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Kalle Lyytinen

*Case Western Reserve University*

Sean McGann

*Case Western Reserve University*

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## **Capturing the Dynamics of eBusiness Models: The eBusiness Analysis Framework and the Electronic Trading Infrastructure**

**Sean T. McGann**

Case Western Reserve University,  
United States  
STM3@po.cwru.edu

**Kalle Lyytinen**

Case Western Reserve University,  
United States  
Kalle@po.cwru.edu

### **Abstract**

*We outline a business model based analysis framework, which helps examine the intricacies and evolution of eBusiness. While the current research has mostly examined volume and scope as indicators of eBusiness evolution, we suggest that this analysis should be augmented with qualitative analysis of the evolution of eBusiness models, their implementation strategies and diffusion. The critical part of this examination is the identification of two constraints that affect eBusiness model evolution: the maturity of the electronic infrastructure (ETI), and environmental factors consisting of regulatory frameworks and push-pull diffusion factors. After presenting the defining concepts of our approach, we exemplify the value of the framework by analyzing the evolution of B2B and B2C business in the US over the past 5 years.*

## **1. Introduction**

The evolution of Electronic Commerce over the past 10 years has brought up many interesting challenges to business and academia. The rise and fall of numerous Dot coms begs important questions about the future of eBusiness and what it will take to succeed. New business models and their associated systems have, in many cases, rewritten the rules of business and added new levels of complexity. [7] Increased dependence on information technology makes tight integration and interoperability among business networks an imperative, as these networks will play a key role in the evolution of eBusinesses. [14] These issues necessitate analysis of the systemic growth of and change in eBusiness models and their associated Electronic Trading Infrastructure. In light of this, we propose a research stream targeted at the examination of the evolution, refinement, diffusion and construction of e-business models. The key questions inherent in this research stream are:

- How do varying eBusiness Models relate to and influence each other in their evolution process?;
- How does the evolution of eBusiness Models in turn relate to the evolution of eBusiness in general?;
- How do the components of an eBusiness Model relate to the evolution of that business model?;
- How do institutional factors such as regulatory frameworks influence the evolution of eBusiness models?;
- How do various diffusion factors influence the evolution of eBusiness models?

An eBusiness Model is defined here as the integration of business rules (revenue models, etc), a viable trading mechanism (auction, exchange, online retail, etc) and associated trading protocols (HTML, ASP, EBXML, EDI, etc) into a business approach that leverages the open network (Internet) as its medium of transaction. eBusiness models are thus composed of the following characteristics: definition of products and services offered, specification of information and revenue flows, identification of business actors involved, their roles and value propositions. [1] Several recent studies have increased our understanding of these characteristics. Timmers [15] provides valuable taxonomies of eBusiness models based on information flows and evolution of services. Kraemer et al [9] have constructed a macro-level framework to examine the drivers and inhibitors, and their effect on the diffusion of Ecommerce.

What is lacking currently is a framework that organizes the elements of eBusiness within their respective business networks, and more importantly, articulates the evolutionary logic inherent in the associated business models. Such a framework would facilitate a detailed analysis of the complexity of eBusiness evolution by

looking at the components of eBusiness models, their implementation processes, and the subsequent evolution of eBusiness at the national, industry and organizational levels. Recent experience teaches that there is an urgent need to better understand strengths and flaws of business models, and to probe their linkages with implementation constraints and potential. [12] The past five years provide ample evidence of the woeful consequences of implementing first, and assessing the details of their repercussions later. [7] This paper seeks to represent one step in this direction.

In this paper, we will use recent evolution in the discourses around eBusiness models to propose a diagnostic method to analyze their evolution and status entitled the eBusiness Analysis Framework (EAF). The analysis will scrutinize current models and define ingredients of the future eBusiness networks. The analysis introduces a critical construct for the analysis of business model evolution called the Electronic Trading Infrastructure (ETI). ETI is defined here as a system of processes and technological components embedded in a network of eBusiness organizations within a given business model that enables the achievement of business model integration for purposes of business transaction and information sharing. ETIs describe key internal and peripheral components of specific eBusiness models. In the articulation of the ETI Framework, we will outline a number of constructs that delineate critical relationships between business entities such as firms, consumers, governments and intermediaries (B2B, B2C, B2G, etc.). Each ETI integrates a host of innovations defined by technological constructs and artifacts, business protocols, as well as processes entailed and enabled by the business model. For individual business models, the framework will help explore their key characteristics and scope (processes, associated technology, trading protocols, etc), and key integration points, to trace the evolution of eBusiness and its underlying models. It is our contention that the key to the success of any eBusiness model will be the its implementation of and integration with an existing Electronic Trading Infrastructure, which both constrains and enables the execution of such models. The ETIs serve as a critical benchmark for eBusiness success by providing a means with which to make sense of eBusiness.

Our approach to eBusiness model analysis forms an expansion and refinement of Timmers' [15] and Kraemer et al's work. [9] By leveraging the ETI Framework, our analysis reaches beyond Timmers' single model definition and classification. By focusing on the evolution of business models we supplement one-dimensional eBusiness diffusion models that focus solely on **quantitative changes** in eBusiness activity (see [www.crito.com](http://www.crito.com) for examples of such quantitative analysis) but ignore the business innovation which are the causes of such changes. Our approach entails a detailed scrutiny, critiquing and diagnosing of the evolving set of eBusiness models through the analysis of ETIs and their components. Our focus is placed squarely on critical relationships of business models with their broader technological and institutional environment and the growing complexity of eBusiness which results from the increased number and type of such relationships. We achieve this by investigating critical infrastructure components that support business models and their mutual evolution. This helps detect reasons why some

models evolve, diffuse and are accepted more rapidly than others. It also helps identify learning that has taken place as a result of the trial and error process of eBusiness model innovation. We deploy the framework as a diagnostic tool to assess eBusiness success by comparing successful and failed business models with the ETI Framework. It is our view that a framework to assess eBusiness model viability is an essential proactive measure for assessing eBusiness prospects and diffusion dynamics.

In the remainder of this paper, we will first expand in detail on the EAF Framework, and the ETI components. This will be followed by an application of the EAF using historical data collected on US Ecommerce evolution/diffusion. Next, we will use the EAF to analyze the US case data. Finally, some conclusions will be drawn for future research.

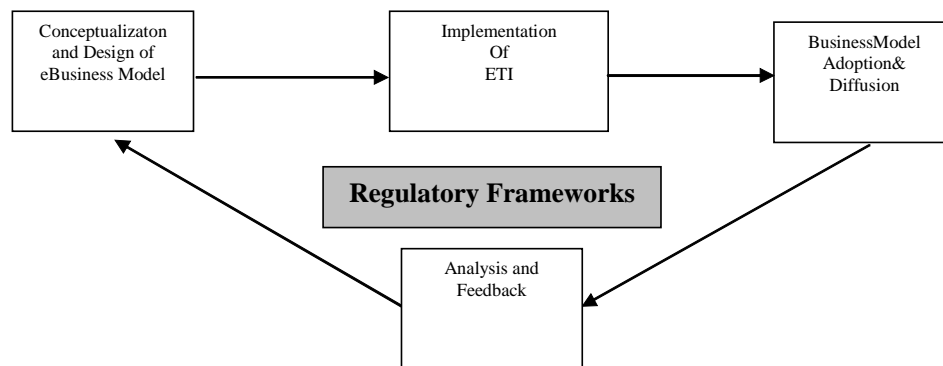
## **2. The eBusiness Analysis Framework (EAF) Process**

The building of the EAF begins with the recognition of the primary entities present in the eBusiness network i.e. market based actors. These are, in general, businesses, consumers and governments. Recognition of these entities and vital relationships between them enable business transactions to take place. [13] Each transaction set between these actors is conducted in line with a specific business model (e.g. B2B procurement, consumer purchase of goods and services or the governmental requisitioning process). [4] Business models, therefore, are 'one of the most discussed topics in electronic commerce'. [15] In line with this, surveys of small and large companies show that one of the most frequently mentioned barriers to electronic commerce is 'the lack of a viable business model' [15] which normally means that either the value propositions for different actors, the transaction content or the governance mechanisms has not been adequately developed. A business model together with the actors' strategies enables one to assess the commercial viability of a specific eBusiness initiative. It provides answers to questions like: 'how is competitive advantage being built?, what is my positioning?, what is the channel mix?, which product-market strategy is being followed?'. [15]

Business models, by and large, are conceptual and idealized representations of a business structure and dynamics and their execution requires that they can be enacted and supported by a technical and social infrastructure, and that they are adopted and enacted by the involved actors. [3] The execution moves the business model from the conceptual realm to their physical and social implementation. The ETI Framework is structured accordingly in a 'Top Down' fashion to examine this progression while an eBusiness model is implemented. Instantiations of business model implementations over time and space involves the adoption and enactment of business models by actors and thereby leads to the diffusion of eBusiness. [2]

In the first step of the EAF, a rough conceptualization of the business model takes place. Whilst the business environment is analyzed for opportunities, it is compared

with available infrastructure and external factors to derive a potentially viable protocol which enables the actors to transact. We refer to this as a Trading Mechanism. Examples of such mechanisms are auctions in the B2C sector and marketplaces in the B2B sector. Upon completion of the conceptualization, the second step entails the implementation of the model within ETI. This moves the business model into “action” by establishing its technical, social and institutional infrastructure. The third step involves recognition of factors that come into play after a business model has been technically implemented. During this step, eBusinesses are monitored for understanding the dynamics of diffusion and adoption that take place in relation to the business model. As eBusiness models succeed or fail in the markets, the weaknesses of an ETI can be partly used to explain why this happens. Finally, the learning involved in this innovation-diffusion cycle can be fed back into the eBusiness model discovery process. All of this is subject to regulatory frameworks that can be imposed by institutional bodies. [8] This iterative cycle of e-business model invention, adoption and evolution is illustrated in figure 1.



*Figure 1: eBusiness Analysis Framework*

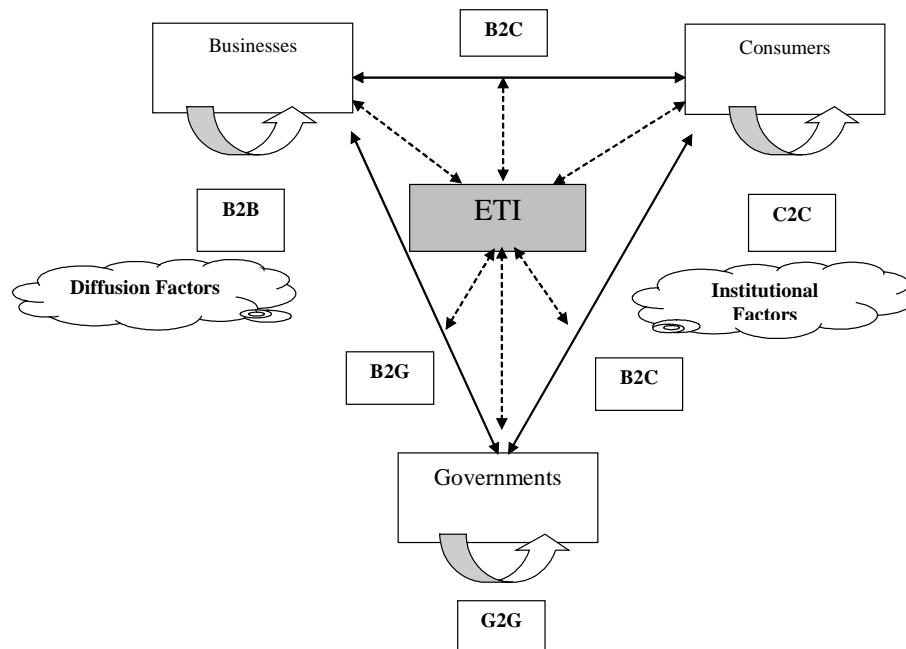
### **3. Electronic Trading Infrastructure (ETI) Defined**

#### **3.1 A Definition of ETI**

ETI elaborates the details of the eBusiness environment by providing a comprehensive list of components that are needed to execute a specific set of eBusiness models. This section focuses on defining those components for common e-business models. This helps to capture the inner complexity of the emerging eBusiness environment. We show that the implementation of any ETI requires

simultaneous consideration of social, institutional and technical factors. It is our contention that any business operating within the confines of some common eBusiness model within any set of relationships between market makers (e.g. B2B, B2C, B2G, C2C, G2C, C2C) will need to understand and leverage its associated ETI in order to thrive.

As noted above the eBusiness trading infrastructure (ETI) is defined as a system of processes and technological components that are associated with a network of eBusiness organizations within a given business model to achieve integration for purposes of business transaction and information sharing. Figure 2 illustrates the contents of a typical ETI in the context of the definition of eBusiness models. The solid-arrows depict key relationships between businesses, consumers and governments that embrace the space of all eBusiness models. The figure illustrates how the ETI sits at the “center” as an enabler and constraint in the eBusiness environment, and thus drives much of the evolution that takes place within the business models. Furthermore, the bi-directional dotted lines symbolize the multitude of roles that the ETI plays in the evolutionary process. As new eBusiness models are implemented, the overall ETI must change and its infrastructural components must adapt and expand. This evolution creates a systemic feedback process, which transforms eBusiness models, as the ETI becomes more pervasive and robust. This illustrates the evolutionary nature of different eBusiness models. Finally, the eBusiness environment includes external factors that drive the diffusion and adoption process eBusiness models.



**Figure 2:** *The eBusiness Environment and the ETI*

## **3.2 ETI Components**

In ETI, each component will be defined in the context of the EAF process. While each component is defined we will move in a 'top down' fashion from initial conceptualization to physical implementation. This process moves from the conceptual realm of trading mechanisms, which establish the blueprint for the model, through the establishment of trading protocols to facilitate transactions, into the integration of value added service providers at the integration points, and finally to the physical realm of implementing enabling technologies and supporting infrastructure to transform the business idea into reality.

### **3.2.1 Trading Mechanisms**

Any eBusiness model invokes a set of processes, policies and procedures that must be enabled, accepted, understood and implemented in order to enable eCommerce transactions. The aggregation of these constructs into a viable business architecture is what is referred to as a trading mechanism. Examples of such trading mechanisms are: exchanges, marketplaces, auctions and reverse auctions, virtual communities. [15]

### **3.2.2 Trading Protocols**

The integration of actor's internal infrastructure for the purpose of transacting commerce requires a common platform of trading protocols. This provides a means for dissimilar technical elements to seamlessly and efficiently communicate and share processes and states. In the past, EDI has served as the standard for B2B (Hasselbring and Weigand 2001), but proved to be difficult and costly to implement. Similarly, a number of protocols have been employed in the B2C realm such as HTML, HTTP, but have met with inherent limitations such as lack of platform flexibility and lack of support for commercial transaction concepts. Currently, a new breed of Ecommerce protocols is under development, which are designed to remedy these issues. They allow for information systems across different businesses and on different platforms to transact seamlessly through a common protocol, with a high degree of flexibility and efficiency. [4] Examples of trading protocols include XML based solutions like EbXML, Rosettanet or Biztalk.

### **3.2.3 Integration Points**

In the network of actors that comprise a given eBusiness model, there are key integration points, both virtual and physical, inherent in the interfaces which allow



businesses, consumers and governments to trade. These are the origination, conversion and termination points for all information related to eCommerce transactions. These nodes consist of technology, knowledge, and the capability needed to encode, encrypt, decode, verify, convert and transmit all information that flows through the ETI. As the majority of these capabilities are currently outsourced, the role of value added service providers such as ISPs, ASPs and payment services is key in both the B2C and B2B realms. [13] In particular, in the B2B sector, the role of intermediaries or B2B marketplaces is a key for future evolution as they provide a platform to accomplish tight integration amongst the disparate systems, business rules and practices that prevail. [13] Examples of integration points consist of firewalls, value added networks, intermediaries and conversion technology.

### **3.2.4 Enabling Technology**

The technical platform on which eBusiness is conducted consists of a set of technologies that must be developed, tested and integrated to allow for integration of business processes among trading partners. [13] The presence, cost and maturity of these technologies are a key factor in determining the success of eBusiness model implementation. As will be explained below, these technological components and their evolution are a key to understanding why e.g. B2C was quickly adopted and able to achieve widespread success, while B2B has fallen far short of the expectations. Examples of key enabling technologies consist of: payment systems and credit card processing technology, PKI, personal and “organizational” computers, broadband internet access (xDSL, Cable), ERP and CRM packages, wired telecommunications infrastructure, and the wireless infrastructure.

### **3.2.5 Supporting Infrastructure**

Outside of the confines of the technical framework of eBusiness, there are myriad other supporting artifacts whose presence is integral to transaction and information flow. In general, these components form an essential part of any business model, but they become even more critical in eBusiness.

Examples consist of integrated logistics, payment and financial instruments, article/product numbering and identification technologies, identification schemes for actors (e.g. social security numbers, business identification numbers, digital document recognition etc.)

Table 1 summarizes the ETI for B2C and B2B models by illustrating all detailed components that must be considered in the analysis of implementing and executing eBusiness models. This serves to further capture the complexity of the eBusiness environment when one considers that each of these components must be considered

in aggregate, along with institutional and diffusion factors, in order to gain a full understanding of the overall eBusiness model and its evolution.

**Table 1: The Electronic Trading Infrastructure Framework**

<b>Business Model</b>	<b>I. Trading Mechanisms</b>	<b>II. Trading Protocols</b>	<b>III. Integration Points</b>	<b>IV. Enabling Technologies</b>	<b>V. Supporting Infrastructure</b>
<b>B2C</b>	Communities  Auctions  Online Retail  Banking  Infomediary	HTML  ASP  Java  COM  ODBC	ISPs  ASPs  Value added services	CC Systems  PCs  Internet Access  Telecom Inf.  Wireless Inf.  CRM  SSL  Encryption  Firewalls  Web Servers	Integrated Logistics  Actor identification schemes  Payment instruments
<b>B2B</b>	Marketplaces  Exchanges  Eprocurement	XML  EbXML  EDI	VANs  ASPs  Intermediaries  Integration Partners	Telecom Inf.  Wireless Inf.  Broadband  ERP  SCM	Integrated Logistics  Actor identification schemes  Payment instruments  Article numbering and identification schemes

### **3.3 Environmental Factors**

In the EAF process, an assessment of the factors that lie outside of the scope of the ETI is necessary to complete the examination of eBusiness models. During the model evolution, institutional and diffusion factors play a key role in determining a model's destiny. These factors and their role in the EAF process are explained below.

#### **3.3.1 Institutional Factors**

Relevant in any discussion of eBusiness model evolution are the institutional factors, which can affect the conditions for developing or implementing business

models. Such institutions are ‘any standing social entity that exerts influence and regulation over social entities’. [8] For purposes of our framework, we will focus on the governmental dimension of institutional factors. Many of these factors are similar in the nature of their impact on traditional business models. However, in the context of eBusiness it is clear that their composition, scope and potential for impact are much larger. Governments can, through the enactment of regulatory frameworks, either impede or promote the development of eBusiness models. Through prudent regulatory means, governments can be extremely vital in providing a healthy environment for eBusiness to prosper. Issues such as privacy and security are extremely significant here. [7] At the same time, governing bodies have the potential to impede the eBusiness process and hence the evolution of eBusiness models through the introduction of barriers or complexities into the business models. For example, the lack of governmental involvement combined with a policy of letting the private sector lead in the realm of eBusiness, is one primary reason why eBusiness growth has taken place so rapidly in the US. However, this has also perpetuated the existence of security and privacy concerns. [7]

Examples of institutional factors are as follows: regulatory frameworks for eBusiness taxation, privacy principles and online security policies.

### **3.3.2 External Diffusion Factors**

Adoption and diffusion factors can influence the adoption of an eBusiness model as well as their evolution. In assessing the growth of eBusiness, a host of factors come into play that are related primarily to the social and economic landscape. These factors either serve to push the model towards success by providing needed catalysts for diffusion (push factors), or they have a tendency to propel the model forward by creating a favorable environment for its adoption by creating demand (pull factors). Typical pull factors include: computer literacy, GDP, cultural factors, competitive landscape, cost of computing etc. . Typical push factors include: venture capital, economic growth, willingness to invest and risk taking, technical competence, or the existence of learning networks.

## **4. The EAF Framework Applied**

This section will apply the EAF approach to analyze the evolution of eBusiness models in the US over the past five years. As stated before, such a diagnostic process can serve as a means for practitioners and academics to assess the viability of current and future business models. It can serve as a decision tool for prospective businesses, can assist academics in understanding past evolution, and in making

predictions about the future of eBusiness. We will explain how, armed with the knowledge and understanding that the framework can provide, actors will be able to accomplish this. Based on data gathered in our preliminary study of the growth of US eBusiness [7], we will give examples of some assessments of the past and make some predictions about the future of B2C and B2B Ecommerce in the US. Through our analysis, it will become evident why some US businesses, such as those utilizing B2C models have been able to realize some success in a short period of time. We will explain that this is due to the fact their ETI leveraged, to a large extent, existing technology, protocols and institutional frameworks. We will also use the framework to illustrate why B2B will likely struggle due to a less developed ETI.

#### **4.1 The Evolution of Business Models in the U.S.**

The US has, over the past years, set a benchmark for the establishment of new models of eCommerce by implementing a number of innovative business models. Their subsequent success or failure, as evidenced by the performance of the overall economy over the past years, has also served to dictate the pace of economies worldwide. Currently, the US is said to be ‘the best country to initiate Ecommerce’ [19] which sets the pace in the global realm of Ecommerce for business model evolution. From the inception of the Internet as a tool for communication and the advent of Ecommerce, US businesses have been more passionate in the development of the infrastructure, building and implementing the business models, educating their communities and embracing the wave of societal change. By all measures this phenomenon is still in its very early stages, yet the transformation that it has brought to the US is profound and will be permanent. [7] The questions now center on what the future looks like for Ecommerce in the US, and how the US can best leverage the powers of the Digital Economy. Here a framework such as the EAF can provide a basis for more rigorous analysis.

In mapping the historical data gathered in our study to the ETI Framework in Table 2, the storyline of US eBusiness evolution becomes clear. The detailed analysis of the ETI shows a number of interesting trends that have emerged and serves to expose factors that have contributed to success. It also highlights several core issues, which will need to be addressed in the future evolution of eBusiness.

**Table 2: The US Electronic Trading Infrastructure**

<b>Business Model</b>	<b>I. US Trading Mechanisms</b>	<b>II. US Trading Protocols</b>	<b>III. US Integration Points</b>	<b>IV. US Enabling Technologies</b>	<b>V. US Supporting Infrastructure</b>
<b>B2C</b>	<p>Prevalent Online Communities (Geocities)</p> <p>Auctions widely used (eBay)</p> <p>Growing Online Retail Sector (Amazon et al)</p> <p>Online Banking Use High (Bankone et al)</p> <p>Infomediaries Evolving Rapidly (Yahoo, MSN)</p> <p>Economic factors, efficiency, comp adv.</p> <p><b>Significant Issues:</b></p> <p>None</p>	<p>HTML</p> <p>ASP</p> <p>Java</p> <p>COM</p> <p>ODBC</p> <p>All Trading Protocols highly developed, widely used and accepted. High level of clarity, simplicity, easily implemented</p> <p><b>Significant Issues:</b></p> <p>None</p>	<p>ISPs</p> <p>ASPs</p> <p>Value added services</p> <p>World leader in development and implementation of integration point technology.</p> <p><b>Significant Issues:</b></p> <p>None in short term, in the long term PKI and associated identification schemes</p>	<p>Robust CC Systems</p> <p>PCs in over 70% of homes</p> <p>Ubiquitous Internet Access</p> <p>Highly Advanced Telecom Inf.</p> <p>High Level of CRM Use</p> <p>Advanced SSL/Encryption Technology</p> <p>Firewall Tech</p> <p>Web Server Tech</p> <p>High level of reliability and interoperability</p> <p><b>Significant Issues:</b></p> <p>Wireless Inf. Development lagging significantly, need for broadband access in the long term</p>	<p>Leader in Integrated Logistics Capabilities (UPS, DHL, Fedex)</p> <p>Payment instruments in place</p> <p>Actor Identification Schemes in place (SSNs, Digital Document Recognition)</p> <p><b>Significant Issues:</b></p> <p>None short term, long term PKI, regulatory issues for security</p>

<p><b>B2B</b></p>	<p>Marketplaces in place</p> <p>Exchanges</p> <p>Eprocurement marginally used (MRO Items)</p> <p><b>Significant Issues:</b></p> <p>All primary mechanisms implemented, but acceptance issues prevail. Many have failed in their initial rollout.</p>	<p>XML in limited use</p> <p>EbXML under development</p> <p>EDI use is scaling back due to fundamental problems</p> <p><b>Significant Issues:</b></p> <p>EbXML and associated solutions deliver a viable value proposition. Its acceptance as a standard and overall use is still in early stages.</p>	<p>VANs are being phased out in the wake of intermediaries</p> <p>Intermediaries will provide most supply chain integration in the future.</p> <p><b>Significant Issues:</b></p> <p>As EDI gives way to more robust supply chain solutions, the role of the VAN decreases and the intermediary becomes the significant player. Intermediary solutions are in the early stages of development and acceptance.</p>	<p>Highly Advanced Telecom Inf.</p> <p>Broadband widely available</p> <p>ERP implemented widely</p> <p>SCM implementations are following ERP</p> <p><b>Significant Issues:</b></p> <p>Wireless Inf. Development lagging significantly</p>	<p>Leader in Integrated Logistics Capabilities (UPS, DHL, Fedex)</p> <p>Payment instruments in place</p> <p>Actor Identification Schemes in place (BINs, Digital Document Recognition)</p> <p><b>Significant Issues:</b></p> <p>Industry level coordination for semantic classifications and identification of products lagging</p> <p>Process integration mechanisms need development</p>
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In analysis of the US EIT for B2C and B2B combined with diffusion and institutional factors, the EAF process yields the summary assessment as follows: Although there seems to be no question that Ecommerce can be expected to play a vital role in the future growth of businesses in the US, there are significant barriers that will limit its diffusion. Most significantly, the US economy's recent downturn is slowing the trend toward the adaptation of Digital Age eBusiness models. Online consumer spending growth is falling short of projections of a year ago. [7] The death of many dotcoms has caused an air of skepticism on the part of investors and consumers. Furthermore, the lack of common protocols and platforms such as EbXML will cause B2B ebusiness exchanges and marketplaces to fall far short of achieving widespread implementation, with resulting momentum loss in the B2B sector. [14] These barriers are compounded by the US's laggard position in the wireless communication sector that will drive future evolution. The position is exemplified by a recent announcement by the FCC that the release of 3G wireless spectrum capabilities will not be available until 2004. This is significant to the future of US eBusiness, as 3G is expected to offer the first truly capable infrastructure for wireless ecommerce. This development will put the US behind

many Asian and European countries that are currently rolling out these capabilities and are firmly entrenched in the use of wireless technology. [7]

Although these barriers are significant in the short term, projections for the future of US Ecommerce diffusion are positive. Taking into consideration its strong demographics, growing level of online consumer spending, robust telecom infrastructure, relatively strong economy and businesses' intent to adopt sizable long-term Ebusiness strategies, the US is positioned well to maintain and expand its leadership in many areas of global eBusiness. [7]

A summary of the analysis leveraging the EAF Framework yields the following descriptions in Tables 3 and 4 of enablers and barriers for implementing B2C and B2B eBusiness models and their associated ETIs:

### EAF Analysis Summary

**Table 3: B2C Summary**

ETI	Trading Infrastructure	Trading Protocols	Integration Points	Enabling Technologies	Supporting Infrastructure
<b>Enablers</b>	Prevalent Online Communities (Geocities) Auctions widely used (eBay) Growing Online Retail Sector (Amazon et al) Online Banking Use High (Bankone et al) Infomediaries Evolving Rapidly (Yahoo, MSN) Economic factors, efficiency, comp adv.	All Trading Protocols highly developed, widely used and accepted. High level of clarity, simplicity, easily implemented	World leader in development and implementation of integration point technology.	Robust CC Systems PCs in over 70% of homes Ubiquitous Internet Access Highly Advanced Telecom Inf. High Level of CRM Use Advanced SSL/Encryption Technology Firewall Tech Web Server Tech High level of reliability and interoperability	Leader in Integrated Logistics Capabilities (UPS, DHL, Fedex) Payment instruments in place Actor Identification Schemes in place (SSNs, Digital Document Recognition)
<b>Barriers</b>	None	None	None short term, in the long term PKI and associated identification schemes	Wireless Inf. Development lagging significantly, needed for broadband access and Mcommerce in the long term	None short term, long term PKI, regulatory issues for security

**Table 4: B2B Summary**

<b>ETI</b>	<b>Trading Infrastructure</b>	<b>Trading Protocols</b>	<b>Integration Points</b>	<b>Enabling Technologies</b>	<b>Supporting Infrastructure</b>
<b>Enablers</b>	Marketplaces in place Exchanges Eprocurement marginally used (MRO Items)	XML in limited use EbXML under development EDI use is scaling back due to fundamental limitations	VANs are being phased out in the wake of intermediaries Intermediaries will provide most supply chain integration in the future.	Highly Advanced Telecom Inf. Broadband widely available ERP implemented widely SCM implementations are following ERP	Leader in Integrated Logistics Capabilities (UPS, DHL, Fedex) Payment instruments in place Actor Identification Schemes in place (BINs, Digital Document Recognition)
<b>Barriers</b>	All primary mechanisms implemented, but acceptance issues prevail. Many have failed in their initial rollout.	EbXML and associated solutions deliver a viable value proposition. Its acceptance as a standard and overall use is still in early stages.	As EDI gives way to more robust supply chain solutions, the role of the VAN decreases and the intermediary becomes the significant player. Intermediary solutions are in the early stages of development and acceptance.	Wireless Inf. Development lagging significantly	Industry level coordination for semantic classifications and identification of products Process integration mechanisms need development



**Table 5: External Factors Summary**

	<b>Institutional Factors</b>	<b>Diffusion Factors</b>
<b>Enablers</b>	Favorable long term economy Governmental policies allowing private sector to lead Governmental support of the emphasis on Ecommerce growth and the Internet as a learning tool in schools	High GNP Digital Divide narrowing Highest Internet user population in the world Future ubiquitous availability of broadband access for both consumers and businesses B2B and B2C revenue expected to increase significantly over the next 5 years Technically savvy workforce Wide use of credit cards for consumer purchases Availability of Venute capital Learning networks Technological competence unmatched by any other region
<b>Barriers</b>	Short-term economy struggles Geopolitical uncertainty surrounding the aftermath of the terrorist attacks Data and transaction security issues as businesses invest more of their strategy in Ecommerce Lack of content regulation	The current economic downturn, plus on the US in September of 2001. Skepticism in the US business community that has resulted from the rise and fall of the dotcoms Lack of standard platforms and infrastructure to enable B2B Systems Integration

## 5. Discussion – eBusiness Evolution: Past, Present and Future

US eBusiness evolution on the basis of the EAF framework indicates several critical factors that have ignited the chain of events that occurred over the past 5 years. The fast diffusion of B2C models can be attributed to maturity and simplicity of the ETI components related to implementation of B2C trading mechanisms in the supporting infrastructure. Our study shows that in the development of enabling technologies such as credit card payment systems and the provision of integrated logistics, the US has always been a leader. The obvious and most significant issue for future B2C is the position on wireless commerce. US leadership position in some areas of future eBusinesses at risk if it is unable to remedy this situation. In the B2C realm, we see US eBusinesses as having gone through a number of iterations in the EAF eBusiness evolution cycle. As a result, significant improvements have been made and overall growth potential is substantial.

The US business strength is not as well mirrored in the B2B realm. As the ETI shows, there is a sizable list of issues that US business must be able to resolve in

future in order for B2B models to achieve the success. Although considerable trading mechanisms are in place and being evolved, businesses have been much slower to accept them. This is due to fundamental business process change issues, and changes in industry structures. It is also partly caused by the lack of common trading protocols to facilitate seamless commerce. [14] This is further complicated by the current lack of integration capabilities between business platforms. [13] Although there is momentum to move past these issues and create a more robust B2B commerce environment, the full potential of these models seems to be years from fruition. In the US B2B realm, we see businesses as having gone through the first iteration of eBusiness evolution, with the current feedback being used to create better models.

In consideration of the diffusion factors, it seems that the US is positioned favorably, and as a result the diffusion level has been high. High GDP, a narrowing digital divide, ubiquitous Internet access and availability of computing equipment all combine to make the US a very favorable environment for B2C and B2B. [7] However, the primary issue exposed through the EAF that looms in the periphery of diffusion factors is the US economic situation. Given the recent state of recession, growth has been slowed significantly. The future of the US economy remains to be seen, but the effect that it will have on the evolution of eBusiness could be profound. Further, institutional factors in the US have created a multifarious effect on eBusiness. On one hand, the policy of letting the private sector lead, while providing institutional support for eBusiness initiatives and education has created rapid growth and experimentation. Uninhibited by bureaucracy, US eBusiness has been allowed to largely control its own destiny. However, this lack of regulation has also caused a number of issues to surface with regard to security, privacy, cybercrime and the overall quality of eBusiness content. A better regulatory framework provided by the US government could indeed be needed serve to remedy these problems. The future of eCommerce is largely in the hands of the government in the US, and the stance that they choose to take will in large part determine the evolution of eBusiness.

## **6. Conclusion**

Our contribution comes first through the introduction of a framework that facilitates exploration of eBusiness evolution. Second, it enables us to unpack the dynamics present in eBusiness models as they interact with each other, and with the eBusiness environment. Third, it helps generate pertinent eBusiness research questions. Finally, through its application in an exploratory study on US eBusiness evolution we were able to gain an understanding of the evolution of US eBusiness as well as the see the framework's applicability in any context.

The previous analysis demonstrates a high level of potential that the EAF and ETI offer for a holistic eBusiness analysis. The proposed framework is versatile,

powerful and universal. It provides a general perspective to any eBusiness evolution, at the national, industry or individual business level. Leveraging at this framework, researchers and practitioners can better understand and analyze the future of eBusiness, and identify areas for concentration and research.

Our core argument is that, in the study of eBusiness evolution it, is not only the business practice that needs to be scrutinized, but also the models it is built upon. There is a need to understand the inherent strengths and flaws of existing models and their implementation strategies to develop a systemic view of the processes that cause these models to evolve and diffuse. The concepts inherent in the EAF establish an important step towards achieving this goal. The next step is to use the concepts to empirically investigate the dynamics of eBusiness evolution.

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