & Row, 1991a; Clemons & Hann, 1999; Chircu & Kauffman, 2000c).

One of the most well accepted predictions regarding the impacts of EC on market structure, even though it not necessarily confirmed by practice, is *disintermediation*, or the replacement of established industry players with Internet-based systems. In the corporate travel industry, depending on the intermediaries replaced by Internet-based reservation systems, several types of disintermediation can occur: disintermediation of traditional travel agents only, disintermediation of traditional travel agents and CRSs, and disintermediation of CRSs only. (See Figure 2.)

The *disintermediation of traditional travel agents* was triggered by the introduction of the first generation Internet-based travel reservation systems in late 1995, when the EC technology provider GetThere.com (then ITN, the Internet Travel Network) announced the first such product intended for the corporate travel market. Other system providers were soon to follow, and a whole range of electronic reservation system solutions offered by technology vendors (such as GetThere.com and e-Travel), CRSs (such as Sabre BTS) or travel agencies (such as American Express' AXI) later emerged. At the same time, the developers of business travel reservation systems were also focusing on the leisure market, where names such as Travelocity.com (offered by Sabre, the developer of Sabre BTS) or Expedia (offered by Microsoft, American Express' development partner for AXI) were starting to establish themselves as viable online travel services providers.

The Internet-based electronic travel reservation systems promised significant cost savings for the corporate customers through the replacement of traditional travel agency fees with much lower electronic travel reservation system fees, better travel policy enforcement, and better negotiations with suppliers. These savings are now possible due to the more prevalent use of *net/net* fare agreements, which enable companies to negotiate discounts from regular prices and receive these discounts at the time of purchase, without the involvement of the travel agency (National Business Travel Association, 1999). This replaces the old system of passing back the supplier rebates by the corporate travel agency, which used to offset the fees the corporation had to pay to the travel agency in exchange for its services. As a result of this fee reduction, Internet-based travel reservation systems pose a significant threat to established corporate travel agencies. They now see their travel information and reservation services being replaced by these automated systems, as potential savings on the transaction fees attract more of their customers.

The *disintermediation of traditional travel agents and CRSs* has been triggered by the latest attempts of EC technology providers such as e-Travel and GetThere.com to establish direct connections with major suppliers. By bypassing the CRSs, these providers hope to generate significant transaction fee savings for these suppliers, who now have to pay much lower fees for every reservation booked through the direct link as opposed to the CRS.

e-Travel pioneered the direct connection trend with its ETLink program, which became operational in March 1999 (McNulty, 1999a). ETLink enabled direct connections to just a handful of suppliers, including Continental Airlines and Hertz Corporation. Since then, e-Travel's supplier network has grown slowly, and now, in addition to its early participants, it includes Amtrak, Pegasus Solutions (a hotel distribution network providing links to more than 90 hotel brands with over 25,000 properties), and StarCite Inc. (a meeting planning electronic system). e-Travel also has connections to the CRSs Galileo/Apollo, Sabre and Worldspan. e-Travel's latest strategy is to encourage direct links by developing its system in Extensible Markup Language (**XML**), which will ensure a standard, cost-effective way of adding additional suppliers. GetThere.com has already attracted several major suppliers, as well as smaller ones, to connect directly to its B2B marketplace. As of June 2000, participants include United Airlines, Northwest Airlines, Trans World Airlines, British Airways, Accor Hotels, Marriott International, Radisson Hotels and Resorts, Starwood Hotels and Resorts, Micros Fidelio & Hotel Bank, Candlewood Hotels, Avis Rent a Car, Budget Rent a Car, and Hertz. GetThere.com's B2B marketplace now incorporates wireless access capabilities, and as a result, it exemplifies a combination of strategies that go well beyond simple disintermediation, based on aggregation of buyers, suppliers, and access options.

We further note that another CRS disintermediation scenario is also possible: the establishment of direct connections to suppliers by travel agencies. (See Figure 2 presented earlier.) While this scenario has not been implemented yet by any travel agency, it is entirely possible that we will see it occurring more frequently in the future.

The reader should bear in mind that the leisure travel industry has also experienced similar disintermediation attempts of traditional travel agents, represented by the Internet-based reservation systems such as Expedia.com and Travelocity.com. However, disintermediation approaches specific to the leisure travel market have also occurred. For example, travel agency disintermediation approaches include the introduction of *supplier-specific systems* for travel reservations, such as NWA.com or Hilton.com, where travelers can make reservations without the involvement of a travel agency. They also include *reverse auction systems* for leisure travel, such as Priceline.com, or the online outlet for discount travel services, Hotwire.com. The interesting "twist" in Hotwire.com's business model is that it hides the identity of the supplier of the airline ticket and the times of the flight, like Priceline.com does, right up to the time the traveler makes a purchase, thereby enabling the airline to retain some market power by

maintaining anonymity around its inventory of supply. It is also interesting to note that the CRS disintermediation approaches for leisure travel have been promoted by different players than in the case of business travel: the suppliers. This, for example, is the case of the soon-to-be-launched airline website, Orbitz (www.orbitz.com), which promises to offer unbiased fare searches among all regular and Internet-only fares available at any time in an attempt to identify the lowest possible fares for any travel request.

2.3. Reintermediating Systems Solutions

Full disintermediation of either travel agencies or CRSs has not yet occurred, however, as only a small percentage of business travel transactions are now conducted online. It is in fact possible that full disintermediation will *never* happen as the established industry intermediaries find solutions to fight back and adopt the very EC systems that caused their disintermediation in the first place. These firms' *reintermediation* strategies are based on leveraging their long-standing industry position while taking advantage on the new developments in EC technologies.

Reintermediation of travel agencies is made possible by licensing agreements with EC technology providers that allow agencies to offer their clients the option to book either by phone, using traditional travel agency services, or on the Internet using electronic systems for making reservations, which are then checked for quality and ticketed by the traditional agency. Currently, all major corporate travel agencies offer such an arrangement, most often by providing a choice among several electronic reservation systems – a result of strong demand for Internet-based electronic reservation systems from these agencies' clients. (See Table 1.) Indeed, as a recent survey of the largest 100 corporate travel buyers shows, 67% of the respondents have already selected – independently or through their travel agency – an Internet-based travel reservation system provider, and the rest intend to follow within 1 year (Campbell, 2000a). (See Figure 3.)

This strategy, however, presents a number of challenges, related primarily to losing important revenue streams from reduced transaction fees for fulfilling online reservations, which, clients argue, are easier to handle than phone reservations and therefore require a lower fee. Still, the travel agency has to receive enough online reservations in order to make the fulfillment processes efficient. As a result, many travel agencies have established tiered pricing schemes, where transaction fees for online reservation fulfillment goes down only when online reservation volume reaches a reasonable threshold, which should be, by industry estimates, at least 20%, and even 35%-40% in some cases (Welt, 1999).

Reintermediation is also made possible by the significant travel-specific expertise required to use Internet-based travel reservation systems effectively and effectively. Because of this, these systems may not always be so convenient for busy business travelers. Hal Rosenbluth, chairman of Rosenbluth International, put this into the proper perspective:

> *"I believe that [Internet-based electronic reservation systems] will become more and more ubiquitous. […] Where I begin to diverge a little bit is in the rate of intervention. It needs a human interface, whether it's GetThere, e-Travel, @Rosenbluth or Sabre BTS. […] A lot of companies would rather take one minute speaking to an agent as opposed to taking 10 to 15 minutes doing something on their own.*" (Limone, 2000)

The CRSs' reintermediation attempts have just started to emerge, given that the disintermediation threat itself is fairly new. Some of the most powerful industry players have acted quickly by lowering suppliers fees pay for online reservations and by buying direct-connect technologies. Their reintermediation attempts present similar challenges for the traditional travel agencies: building (or acquiring) technology for direct connections is relatively easy. However, lowering the transaction fees is a hard decision, given

that it is against the very business model of the CRSs. The first CRS to respond to the disintermediation threat is Sabre, which has recently completed the acquisition of GetThere.com.

3. A 'VALUE LIFE CYCLE' FRAMEWORK FOR CORPORATE TRAVEL SYSTEMS

We next present a framework that conceptualizes our overall thinking about how different industry players can achieve high value outcomes from implementing such EC systems as we have discussed up to this point in this chapter. Although our focus is mainly on corporate customers, we will point out related examples and theoretical perspectives that relate to value realization for the other industry players, especially travel agencies, CRSs and suppliers.

As the reader can see from our industry analysis, Internet-based electronic reservation systems are the major force behind the recent corporate travel industry transformations. But some companies see immediate benefits from implementing such systems, while others take a longer path to realizing benefits (Spradling, 2000).

Based on our previous research on the corporate travel industry, as well as on the most recent results related to EC impacts on other industries, we propose a life cycle framework that describes how value from EC technology solutions for corporate travel is created and realized by firms implementing these technologies. (See Figure 4.) The first step in determining the value of an EC technology is to perform an *investment evaluation of the system* (**Box 1**) that enables the identification of its core value propositions, and the projected favorable cost and revenue impacts associated with them. In this context, it is important for the corporate investor to identify the key sources of value, as well as the extent of the potential value that may be obtained for the firm. Some value may come in a *direct form* (e.g., savings from the e-channel), or in a more *indirect form* (e.g., leverage for improved market share through business intelligence for better pricing). In both cases, however, the value flows will be tied to the implementation of the current technical infrastructure.

These projections depend on *value barriers* generated by the *organizational environment, market structure* and *industry competitive context* where the system is implemented, and also require background analysis (**Box 2**). For corporate customers, the organizational environment might prevent the successful implementation and adoption of an Internet-based reservation system because of specific processes that make travel automation difficult, such as complicated travel policies or requirements for special handling for international travel and complicated routes for many of the company's reservations. In addition, a company whose employees are not knowledgeable computer users or do not have easy access to the Internet is unlikely to have too much success with an Internet-based travel reservation system. Such a systems' wireless features may also be useless for a company whose employees do not routinely have wireless Internet access. We also note that in many cases, the current industry structure does not support real-time hotel reservations using the Internet-based reservation system, and as a result the online reservations need to be manually processed by traditional travel agents, who have to contact the hotels directly by phone to make reservations. In addition, implementing a solution that is not advanced enough and cannot survive in the marketplace also creates value barriers. In support of this issue we recall the case of TravelNet, an early Internet-based reservation system whose users had to switch to other providers when the company closed its doors in 1998 and thus have lost their initial investment (both in terms of system implementation costs and user training) in TravelNet (McNulty, 1998a). More recently, AXI, the reservation system jointly developed by American Express and Microsoft, seems to loose its support from its developers and its clients after the end of the American Express – Microsoft exclusive development agreement and American Express' new partnership with GetThere.com (Campbell, 2000c).

For travel agencies, Internet-based reservation systems and CRSs, the key issues that arise have to do with the fact that competitors may be implementing the same kinds of systems, creating external value barriers

to the achievement of high value outcomes from the investment. For example, being early to market with a wireless B2B travel procurement is currently an important competitive capability, but there will be many corporate travel vendors that will put such capabilities into place in the coming years. As a result, industry competition is likely to create a value barrier. In addition, the lack of XML standards might create barriers for supplier participation in CRS-disintermediating Internet-reservation systems. Over time, the market structure of the industry may also change, for example, as we have seen with airline firms and their own DotCom business models to lure travelers to make direct bookings, dulling the prospects of the major Internet-based, but non-airline or travel agency affiliated airline reservation portals. Finally, the organizational environment of a firm may change, impacting the value of a systems investment for leisure and corporate travel booking. TravelBids.com, an early and innovative competitor that brought "on bundle" bidding for travel and hospitality services to the Internet, is one of the Internet-based travel reservation marketplaces that is no longer operational, despite the attractiveness of its original business model that forced travel agencies to bid against one another for leisure business. In its case, the industry structure and competitive environment changed considerably, rendering its business model ineffectual. Faced with such changes, numerous other firms in the DotCom patch – not just travel industry-related – have chosen to shift their business models in order to survive in the marketplace.

The market structure and competitive context also influence the organizational *adoption* of the system (**Box 3)** by corporate customers, and, if direct links are provided, by suppliers. Adoption also needs to be analyzed in terms of individual traveler usage within organizations implementing Internet-based reservation systems. The expected benefits of the EC systems are highly dependent on the adoption levels within the organization, after implementation is completed. Few such organizations can, or want to, mandate the use of the electronic system. Instead, many offer it as an alternative to phone reservations through traditional travel agents. They try to drive adoption through focused communication and training campaigns and by charging back the transaction fees to the individual department to which each traveler belongs, such that these departments have an incentive to encourage the less expensive online reservations.

The evaluation of the investment decision provides guidelines regarding the scope and content of the *implementation* (**Box 4**). During implementation, companies are usually faced with various problems, ranging from technical difficulties to lack of sufficient organizational resources. All these problems act as *value contingencies*, lengthening the time of the implementation and affecting its success. It is therefore important to assess the impact of all the factors that can limit the realization of all potential value that was estimated during the evaluation phase, and try to take action to maximize the realized value.

Performance assessment (**Box 5**) helps firms understand how successful their implementation has been, and establish benchmarks for improving implementation. This step should involve value measurements at the level of the reservation processes supported by the implemented systems, and not at the aggregate organizational level, since this is a mismatch for assessment the implementation. It should also compare pre-implementation and post-implementation value measurements. This is not a trivial step, however, as value from EC systems is multi-faceted, and monitoring of all hard and soft benefits will require additional effort that not every company is willing to make. What is important, though, is that senior managers pay attention to their *realized value estimates* and the characteristics of the reservation processes for which they are obtained. (For a fuller interpretation of this recommendation, the interested reader should see the first author's doctoral dissertation (Chircu, forthcoming)).

In the next several sections, we will provide more details about each framework element by highlighting specific issues and problems, the relevant theoretical perspective that can help us understand these issues, and managerial recommendations related to these issues.

4. INVESTMENT EVALUATION

Investment evaluation is the first step corporations have to go through to determine the benefits of implementing Internet-based reservation systems. Industry reports show that investment costs are high, but also suggest significant benefits may exist. (See Table 3.)

4.1. Relevant Theoretical Perspectives

A number of theoretical frameworks can aid our conceptualization regarding the investment evaluation phase. For example, Davern & Kauffman (2000) show how firms can discover the *potential value* of a technology by looking at the maximum benefits the technology can generate and comparing them with the benefits obtained without using the technology. Chircu & Kauffman (2000b) propose that this potential value is created by generic *value flows* applied to the specific characteristics of the technology implementation environment. Value flows describe sources of value that are generally observed for a specific technology successfully implemented and used as expected. However, these perfect implementation and adoption conditions cannot be found in every company. Instead, existing organizational processes or culture, the current level of technological infrastructure and standards adoption in the industry, and the actions of competitors all create *value barriers* that limit the value flows, resulting in firm and industry-specific technology potential value. Investment evaluation should therefore involve analyzing how these generic value sources apply to the specific organizational and industry context of the firm that makes the technology investment decision, what the value barriers are and how they can be overcome (if possible).

How can firms identify the general value flows that will occur for their EC technology investments? Existing theoretical and empirical studies suggest that these value flows occur primarily from two sources. *First, process-level value flows* will be observed, consisting of increased process efficiencies, that are reflected in cost savings and improved product quality (Barua, et al., 1995; Brynjolfsson & Hitt 1995; Srinivasan et al., 1994; Lee & Clark 1996). *Second, market-level value flows* will also occur, based on the extent to which the business model offers sustainable competitive advantage (Clemons, 1991; Clemons & Row, 1991b; Teece, 1987). In some cases, another market-level value flow is generated by positive network externalities that increase the value of the technology for all of the firm's technology adopters, as more adopters join the network (Katz & Shapiro, 1986; Kauffman et al., 1999). The reader will recognize that this value flow applies, for example, to second-wave CRS-disintermediating EC solutions that we described earlier, such as GetThere.com and e-Travel.

A new approach to analyzing the value of investments, *real option pricing* (**ROV**) *methods*, has become increasingly popular during the past few years (Luehrman, 1998). The option value of a technology investment relates to the flexibility for future projects enabled by the current technology investment. In other words, firms create, through the current investment, the option (a right, but not an obligation) to make future investments as they gain valuable experience with the technology and improved knowledge of the industry and competitive environment. EC technologies are generally characterized by uncertainties that arise as these technologies are adopted in the marketplace, industry standards evolve and industry competition intensifies. Therefore, they are very well suited for real option pricing analysis (Benaroch & Kauffman, 1999). We need to point out, however, that in the special case of Internet-based reservation systems, real option pricing models are most suitable for evaluating the value that industry intermediaries can obtain from implementing such systems. For example, Sabre's acquisition of GetThere.com, or travel agencies' decisions to complement their traditional travel services with Internet-based reservation services all create future options for these firms.

4.2. Managerial Actions and Recommended Solutions

Given that investment evaluation bears significant costs as well – for example, the evaluation consulting fees alone can range from $10,000 to $20,000 – some companies are willing to skip the evaluation step and jump directly to implementation based on industry-wide estimates. (See Table 3.) This is probably the biggest mistake firms can make in implementing Internet-based travel reservation systems. Only firms that take this step seriously and thoroughly analyze their organization and industry affordances for the new technology achieve successful implementations (Chircu & Kauffman, 2000b).

Companies have to spend time analyzing the range of value sources for a specific investment decision, as well as the value barriers that impact them. For example, the value flows for a corporate customer using Internet-based reservation systems are less travel agents required to handle the company's phone reservations resulting in significantly reduced transaction fees, better compliance with travel policy, and more informed and responsible travelers. But various value barriers – which will be detailed in the next sections – can limit these value flows, as the reader will shortly see.

The investment evaluation should prompt an investigation of the advantages and disadvantages offered by a specific industry setting, as well as by existing organizational routines and resources that can limit potential value otherwise available to other firms. Taking into account all these issues during the investment evaluation stage can help identify real value and moderate overly optimistic estimates. In some cases, it is also possible that the investment decision will be delayed until market and organizational conditions allow the benefits to be realized. Most importantly, the investment evaluation phase can help companies plan accordingly to remove at least *some* of the barriers in order to streamline the implementation and encourage the adoption of the system among their travelers.

5. ORGANIZATIONAL SETTING, MARKET STRUCTURE AND COMPETITIVE CONTEXT

As suggested by the theoretical perspectives presented in the previous section, barriers to value limit the technology value flows. These barriers depend on the specific organizational environment, market structure and competitive context where the technology implementation will eventually take place.

5.1. Relevant Theoretical Perspectives

There are a number of theoretical perspectives that explain the basis for the conditions that affect potential value in a specific organizational context and in a competitive marketplace, and what limits the success of the technology implementation. The existing industry structure and established relationships a firm already has within this industry structure can lead to different potential value estimates for different firms investing in the same technology. In addition, value barriers are also created at the market level by technological standards that may favor compatible technologies over incompatible technologies (Katz & Shapiro, 1994; Brynjolfsson & Kemerer, 1994). Another value barrier involves negative network externalities generated by non-standard technologies or technologies that increase competition (Bakos & Brynjolfsson, 1993; Riggins et al., 1994). Again, we note that most of these barriers become relevant for the online reservation system investment decisions of travel agencies, CRSs and suppliers.

At the organizational level, constraints a company must face in capturing value include unique organizational routines and human capital developed over time. (See, for example, Brynjolfsson & Hitt, 1998; Chircu & Kauffman, 2000b; Clemons & Row, 1991b; Davern & Kauffman, 2000; Leonard-Barton, 1988; Teece, 1987) Recent theoretical perspectives on technology investments also point out that successful implementation requires firms to reengineer their processes to enable the new capabilities of the technology in which they invest (Barua, Lee & Whinston, 1996; Brynjolfsson & Hitt, 1998; Lee & Clark, 1996).

5.2. Managerial Actions and Recommended Solutions

Our research also suggests that correct estimation of the valuation barriers enables companies to better assess the success of the IT investment. Firms, therefore, should proactively identify barriers created by their organizational environment, in conjunction with the market structure and industry competitive context, and then take steps to overcome them. In this context, value barriers for companies implementing Internet-based reservation systems can include company characteristics such as specific company travel mix and specific company travel reservation rules, negotiated rates restrictions, existing provider relationships, or travelers lacking time for or experience with online reservations. Barriers can also be generated by Internet-based reservation systems restrictions or limited search capabilities.

How can some of these barriers be eliminated? Some solutions include investing in implementation expertise and human capital, thorough analysis of company's travel reservation processes and rules and their reengineering to fit the Internet-based reservation system, and establishing special relationships with other industry participants that would leverage the technology investment. If the Internet-based reservation system success depends on other industry players' "buying into" the system – such as in the case of direct connections solutions whose viability depends on how many suppliers join the system – the promoters of the system have to sponsor it until it becomes widely accepted by enough suppliers. It is also important that the corresponding cost be factored into the overall investment evaluation, when a firm aims to eliminate such barriers.

6. ADOPTION ISSUES

An important part of the investment evaluation for an online reservation system is determining the *realizable* adoption level for the system. Our experience with analyzing such investments indicates that individual user "buy in" of the new reservation technology is extremely important in realizing value from this investment. For example, even a perfectly implemented system will be unable to deliver much value, if the firm's employees do not view it as a viable alternative for booking travel. In addition, it turns out that despite the fact that they are promoted as an easy-to-use alternative to calling a traditional travel agent, Internet-based reservation systems have specific travel expertise requirements that hinder their adoption by individual users.

6.1. Relevant Theoretical Perspectives

The classical theory of the diffusion of technological innovations, proposed by Rogers (1983), focuses on individual perceptions of innovations in terms of relative advantage, compatibility, complexity, trialability and observability. Significant differences in users' levels of innovativeness exist, which makes them adopt the technology at different rates (Moore & Benbasat, 1991; Rogers, 1983). The *technology acceptance model* (Davis, 1989) shows how individual perceptions regarding technology ease of use and usefulness are important determinants of adoption intentions. Unfavorable perceptions regarding the various characteristics of technology will create barriers to adoption, and result in users choosing not to adopt (Davis, 1989; Moore & Benbasat, 1991; Rogers, 1983).

Technology complexity is important in understanding adoption as well, since complex technologies require new skills, that might be hard to learn because of knowledge barriers (Attewell, 1992). Such barriers describe the inability of a user to acquire new knowledge and use it effectively due to poorly developed *absorptive capacity* (Cohen & Levinthal, 1990). To accelerate adoption of new technologies among their employees, firms can use *change agents* (Rogers, 1983). For example, managers can communicate authority messages to influence adoption decision for employees with low tolerance for change and innovation (Leonard-Barton & Deschamps, 1988).

6.2. Managerial Actions and Recommended Solutions

Managers have to understand that high adoption levels are not always sufficient for the realization of benefits, though they often are necessary. It is important to keep in mind that, depending on a company's specific travel patterns, that not all reservations can be completed online. Complex travel requirements, including multiple stops and international travel, or last-minute travel, are best reserved by phone given the current capabilities of online reservation systems. For those reservations that can be performed online, however, adoption levels need to be monitored and encouraged. If the organizational culture does not afford mandating an Internet-based reservation system, managers should focus on improving these adoption levels through communication, training and incentive programs.

Training can be used to improve absorptive capacity and lower the knowledge barriers, by allowing employees to develop the necessary skills for using the system at least as efficiently as the traditional reservation method by phone. Communication programs can improve the perceptions employees have about the online systems, pointing out their relative advantage over phone calls. Incentive programs can also be used to overcome employees' initial resistance to using an unfamiliar technology and familiarize all employees – even those with low *innovativeness levels* – with the benefits of online reservations. Most importantly, companies have to continue providing training and advertising for the Internet-based reservation system until its use becomes routine. This often takes longer than most managers expect.

7. IMPLEMENTATION OF CORPORATE TRAVEL SYSTEMS SOLUTIONS

Companies that implement Internet-based travel reservation systems have to overcome a number of difficulties related to process re-engineering, seamless integration across the company, the traditional travel agency and the online system, and system performance. Among 20 companies that we interviewed in 1999 regarding their implementation of leading online systems, 30% complained that they lacked the resources to solve unforeseen implementation difficulties. Almost half of these companies have also discovered the automating travel reservations was more complex than expected. Finally, in 60% of the cases, companies were faced with technical problems and hard-to-remedy system errors (Chircu et al., forthcoming). It comes as no surprise, however, that the majority of these companies (40%) were in the pilot testing stage, and only very few (20%) were able to move to a full enterprise rollout. (See Figure 5).

7.1. Relevant Theoretical Perspectives

When business organizations implement systems, they aim to convert the potential value of the IT in which they have invested into *realized value* that is measurable (Davern & Kauffman, 2000). However, the implementation process is usually characterized by *conversion contingencies*, which describe the extent to which the implementation goes as planned (Weill, 1990), and which affect conversion effectiveness of potential value into realized value (Chircu & Kauffman, 2000b; Davern & Kauffman, 2000; Lucas, 1999).

These contingencies limit the amount of potential value that the organization can realize from implementation. In general, contingencies occur due to the specific organizational environment and the market structure context where the technology is implemented, as we described earlier, and due to the inherent uncertainties embedded in technology implementation projects (Atler & Ginzberg, 1978).

In most cases, successful implementations require additional investments in specialized technology-supported industry relationships and new organizational processes. Developing or acquiring the requisite implementation expertise is also important (Grove et al., 1995; Thong et al. 1996). Moreover, top management support during the implementation process is important (Beath, 1991; Howell & Higgins,

1990; Thong et al., 1996), to ensure that the critical implementation uncertainties are actively managed (Alter & Ginzberg, 1978). When these factors are not taken into account, the implementation either is delayed or may fail, and the expected value that the technology can produce will be diminished accordingly.

7.2. Managerial Actions and Recommended Solutions

When it comes to implementation, managers have to proactively identify and manage implementation problems. Being aware of these potential problems from the beginning improves the chances of a successful implementation. However, ignoring them and not investing in specialized implementation expertise can lead in extreme cases to the failure of the implementation project. Implementation problems reported by companies implementing Internet-based reservation systems include lack of implementation knowledge, financial and personnel resources, unexpected system errors, and lack of a technology champion promoting the implementation.

To overcome these problems, managers can plan ahead and ensure they have adequate implementation support from their own IT departments or outside implementation specialists, and allocate sufficient financial resources to the project. Dynamic allocation of resources during the implementation and proactive problem solving are also crucial in dealing with implementation problems that cannot be predicted in advance. Most importantly, the implementation needs to be approached as a project yielding only long-term benefits while requiring significant short-term financial and human resources commitments. As a result, managers need to realize that the implementation of an Internet-based travel reservation system requires not only their company, but also their company's travel agency to re-engineer their travel processes to seamlessly integrate phone-based and online reservation making. Commitments of time, resources and expertise from the company itself, its travel agency, and online reservation system vendor are thus essential for ensuring a smooth implementation.

8. PERFORMANCE ASSESSMENT AND BUSINESS VALUE

Many organizations that invest in IT struggle to adequately assess the business value of their investments. This occurs because technology investments are often intended to support business activities, and are less often the thing that directly produces the revenues. In the case of e-procurement systems, such as those we have discussed in the travel industry, the technology provides an *infrastructural utility* upon which to build a service delivery capability that enables a firm to leverage a new channel, the Internet. This is complicated by the fact that typically there are *multiple channels* through which the same services can be delivered, each with its own associated costs and benefits, and unique value proposition for the user. Moreover, such delivery systems also handle *heterogeneous transactions*, and these, as we have already argued, may be subject to different quality support (e.g., support for simple versus complex travel specifications). In this context, organizational estimates of savings can differ, depending on what type of comparison was performed (transaction fee savings or average ticket price savings) and on whether the heterogeneous transaction characteristics have been taken into account. (See Table 4.)

8.1. Relevant Theoretical Perspectives

Barua et al. (1995) suggest that the measurement of business value from technology applications has to be performed at the level of core business processes of the firm where the application is implemented. This perspective points out that the process level is the locus of true business value, where the impacts of technology accrue and are easily discernable.

Performance assessment of e-procurement technologies can focus on three types of performance measures. *First*, performance can be measured in terms of *transaction efficiency*, which, turn, can be expressed as transaction cost reductions (Lee & Clark, 1996; Malone et al, 1987; Srinivasan et al., 1994) and lower prices (Bakos, 1991, 1997, 1998). Lower prices can result from an increased ability to negotiate better prices with suppliers due to an increase in industry competition brought about by easier price identification using EC technologies (Bakos, 1991). Lower prices can also result from improvements in evaluation of available products and selection of the lowest price option (Barua et al., 1997; Degeratu et al., 1999; Lynch & Ariely 2000; Shankar et al., 1999). *Second*, performance can be measured in terms of *transaction effectiveness*, or fit with the preferences regarding product attributes specified at the beginning of transaction (Clemons et al., 1998; Lee & Clark, 1996). *Third*, performance can be measured in term of *subjective benefits* such as less time spent searching, convenience, employee empowerment, and increased liquidity (Bakos, 1991, 1997, 1998).

8.2. Managerial Actions and Recommended Solutions

In the travel context, the key questions that need to be answered include the following: Do Internet-based travel reservation systems permit users to obtain better information, resulting in lower booked airline fares? Or do they support some kinds of reservations better than others, resulting in an uneven distribution of reductions in fares? And, to what extent is the extent of individual adoption of an Internet-based corporate travel reservation system a primary determinant of the system's value?

Managers have to recognize that although reductions in transaction costs for Internet-based electronic reservation systems are certainly an important source of savings, they can be achieved only when adoption levels for electronic transactions are relatively "high." By "high," we mean at least 20% and usually 35% to 40%, according to industry estimates (Welt, 1999). In addition, despite aggregate level estimates of a 15% to 20% reduction in prices due to better evaluation of alternatives and more informed buyers (McNulty, 1998b; Rosen, 2000a), more accurate process level estimates indicate that this reduction is an order of magnitude smaller than what is typically expected. Moreover, it occurs only for a small percentage of transactions (Chircu & Kauffman, 2000a). (See Table 4.) Therefore, managers have to measure the price reduction benefits at the process level, and not at the aggregate firm level, by taking into account all situational factors.

Even if the expected transaction price reductions due to improved evaluation and selection capabilities are not as high as expected, managers should not discount the ability of the Internet-based travel reservation system to reduce overall ticket prices. Having access to centralized spending data through such a system can help corporations select the most appropriate suppliers and negotiate better volume-based discounts.

Managers also have to keep in mind that various Internet-based reservation systems will have different efficiency and effectiveness levels, mainly because they rate the importance of finding the lowest price or of finding the best fit with schedule and routing preferences in different ways which are implementation-specific. Rather than assuming that all system behave the same way, managers should evaluate the search efficiency and effectiveness of all available Internet-based travel reservation systems and select the one that works best for their company's goals.

Finally, because the implementation and adoption processes of Internet-based reservation systems are lengthy and problem-laden, managers need to establish realistic timelines for performance assessment, and recognize that they will have to incur significant short-term costs before being able to measure the true value of these systems.

9. CONCLUSIONS

The primary conclusions that we draw from our research relate to the surprisingly contingent value that is associated with the implementation of EC systems, and especially those in the corporate travel procurement area. In this chapter, we presented the findings of research that suggests caution to organizations that implement this kind of technology. Senior managers need to be aware of the extent to which business process change, user adoption, external factors, and a variety of other considerations may diminish the value that an organization can actually obtain from its EC technology investments, relative to the great promises of value that are typically offered by vendors and managed corporate travel services providers.

In closing, we recognize several important contributions from this research that should be useful for different audiences. *First*, for the academic research audience, we integrate a number of theoretical perspectives regarding value creation and accrual from EC technologies. We offer a new framework that can be a starting point for the establishment of a general and comprehensive assessment of the business value of such technologies. *Second*, for industry professionals and executives interested in justifying the value of their investments in EC technology solutions for corporate travel, we provide guidelines for investment evaluation, implementation and measurement, and managerial recommendations that can help maximize value in every stage of the EC technology life cycle. *Third*, for MBA students, we provide a framework for analyzing the corporate travel industry that is applicable to a wide range of technology investments, and show how theoretical perspectives can be used to explain real-world transformation fueled by EC technologies.

The research that we have discussed is a by-product of an industry-university collaboration that spans three years and which has offered unique opportunities for case study, field survey and empirical research. Even though the range of new knowledge about e-procurement of travel services that we have produced has been significant, we are struck by how little we know about the value of e-business technologies. Indeed, our work sets the stage for additional research so that managers can obtain an even more refined understanding of the situational contingencies that deflate the value that can be achieved by the organizations that invest in them.

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Figure 1. Traditional and EC-Enabled Players in the Corporate Travel Industry

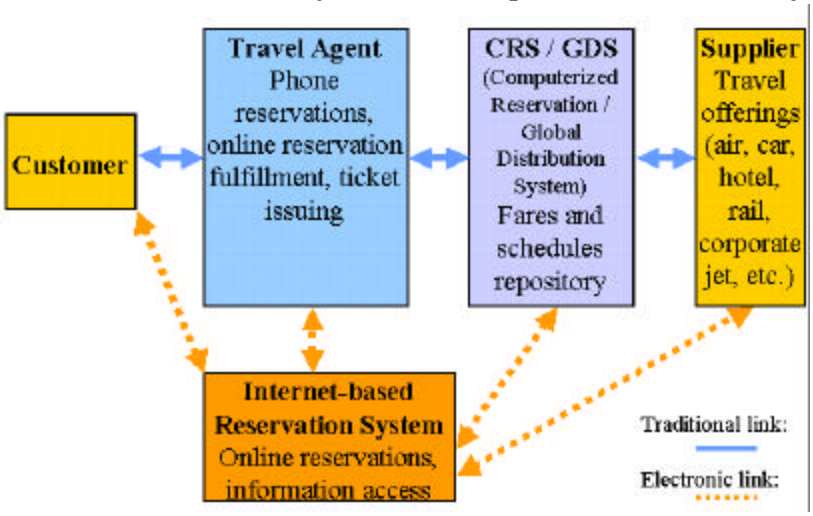

Figure 2. EC Disintermediation of the Traditional Distribution Chain in Corporate Travel

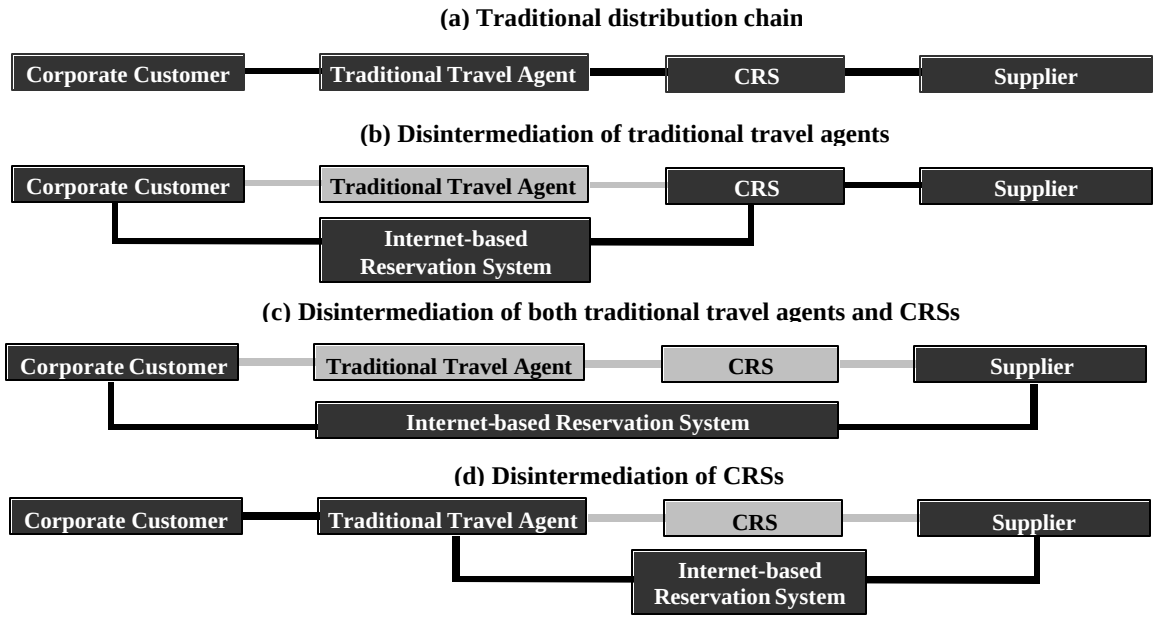

Figure 3. Internet-Based Reservation System Adoption Among the Largest 100 Corporate Travel Customers in 2000 (Source: Campbell, 2000a)

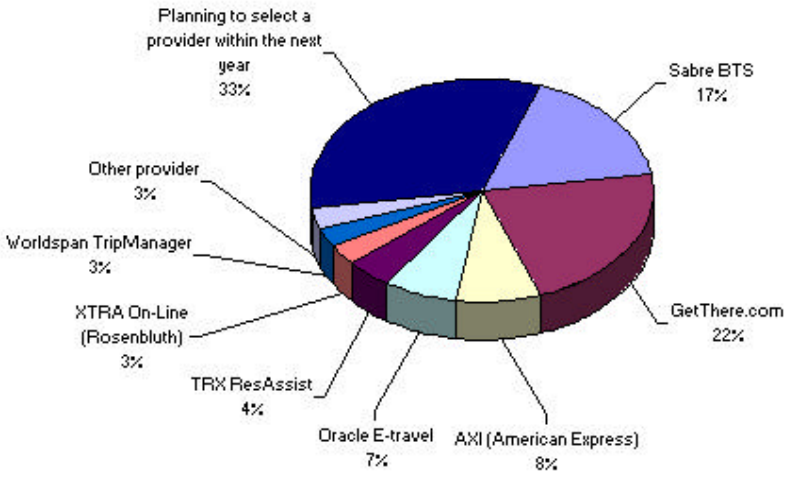

Figure 4. A Life Cycle Framework for Understanding the Value of E-Commerce Technologies

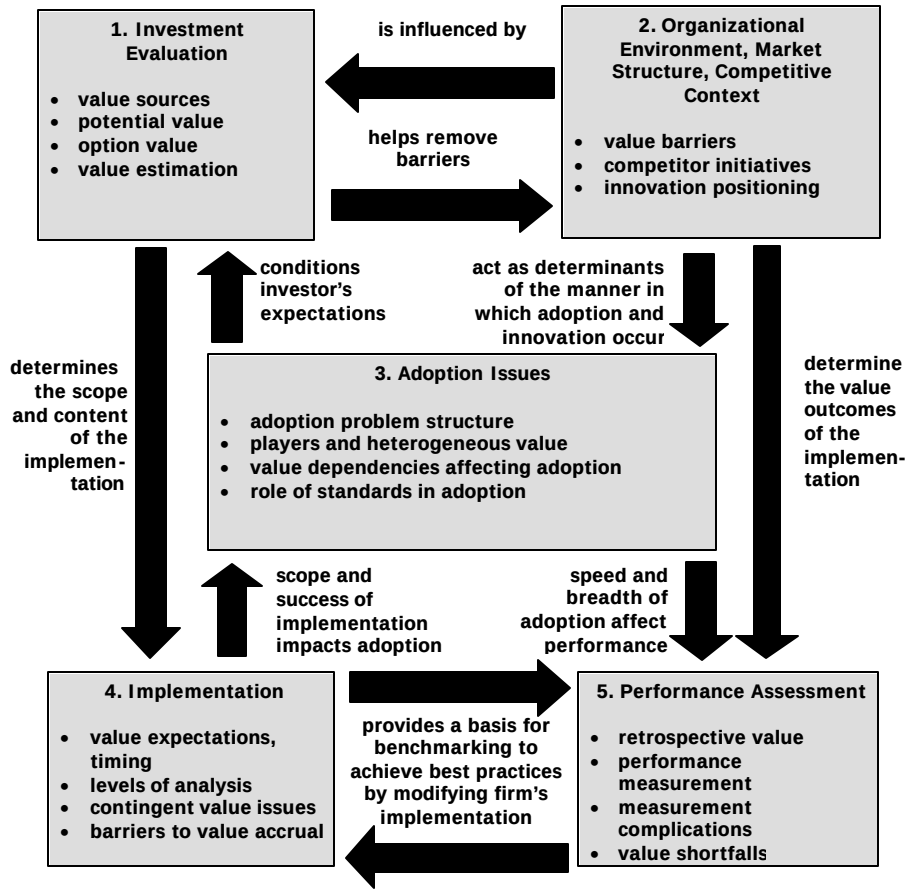

Figure 5. Internet-Based Reservation Systems Implementation Stages at 20 U.S. Companies Surveyed During 1999 (Source: Chircu, forthcoming)

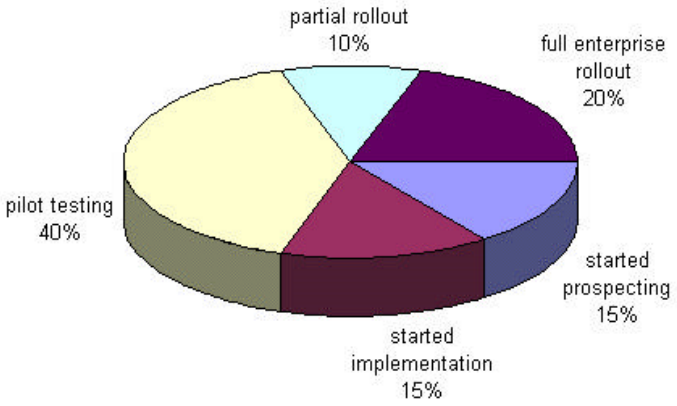

Table 1. Top U. S. Travel Agencies (Source: *Travel Weekly*, various issues in 2000)

RANK	AGENCY	US$ GROSS (in millions)		LOCA-TIONS	BUSINESS TRAVEL (as a percentage of total sales)	ONLINE CORPORATE TRAVEL RESERVATION SYSTEM
		1998	1999			
1	American Express	$11,950 (*Travel Weekly* estimate)	$13,700 (*Travel Weekly* estimate)	3,700	2,000 locations serve corporate customers; "business mix is dominated by corporate travel"	AXI, GetThere.com (under development); 272 corporate customers with 667,000 registered online users already use AXI
2	Carlson Wagonlit Travel	$11,000	$11,000	3,000	96%	SoloAct online booking solution powered by Sabre BTS, e-Travel, KDS; GetThere.com will be used for leisure travel only
3	World Travel Partners	$3,300	$4,300	1,632	84%	TRX's ResAssist recommended (but clients may use any online system); 7% of corporate clients use online reservation systems.
4	Rosenbluth Interna-tional	$3,740	$4,200	N/D	96%	@Rosenbluth powered by XOL's XTRA On-Line; Biztravel.com , which Rosenbluth now owns, is targeted to unmanaged business travel
5	Navigant Interna-tional	N/D	$3,300	1,150	88%	XOL's XTRA On-Line, Sabre BTS and Worldspan Trip Manager; 10% of corporate clients use these systems
6	Maritz Travel	$1,883	$1,740	367	94%	eCom Booking Solutions powered by Sabre BTS, GetThere.com and Worldspan Trip Manager; 24 clients are currently implementing these systems
7	Liberty Travel	$1,089	$1,200	198	2%	Agency has Internet-based reservation system for leisure clients
8	Sato Travel	$1,089	$1,200	925	92%	Proprietary reservation request system integrated with agency's call center (Res By Web); 5% of reservations are currently made online
9	Travelocity .com	$285	$1,200	Online only	Primarily leisure travel	Proprietary (www.travelocity.com)
10	Expedia, Inc.	$250	$832	Online only	Primarily leisure travel	Proprietary (www.expedia.com)

Table 2. Leading Online Reservation System Providers for Corporate Travel (Sources: McNulty, 1999a; Rosen, 2000b; Rice, 2000; PhoCusWright, 2000)

TECHNOLOGY PROVIDER	ONLINE SYSTEM	CUSTOMERS AND ADOPTION LEVELS	MOST RECENT DEVELOPMENTS
Worldspan	Trip Manager	891 customers Adoption: N/A	Automated quality control; wireless services
TRX	ResAssist	More than 600 customers Adoption: N/A	Multi-lingual capabilities; direct connections with suppliers
GetThere.com	GlobalManager, DirectCorporate (newly launched)	100 major corporations and travel providers (who license private label versions of GetThere.com's software) 1,000 small American Express customers Adoption: N/A	Wireless services; direct connections with suppliers; acquired by Sabre in October 2000
Sabre	Sabre BTS	500 corporate customers Adoption: 5% of customers book 90% of travel online, 95% of customers book 15-25% of travel online	Automated quality control; has acquired GetThere.com on 10/00
Microsoft	AXI	272 American Express corporate customers Adoption: N/A	Exclusivity agreement with American Express ended June 1999; international versions
XOL	XTRA On-Line PowerTrip	200 corporations Adoption: N/A	Combined fare rules and schedule listing; automated trip planning product
Oracle	e-Travel	9 major global corporations featured on e-Travel.com website, 200 customers Adoption: generally 10-15% , in some cases 25-30%	XML-based release; direct connections to suppliers; wireless services

Table 3. Internet-Based Corporate Travel Reservation Systems: Investments, Potential Savings

INVESTMENTS	POTENTIAL SAVINGS
One-time costs: evaluation consulting fees of $10,000-$20,000, system cost of $30,000-$80,000 to $1-$5 million depending on vendor significant implementation costs (Chircu et al., forthcoming; McNulty, 1998b, 1998c, 1999b)	Transaction cost savings: tiered pricing savings of 20-40% depending on adoption level agent headcount savings (Welt, 1999; Rosen, 2000a)
Recurring costs: annual license fees of $10,000-$50,000 depending on volume; transaction fees (50% or more lower than traditional transaction fees); maintenance and upgrade costs of 15%-20% of license fees; adoption costs (consultants, incentives) and system improvement costs (Chircu et al., forthcoming; Feldman, 1999; McNulty, 1998b, 1998c, 1999a, 1999b)	Lower price savings: more informed and responsible travelers and better enforcement of corporate travel policy, leading to lower prices chosen online among the set of available travel options (McNulty, 1998b, 1998c; Rosen, 2000a)

Table 4. Different Comparisons of Internet-Based and Travel Agent-Based Reservations (Sources: Chircu & Kauffman, 2000a; Rosen, 2000a; Welt, 1999)

BASIS OF COMPARISON	SAVINGS ESTIMATE (ELECTRONIC VS. PHONE)	COMMENTS
Transaction fees	35%-55%	Range of values reported in industry journals: 20%-40% (starting at minimum 20% electronic reservation usage)
Average ticket price (ignoring ticket or traveler choice details, travel routes or seasonality)	11%	Range of values reported in industry journals: 15%-20%
Average ticket price (accounting for travel routes and seasonality, ignoring ticket or traveler choice)	13%	Range of values reported in industry journals: 15%-20%
Average ticket price (accounting for travel routes and seasonality, ticket details; ignoring traveler choice details)	0%-2%	Range of values reported in industry journals: N/A
Average ticket price (accounting for travel routes and seasonality, ticket details, traveler choice details)	0% for brand-related choices (airline preference), 11%-26% for non-brand-related choices (schedule preference)	Savings limited to small subset (10%) of company transactions for which the non-brand-related choices occur