

**Electronic Integration and Business Network Redesign:
A Roles-Linkage Perspective**

by

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Abstract

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Electronic integration - the use of information technology to re-engineer key business processes and business relations, enables new forms of organization that transcend traditional industry and firm boundaries. Indeed the electronic integration strategies alter the fundamental structure of both firms as well as their environments, requiring a shift in the study of organizations from the level of a focal firm to that of the business network. The business network represents the pattern of interdependent relationships between the activities of a given firm and those of other firms in its competitive environment which influence each others' strategies.

This paper analyzes the effects of electronic integration on organization structure and competitive processes at the level of business network. It proposes the roles-linkage perspective as a useful abstraction to characterize the business network and guide research on the effects of information technology on industry structures. Building and analyzing the effects of electronic filing on the tax preparation market we build a preliminary model of how electronic integration strategies alter roles and linkages in a business network.

The contributions of the paper are a provisional theory of electronic integration at the level of the network, and an abstraction mechanism to characterize and study business networks.

1.0 Introduction:

The business environment of the 1990s is characterized by heightened competition, turbulence and transformation in firm and market relationships. Environments are changing rapidly due to innovations in products and services, market structures and technology, as well as shifting firm, industry and national boundaries [3, 24, 35, 62, 68]. In addition the traditional buffers between the firm and its environment including time, inventory, people and geography are reduced leading to greater interdependence between the firm and its environments [65]. Information technology (IT) is seen as a critical force in this transformation of competition, firm structures and firm boundaries [4, 15, 17, 61, 73].

Electronic integration (EI) is the strategic choice made by firms to transform the firm's business scope or business network, by using information technology to re-engineer key business processes and relationships. The business network is defined as the structure of interdependent relationships between the activities of a given firm and those of other firms in its competitive environment which influence each others' strategies. In contrast to applying information technology to merely automate existing firm processes, electronic integration strategies have impacts beyond the firm's boundaries at the level of the business network.

The purpose of this paper is to propose a means of modelling the effects of electronic integration on business networks, and to develop a preliminary theory of the effects of electronic integration at the level of the business network. Understanding and effectively using electronic integration or responding to its effects on business environments is an increasingly important management activity. As electronic integration strategies are used to redesign the firm's economic production and exchange relationships [19, 37, 40, 57, 74], information technology enables new forms of industrial organization variously called the "network organization," the "flexible corporation" or the "virtual firm" [24, 26, 46, 62]. Firms implementing these structures redesign their business networks to work with a variety of

external organizations through alliances, strategic partnerships and other modes of relational governance [33] to quickly bring products to market and to take advantage of turbulent and changing markets by collectively leveraging each others' strengths [35, 63]. Managers in these environments characterized by electronic integration, must carefully select the activities undertaken within firm boundaries, and also select and build suitable governance mechanisms to effectively coordinate and integrate the activities of the firm with those of its customers, suppliers and other organizations in the environment. Thus a critical management challenge for the 1990s is the effective design of business networks and the management of interdependence within such networks [42, 65, 76].

Despite the increasing importance of the business network as a unit of strategic analysis and action, current theories, frameworks and planning tools are incomplete and of limited use in helping decision makers understand and manage the complexity of these emerging interdependent, networked environments. This complexity arises from the multitude of strategies, organizational capabilities, and other factors within a typical business network which contribute to turbulence and uncertainties in a given firm's environment. In this paper we build from a critical review of prior research on electronic integration, to propose the roles-linkage model as a useful conceptual schema for managing complexity in the representation and study of business networks. We elaborate our model in a case drawn from the tax return preparation industry and develop a preliminary theory on the effects of electronic integration at the level of the business network. Based on our analysis, we suggest guidelines for both theory development and case-based research into the effect of electronic integration on business networks. We conclude by discussing key advantages and disadvantages of our preliminary model, and suggest research extensions of the approach to facilitate further studies of networked organizations.

2.0 Electronic Integration and Business Networks: A Critical Review

Prior research on electronic integration can be organized into a classificatory framework which varies by level of organizational analysis and reference frame for the research. The level of analysis dimension identifies the basic organizational unit chosen in the study of an IT-based integration

strategy. These include the *focal firm*, the *dyad* and *business network*. The reference frame identifies how the work was theoretically, empirically or otherwise approached. The four reference frames are *theories*, *conceptual frameworks*, *case research*, and *variance studies*. Figure 1 provides illustrative examples of prior studies on electronic integration and organizations.

Based on analysis of work included in Figure 1 and related studies, we observe:

- *There is little empirical research on electronic integration at the business network level.*

Prior research on electronic integration generally examine the impact of information technology on the competitive dynamics of a focal firm or, in a few cases, a firm dyad [52, 75]. Analysis at the focal firm level considers IT's impact on the focal firm through one or another of its core business processes (e.g., order management; product development; distribution and logistics; sales and marketing). Alternatively, the structure and processes of specific business relationships between a given focal (producer) firm and customer is examined. Generally, there has been minimal consideration for how an electronic integration strategy could alter the strategies of other firms in the environment or, more generally, the structure of the business network [16, 36, 69].

Research on electronic integration at the business network level recognizes the pattern of interdependence among multiple economic actors and how firm roles and positions in the business network are altered through information technology-based strategies. Selecting this level of analysis seeks to bring the "environment back in to the analysis" [41] and to understand the broader impacts of EI strategies on market structures, competition and the actions of firms in relation to their environment. Dill [21] defines the organization's *task environment* as those activities and institutions that have an immediate influence on a firm's operations. The task environment includes customers, suppliers, competitors, shareholders and government agencies. In addition, the wider *contextual environment* of social, political, technological and demographic factors influences the longer term activities of

the firm. The nature of both task and contextual environments critically influences the selection of strategies undertaken by the firm [47, 59].

Given the emergence of networked organizations and markets with multiple coalitions deploying competing IT-based strategies, the business network is an increasingly important level of organizational analysis. However, to date there are few systematic studies of the effects of electronic integration at this level [3, 37, 74].

Figure 1:
Selected Research on Electronic Integration: A Classificatory Framework

Reference Frame Level of Analysis	Conceptual Frameworks	Case Research	Variance Research
Focal Actor (Firm)	Parsons 1983 [54] McFarlan 1984 [43] Benjamin et. al 1984 [12] Holland, Lockett & Blackman 1992 [34]	Vitale 1983 [77] McFarlan 1986 [44] Konsynski & Vitale 1988 [38] Earl & Vitale 1988 [25]	Venkatraman & Zaheer 1989 [75] Banker et al 1988 [6]
Dyad	Porter & Millar 1985 [61] Malone et. al 1987 [40] Barrett & Konsynski 1982 [9] Cash & Konsynski 1985 [15]	Clemons & Row 1988 [17] Clemons & Weber 1990 [19] Hart & Estrin 1991 [32] Short & Venkatraman 1992 [69]	Nidumolu 1989 [52]
Network	Antonelli 1990 [2] Johnston and Lawrence (1988) [35]	Venkatraman ...& Kambil 1991 [74] Antonelli 1988 [3]	
Underlying Theoretical Perspectives	IO Economics -- SCP Paradigm (Scherer, 1980, Tirole 1988) [67, 72] Information Processing (Galbraith, 1977) [28] Coordination Science (Malone, 1988) [39] Interdependent Value-Chains (Porter, 1985) [58] Transaction Costs theory(Williamson, 1975;1985) [78, 79] Game-theory (Bakos, 1987) [5] Social Network theory (Cook et al, 1987) [20]; Resource Dependence (Pfeffer & Salancik, 1978) [56] Political Economy (Benson, 1975; Piore & Sabel, 1984) [13, 57]		

- Theory development and conceptual frameworks identifying electronic integration strategies and their effects on business networks are still in their infancy.

We observe that while different theoretical perspectives can be adapted to the study of electronic integration - e.g. industrial organization (IO) economics [72, 78], information processing and behavioral theories of the firm [29, 49] - these theories generally view firms and industries in discrete terms. This sheds little light on the structure of business networks and their relationship to blurring industry boundaries and inter-industry and inter-firm alliances. At the network level, resource dependence, political economy and organizational network perspectives [13, 22, 56, 57] are possible frames for analyzing emerging network structures and processes. However, the lack of a dominant theoretical paradigm serving to integrate this work has produced a lack of consensus on key constructs and, similarly, a lack of consistent language to characterize network level phenomena. Moreover, unfortunately these general theories to date have yielded relatively few operationalizable and testable hypotheses. This adds to difficulties in establishing a cumulative body of theoretical and empirical knowledge. While conceptual frameworks are valuable in the initial stages of theory development, we note a *weak link* between existing frameworks and relevant theoretical perspectives or empirical data at the business network level.

•*Research and analytic methods for studying electronic integration are still in their infancy*

The prior empirical research on electronic integration can be classified into two different frames: case-based and variance research. Case research uses single or multiple case studies to investigate emerging phenomena. Case studies are generally focused on understanding 'leading-edge' companies and are especially useful for studying novel phenomena. Following Bonoma [14], Yin [82] and Eisenhardt [27], we distinguish between cases prepared for pedagogical purposes and cases for research purposes. The latter represent inductive approaches to understanding novel phenomena and constitute a basis for refuting or constructing conceptual frameworks and theories. We note to date there are relatively few instances of such research at the level of the business network. (See Figure 1).

Variance research refers to empirical studies of electronic integration through multivariate analysis of survey, experimental, archival and other quantitative data. Generally variance research is based on a set of theoretical

arguments and propositions used to generate hypotheses. Research hypotheses are tested through the collection of data and the application of statistical methods to establish the degree of support for the hypotheses. Multivariate techniques can also be used to infer structures in data. For example, network and cluster analysis techniques can be used to identify patterns of inter-firm relationships and to characterize the structure of networks. However, research to date is sparse and has not generally adopted these methods for inferring patterns or testing hypotheses. This is partially explained by the increased complexity of undertaking research at the network level. Data collection is more expensive than at the level of the focal firm or dyad, and difficulties arise with respect to access and conduct of research across multiple organizations. In addition, methods for theory testing in these settings are unresolved.

Understanding the effects of EI-based strategies at the business network level of analysis is increasingly important as the interdependence between firms and their environments increase. Efficient approaches to inquiry and theory development are required to develop this understanding. Developing theories on the business network effects of electronic integration also requires consensus on key constructs at the network level, their representation, and the refinement of methods to manage the complexities of case development and/or variance studies at the level of the network. Careful selection of constructs and representation schemes is especially crucial to the development of a multi-level theory [66]. In the next two sections of this paper we develop the roles-linkage model as a representation schema to support research and theory development at the network level. We then report results on applying this model in the tax return preparation marketplace.

3.0 Representing Business Networks: The Roles-Linkage Model

The roles-linkage model¹ provides a conceptual schema for representation and analysis of business networks. This abstract representation

¹ This model builds on work completed by Kambil in his doctoral dissertation which details organizational structures and processes implemented by firms to manage inter-organizational relations (MIT Sloan School, November 1992), and prior work by Venkatraman and Kambil, 1991.

model focuses research attention on salient constructs and enables researchers to manage the complexity associated with studying business networks. The roles-linkage model represents the business network in terms of two abstract constructs: *roles* and *linkages*. This is described below:

3.1 Roles

Roles are defined as distinct technologically separable, value added activities undertaken by firms or individuals in a given business network. For example, traditional insurance firms typically combine three roles: money management, actuarial services and claims management services within the boundaries of the firm through vertical or horizontal integration. Each of these roles requires different and distinct technologies, both in terms of knowledge and skills as well as equipment. Hence these roles are technologically separable where technology is defined as inclusive of specialized types of applied knowledge and equipment [51, 55].

Sociologists and organization theorists have used role abstraction for classification of individuals or organizations into common groups to simplify data collection and analysis [7, 8, 50]. Occupational roles (e.g plumber, dentist) typically classify individuals on the basis of non-relational attributes such as activities that require different skills, knowledge or task behaviors. In defining our concept of *business network role*, we expand the common role concept beyond individuals to organizations in an economic system. Like occupational roles, firms undertake a variety of different functions or value added activities in a given business network. Using the notion of technological separability as a basis for business segmentation [31], we delineate roles based on the skills and applied knowledge required for the tasks undertaken to accomplish the activity.

The roles abstraction is useful for three reasons. First it reduces the complexity of analysing business networks by focusing attention on the roles undertaken by firms rather than the firms themselves. As the number of roles required to represent a business network is typically less than the number of firms in the business network, it simplifies representation of the business network structure. Second the role delineation on the basis of technological separability focuses attention on how changes in technology

affect the population of role providers and ways of organizing tasks within the role. Third, transitions in individual firm strategies can be systematically mapped by considering the roles in which a firm positions, and how it manages interdependence with other roles in the business network.

3.2 Linkage

Linkage refers to the different ways that firms or individuals manage economic interdependence across value adding roles in the network. Adapting work by Williamson [79] on economic governance and Galbraith's [29] work on information processing organizations, we define six different types for linkages in a business network. These are: simple market exchange, standard linkage, specialized linkage, customized linkages (alliance and hierarchy), and mandate. These forms of linkage reflect different models of coordinating and influencing economic exchange relationships between firms or individuals in different network roles and are explained below.

Simple Market Exchange

A *simple market exchange* is used to classify the governance of infrequent transactions characterized by low levels of relation specific investments between a buyer and a seller in different network roles. Typically the buyer and seller negotiate the price and exchange a standard or well-specified good of relatively low value. The potential for opportunism in this exchange relation is attenuated by the existence of alternative suppliers for similar or equivalent goods. Thus the market mode of governance is used to manage the exchange relation. In repeated transactions by actors across roles the terms of the exchange relation is typically redefined for each transaction between the parties.

Standard Linkage

A *standard linkage* is used to classify the governance of frequent and routine transactions of relatively low value by actors across different network roles. Relationship specific investments are relatively low, but the relationship is more routine than a simple market exchange and the terms of

the agreement are generally not differentiated for each repeated transaction between parties. The two parties therefore commit a low level of investment for administering repeated transactions. The existence of alternative suppliers and legal recourse attenuates opportunism. A standard linkage is exemplified by the use of standard contracts such as the agreements that govern repeated credit card transactions.

Specialized Linkage

A *specialized linkage* is used to classify the governance of complex, infrequent transactions that require a significant *a priori* relationship providing specific investments or the acquisition of specialized information for valuation. Unique and specialized resources are committed to the transaction by at least one of the parties, as in the case of a transaction between a real estate holding company and a developer. To attenuate exchange risks, complex contingent contracts or specialized third party arbitration and intermediation structures are specified and implemented between the parties. In addition, complex coordination mechanisms may be deployed between parties to the exchange. These structures are unlikely to be modified frequently during the course of an exchange relation. For example the exchange relation between an electric utility and a power plant vendor would be classified as a specialized linkage.

Customized Linkage:s Alliance or Hierarchy

Customized linkages are used to classify the governance of frequent complex and long-term transactions that require relation specific investments and adaptive behavior by parties across roles. This requires frequent modification of the exchange relation in terms of the structures and processes implemented to coordinate and influence the relation. Prior work by Williamson [78, 80] has identified two principal modes exist for governing these types of exchange relations: we denote these as alliances and hierarchies.

In an *alliance* or partnership both parties have committed specialized assets to the relationship and share risks. Typically, authority is decentralized between the two parties for resource allocation and dispute arbitration. To coordinate activities, the parties may implement complex bilateral

coordination mechanisms such as joint strategic and operational planning [33]. These structures and processes are modified during the course of the exchange to respond to changing coordination requirements. An example of an alliance would be two companies establishing a joint research and product development effort.

In a *hierarchy*, authority is centralized to coordinate and influence activities across roles, this authority based on the ownership of the assets of production or the ownership of information assets. Complex and/or specialized routines and mechanisms are deployed in order to coordinate and influence activities between roles. Hence these types of linkage are appropriate for complex transactions that extend over long periods of time and are characterized by significant uncertainty. An example of hierarchy would be exemplified by structures and processes that govern the typical employer, employee exchange relation.

While ownership provides the general means for control, not all vertically- or horizontally-integrated firms manage actors in different roles through a hierarchy. Indeed actors in different roles within the same firm may be allowed significant autonomy over the design of their transactions. Hence hierarchy is not synonymous with vertical or horizontal integration.

Mandate

Mandates provide another form of managing interdependence. In mandated linkages, there need not be a direct exchange of economic goods between parties. Instead, actors in one role can influence resource allocation by those in other roles through legal or professional authority, and the ability to make rules over the behavior of those in other roles. For example, physicians have traditionally had a strong mandate over the ability of pharmacists to sell prescription medicines. Mandates may be denoted as strong or weak.

The above specification of linkage types explicitly recognizes different ways in which firms manage economic interdependence across roles in a business network, and it enables us model the distinct ways in which firms manage relations with their environments. Different linkage types reflect different

levels of relation specific commitments by firms and complexity of inter-organizational structures and processes. The latter increase as we shift from simple market linkages to hierarchies.

3.3 Roles-Linkage Models

Using the above definitions of roles and linkages, a business network can thus be represented as a matrix or grid that specifies the *roles-linkage model*. The grid axes correspond to network roles, and the values within each cell of the matrix represent the type of linkage between roles. Figure 2 presents the roles-linkage model for the tax preparation marketplace analyzed in this paper. It represents the tax preparation business network prior to major electronic integration strategies enabled by the IRS electronic filing initiative.

Figure 2: Roles-Linkage Model of The Tax Preparation Market Prior to Electronic Filing

ROLES	taxpayer /consumer	return preparer	mail carrier	IRS	banker	retailer
taxpayer /consumer						
return preparer	M,SC					
mail carrier	M,SC					
IRS	MD	MD				
banker	M,SC					
retailer	M	SpC				

Key: M = simple market exchange; SC= standard contract, SpC = specialized contract, A=alliance, H= hierarchy, MD = mandate

The tax preparation business network prior to electronic filing consists of linkages among six roles: taxpayer, return preparer, mail carrier, banking services, the Internal Revenue Service and retailer. Typically, individuals, who undertake taxpayer and consumer roles, file returns with the IRS who undertakes the role of processing the return, and issuing refunds. Those in the tax payer role may use the tax return preparation service role to prepare

the return and an organization in the mail carriage service role such as the US Post Office or a value-added service such as Federal Express to mail the return to the IRS. Once the tax return is processed, a refund check (if due) was mailed. The taxpayer as a consumer of services can deposit the money for later use by using the services of the banker role, or cash the check and use the money to purchase goods from a retailer. The banker role combines check processing with savings. The value of cells in the role-linkage model illustrate the existence and common types of inter-role relations between firms or individuals who occupy different roles.

The following criteria were used to identify and classify the types of linkages that characterize the business network.

- the extent of relation-specific investments between actors across roles
- the types of contracts utilized by actors across roles
- the distribution of authority for resource allocation and regulation of inter-role resource exchanges

The classification rules are summarized in the decision tree below:

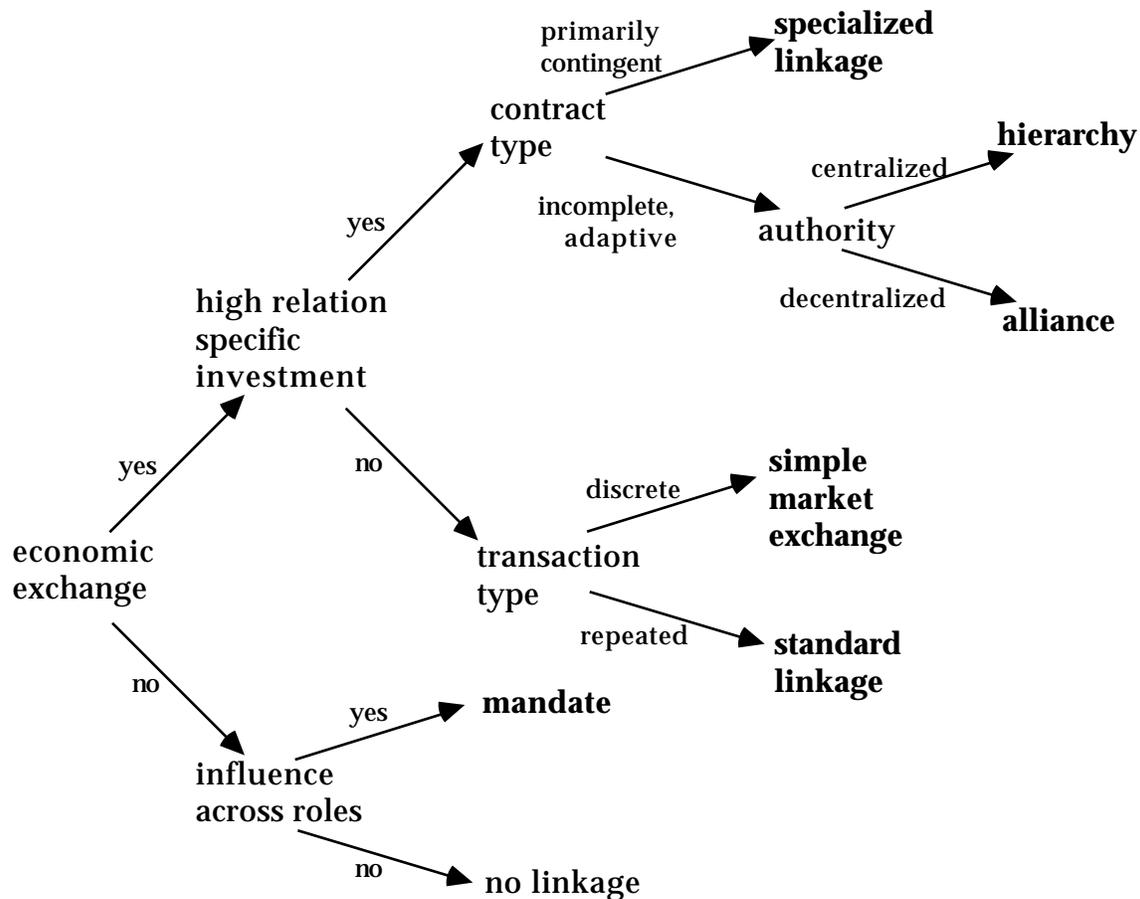


Figure 3: Specifying Linkage Types

The roles-linkage matrix provides a parsimonious graphical representation of the dominant roles in the tax preparation services market place, and the critical modes of relationships between members of different roles in the network. While alternative schemes for representing networks are possible such as interdependent value chains [58] and strategy visualization diagrams [30, 48], the roles-linkage model isolates and represents the business network in terms of a few key constructs, excluding unnecessary detail. In contrast to value chain and similar representation techniques, this model also captures details about the varied ways in which firms manage interdependence across networks. This is important as the selection and design of a firms relations with its environment becomes of increasing strategic importance. The representation also reduces the complexity of analysis in contrast to traditional network analysis which typically examines

all direct and indirect ties between firms in a given network, without simplification to fewer roles through abstraction.

3.4 Data Gathering and Operationalization of the Roles-Linkage Model

To construct the tax preparation market roles-linkage model was collected through interviews with over forty government and industry executives, complemented by extensive searches of archival material obtained from both the Internal Revenue Service and tax return preparation firms (example: H&R Block). Role-linkage classifications were inferred from interview data, and review of government and company documents, including business and IT-strategy planning documents, that analyzed specific information intensive businesses. We compared our own classifications of roles and linkages with those of a panel of government and industry executives who were asked to identify basic functional and value added activities in their respective industry networks and to construct network roles as they saw them. To simplify our analysis, roles were not specified to the finest level of granularity at this stage of work. Instead, key roles were defined by a common aggregation of functions requiring a distinctive combination of technology and knowledge. Furthermore, our definition of the tax preparation marketplace is bounded by a collection of roles that is not exhaustive but is based on identifying the primary strategies of existing firms and the various products and services that they provide in the marketplace.

Linkages were classified based on descriptions of inter-role relationships in the trade press and interviews with the same government and industry executives.

4.0 Electronic Integration and Transformation in the Tax Return Preparation Network

We applied the roles-linkage perspective to systematically investigate the effects of electronic integration on the tax return and tax filing marketplace. Roles-linkage models were developed to illustrate transitions in the structure of the business network, and to focus our attention on the effects of IT on specific roles, and changes in linkage. This case study is used to develop a

preliminary theory into the effects of electronic integration at the level of the business network and the discussion section follows which generalizes observations from the case example to other business network settings.

4.1 The Tax Return Preparation Marketplace

In 1990 the Internal Revenue Service (IRS) made electronic tax return filing available nationwide. In simple terms, electronic filing allowed *return preparers* or *return filers* authorized by the IRS to electronically transmit an individual's return to the IRS using a pre-authorized electronic transmission protocol.² The filer can obtain confirmation of receipt and arrange for direct deposit of any refund.

This IRS electronic integration initiative, which we view as a technological discontinuity in the marketplace, can affect the over 100 million individual taxpayers who file Form 1040 and related schedules annually with the IRS. Taxpayers generally prepare their own returns, or use a professional tax return preparer such as H&R Block, TaxMan, or an independent tax accountant. Before the electronic filing initiative, returns were mailed in, processed by the IRS, and a refund (if due) was mailed back to the taxpayer. About 75 million taxpayers receive an average refund check of \$900 in a given tax year.

Over 40 million taxpayers use professional tax return preparation services. The marketplace -- highly fragmented at the local level -- can be broken down into four tiers:

- Nationwide and regional, "commodity services" tax preparation firms. H&R Block leads this segment with over one third of the market.
- Individual and/or small CPA services firms, generally specializing in individual tax return preparation services.
- Nationwide, professional accounting firms providing a wide range of accounting, investment, and tax advice services to their clients (examples:

² The evolution of the IRS electronic filing initiative is discussed in greater detail in N. Venkatraman and A. Kambil, "The Check's Not in the Mail Strategies for Electronic Integration", *Sloan Management Review* 32 (Winter 1991), pp. 33-43.

Arthur Andersen, Coopers & Lybrand, Price-Waterhouse, etc.). These firms primarily focus on business returns.

- Boutique investment services firms, offering custom services for high-income clients.

As defined earlier, prior to electronic filing, the tax preparation marketplace can be represented as a business network consisting of linkages among six roles: taxpayer, return preparer, mail carrier, banking services, the Internal Revenue Service and retailer. Our focus here is on the business network relevant to tax return preparation services targeted to the average customer as compared to specialized services to business or very high income individuals.

Figure 4: A Roles-Linkage Diagram for The Tax Preparation Market Prior to Electronic Filing

	taxpayer /consumer	return preparer	mail carrier	IRS	banker	retailer
taxpayer /consumer						
return preparer	M,SC					
mail carrier	M,SC					
IRS	MD	MD				
banker	M,SC					
retailer	M	SpC				

Key: M = simple market exchange; SC= standard contract, SpC = specialized contract, A=alliance, H= hierarchy, MD = mandate

Using the methods discussed in the previous section, the typical linkages between members of different roles in Figure 4 were defined using the decision tree for classifying linkage types (Figure 3). For example, the linkage between the IRS, the tax return preparer and the taxpayer is defined as a mandate. The IRS specifies the rules by which taxpayers and tax preparers prepare and submit returns. The linkages between the taxpayer and other roles are defined as market exchanges or standard contracts. Where taxpayers have many alternatives, they may select service providers based on quality of

service and market prices. Alternatively, the exchange may be governed by a standard (undifferentiated) contract such as for mail service. The only specialized linkage (SpC) is between return preparers and retailers. Some retail firms permitted tax return preparers to operate on their premises during the tax filing season. For example Sears and H&R Block use such a cooperative agreement to encourage taxpayers and consumers to visit stores in an otherwise slow season for retail sales. ³

The IRS's electronic filing initiative and the subsequent evolution of electronic fund transfers between different roles in this marketplace has led to major transformations in the business network. A roles-linkage diagram to characterize the evolving tax return services business network is illustrated in Figure 5.

Two obvious transitions in comparing the business networks prior to and after the electronic filing initiative are the expansion of strategically relevant roles in the network and the expansion of linkages in the network. In addition we note that there is a shift to more specialized and customized linkage in the network. We examine these transitions in the tax preparation network.

³Interview with Mr. Thomas Block. An example is the relationship between Sears and H&R Block.

Figure 5: A Roles-Linkage Diagram of the Emerging Tax Return Services Business Network

	tax payer	ret. prep	mail carrier	IRS	banker	retailer	e-filer	Net provider	software provider	Information broker	cons. credit	tax planner	Stk Broker
tax payor													
return prep	M,.. SC,.. SpC												
mail carrier	M												
IRS	MD	MD											
banker	M,S C												
retailer	M	A											
e-filer	M	H, A, SpC		MD	SC	H, A							
Net provider		A, SpC		MD	SC	SC	SC, A						
software provider	M	H, A, SpC		MD		SC	SC, H	SC					
Information Broker	SC	H, SpC						SC					
cons. credit	SC, SpC	A, SpC			H,A	H,A		SC		SC, SpC			
tax planner	SpC	H			A, H	A		SC	SC, SpC	H, A, SpC			
Stk Broker	M	SpC, A			A, SpC			SC		H, A, SpC	A	H, A	

KEY: M = simple market exchange; SC= standard contract, SpC = specialized contract, A=alliance, H= hierarchy, MD = mandate

4.3 Expansion of the Tax Preparation Business Network

Comparing figures 4 & 5, electronic integration has created new, strategically relevant roles in the business network. These are the electronic filer, communications network provider, software vendor, information broker, consumer credit provider, tax planner, and investment broker roles. The electronic filer receives the tax return from the taxpayer in paper or electronic form, and transmits it electronically to the IRS. The electronic network provider provides the value-added network (VAN) supporting data transmission between the IRS and electronic filer. Software vendors provide tax preparation and/or communications software supporting these transactions. These roles can be seen as the *minimum role set* required to implement the simplest form of electronic filing in the business network, becoming important as a direct consequence of the IRS's electronic filing initiative. Other roles combine with this *minimum set* to provide financial, information and related value added services. These are: the consumer credit role which provides loans to taxpayers; the tax planner role which provides financial and tax liability advice; and the investment broker role which sells securities and bonds to the taxpayer. Finally, the information broker role sells information to other parties in the network⁴. These new roles provide new sources of value in the network and serve to reshape competitive processes and inter-firm structures in the tax preparation business network. These transitions are considered below.

4.4 Coordination Across Roles to Implement New Tax Preparation Products and Related Services

New and existing roles may be combined to provide new products and services, reshaping the business network and competition across markets. For example, H&R Block's Rapid Refund program - which promises taxpayers a faster refund than if they filed on paper - combines three roles - electronic filer, communications network provider, and software provider, with the return preparer role to introduce a new product in the market. On a smaller scale, individual taxpayers or small-business return preparation firms may

⁴Note that while many of these roles exist in other business networks (example: investment brokers in financial services), these roles were not previously relevant to the large or small tax return preparers who served most of the tax preparation market.

use a specialized electronic filer business such as Instatax or Nelco Inc. [10], which provide electronic filing through specialized contract or partnership with different return preparers, software vendors and communication network providers (for example, GE Information Services and Compuserve both provide value added network services for tax filing). Indeed, these organizations are beginning to offer tax preparation and electronic filing online to their individual subscribers [45, 53]. To illustrate that there are a variety of new ways of managing specific inter-role linkages in the market place the role-linkage diagram (Fig. 5) illustrates more than one type of linkage in the cells such as the cell representing links from return preparers to electronic filers.

Another new product in the business network is the instant refund, or refund anticipation loan. Here the tax preparer and credit provider link to implement electronic filing in combination with a loan against the anticipated IRS refund. When the electronic return is transmitted, it is checked by the IRS to verify accuracy. This verification enables the credit provider to issue a loan or "instant credit" against the security of the anticipated IRS refund. The repayment of the loan may also be secured as the electronic return can mandate the IRS to deposit the refund directly into the credit provider's account. For example, Dollar Dry Dock Bank of New York offers a three to five day no interest refund advance in combination with electronic filing service to customers for a fee of \$45. It offers non-bank customers a new bank account for using this service, thereby increasing the number of bank clients. For an extra fee, the bank also provides a tax preparation service [23]. The instant refund is one extension of the bank's traditional core business.

More generally, electronic integration enables firms to extend their influence across markets by leveraging information assets acquired in one market to differentiate products and services in another. For example, the tax preparer, planner, and investment broker roles can be linked - tax information provided by a taxpayer to a return preparer allows the tax planner to create customized investment portfolios designed to reduce future tax liabilities. By linking these roles, an investment broker can then sell these securities to the taxpayer. American Express's IDS unit, for example, coordinates across these

three roles within the American Express organization to provide various services to clients.

Another example of coordinated, across market competition is illustrated by retailers who provide consumer credit through instant refund products linked to store cards. Specifically, retailers in partnership with a return preparer and the store credit card operation can provide discounts on tax preparation and filing, or store discounts if the refund is then directed to payments of the store credit card. Such initiatives transform and create incentives for tax payers to purchase products from a specific retailer. These emerging linkages often lead to more complex business ties between retail organizations and tax preparers, transforming the relationship from a specialized contract to a partnership.

4.5 Transformation to more Varied and Specialized Linkages in the Business Network

Comparing similar cells in Figures 4 and 5, we see a shift toward more varied and specialized linkages across roles. As information and technology become specialized investments in relations there is a shift from market exchange to intermediate and more complex forms of managing interdependence across role in the tax preparation market. Different participants in the network will also implement different types of inter-role linkages.

For example some return preparers are implementing customer data bases to improve service and change the linkage between the firm and its customer. Specifically, by maintaining files from previous years, tax preparers can provide a convenient record keeping service to the customer, and improve client interaction by reducing the time required to acquire standard information. By using computers for return preparation and tax planning, traditional return preparers are trying to change the relationship with their customers from a market exchange to a more specialized linkage. In essence, by permitting the storage of customer-specific information and prior records, the customer and tax preparer form an “information bond”. The information bond is a specialized “information investment” in a specific relationship that

is of little value outside of the relationship. This investment provides the tax payer with the incentive to continue using the same preparer.

Another means of transforming the relationship between roles is through the use of information technology to transform a linkage from a discrete exchange to part of an ongoing relationship. For example, H&R Block links its expertise as a tax preparer and planner, with information brokerage and electronic communications through its Compuserve subsidiary. Subscribers of Compuserve can get immediately-useful tax tips, tax advice, tax news, and a list of important income tax dates by typing "Go HRB" on the network. This linkage encourages Compuserve users to use Block's tax preparation services, and enables the tax preparer segment of the company to maintain an ongoing linkage with its customers. Compuserve subscribers have a standard contract with the company.

5.0 Electronic Integration and Business Network Transformation: A Preliminary Model

By examining how information technology is used to transform specific roles and linkages, and overall patterns of competition and network structure in the tax preparation and related markets, we developed the following insights about the effect of electronic integration on business networks. We discuss these observations in terms of transformation in network roles, network linkages, and emerging network structures.

5.1 Transforming Network Roles through Electronic Integration

Electronic integration creates technological discontinuities in information processing activities underlying roles, and transforms skill requirements and routines for performing role tasks. Changes in skills and organizational competencies can change the population of individuals and organizations occupying specific roles. As discussed below this alters inter-industry rivalry and organizational membership in specific roles.

Stinchcombe [70] identifies a worker's skills as the set of routines and the principles of decision to select from among routines, or, the ability to construct new routines for different tasks. Highly skilled workers know more routines and selection principles, and may also construct new routines. Less

skilled workers know fewer routines and principles. Extending Stinchcombe's definition of skills, highly competent organizations can be seen as those with the knowledge and capability to select from and execute a large number of strategies. Observations from our case study suggests that electronic integration has different effects on roles requiring different levels of individual or organizational information processing skills.

For example, in the tax preparation case information technology was applied to automate information processing intensive routines requiring low levels of skill in tax preparing. Here, automation devalued role providers whose primary contribution had been low skilled information processing work.

For roles requiring medium levels of information processing skills (tasks with high variety and high analyzability) , information technology was applied to match routines to tasks and to coordinate organizational capabilities. In this instance, electronic integration served to augment the performance and value of role providers. For example, decision support systems, expert systems and databases have been introduced into investment services firms providing advice to clients on what investments to make. Here IT helps financial advisers design custom investment plans for individual clients.

For information processing roles characterized by low task analyzability and high task variety , the effect of electronic integration is to support the construction of new routines to formalize tasks and to coordinate the application of organizational expertise to tasks. In the case of specialized tax planning for higher income clients, for example, firms such as Coopers & Lybrand have invested substantial resources to construct expert systems (e.g. ExperTax [71]) to formalize tax planning and investment routines and to structure investment advice along a common set of business rules used to define the expert system. This formalization of routines, in large measure supported by information technology, may also be seen to influence individual discretion over job definition and role task activity [83].

Electronic integration as a technological discontinuity in a role, can also change the organizations that compete with each other as members of a specific role. After the electronic filing initiative American Express entered

the broader tax preparation market leveraging their extensive information processing capabilities to support entry. Such entry increases industry rivalry [59] among role members.

5.2 Transforming Network Linkages through Electronic Integration

Our case points to two general forms of transformation in business network linkages: a move to distributed, asynchronous links; and investments in technologies supporting more varied and specialized linkages across roles. We note also the potential for linkages to shift toward more actively monitored and mandated links.

First, as the cost of information technology falls it can be used to intermediate coordination among network participants in different organizations and roles. For example, tax preparers send electronic returns to specialized electronic submission points (electronic filers). Filers maintain distributed, asynchronous coordination between the IRS and other network participants.

Second, specialized investments in IT to support linkages across network roles shifts the relationship between participants and roles toward more differentiated and/or frequent links. For example, in the tax preparation network, network linkages are being shifted from discrete and undifferentiated links towards more unique and frequent longer term linkages across organizations or individuals in different roles. For example, H&R Block implemented a CompuServe service to address tax related questions from customers, enabling the company to increase customer contact and ultimately augmenting the visibility of their services⁵. There is also greater variety in types of linkages implemented for inter-role coordination. This is illustrated by the increase and variety of linkages observed in Figure 5.

Third, we observe the potential in this marketplace for electronic integration to change the mechanisms for the selection, monitoring and control of participants in different roles. For example, banks providing refund

⁵Subscribers of CompuServe can get immediately-useful tax tips, tax advice, tax news, and a list of important income tax dates by typing "Go HRB" on the network. This linkage encourages CompuServe users to use Block's tax preparation services, and enables the tax preparer segment of the company to maintain an ongoing linkage with its customers.

anticipation loans use the direct deposit indicator provided electronically by the IRS to screen against potential fraud and as a criteria for approving loans. The direct deposit indicator is acknowledgement from the IRS after preliminary return processing that the tax payers do not have offsetting federal tax liabilities and that the request for direct deposit of the refund will be honored. Access to more timely information and control enabled by electronic integration reduces the risks of adverse selection and moral hazards faced by bank as it provides loans to customers.

5.3 Electronic Integration and Emergent Business Network Strategies

We have noted earlier the impact of the IRS initiative in creating a technological discontinuity in the marketplace that altered the available set of firm strategies for competitive advantage. Adapting Ansoff's [1] definition of strategy in terms of a firm's product-market posture, we identify firm strategy in terms of the roles occupied in the business network and linkages between roles. A variety of strategy options were identified in the IRS case.

Consistent with prior studies of electronic integration [60, 64] we observed that firms undertook electronic integration strategies for product and service differentiation through technology and information leverage. Technology leverage strategies enable differentiation by exploiting the performance/cost improvements in information storage, communications, processing and input/output [74]. Information leverage strategies enable differentiation through using new information made accessible by information technology applications to alter business processes, products and services. Differentiation strategies are fundamental to creating disequilibrium in markets and enabling firms to achieve higher than normal profits [59, 72].

For example, technology leverage enabled certain tax return preparers to differentiate their product from other preparers by offering Rapid Refund as a value added product. A second option was to coordinate across different roles and product-markets to exploit product complementarities and externalities. Tax planning and tax return preparation roles, for example, provide complementary products. Information leverage strategies enable and drive the combination of both roles.

Coordination across roles was also used to exploit weak complementarities across markets. For example, American Express's IDS unit leverages information assets gained from tax preparation into the sale of tax free securities. This strategy exploits weak ties across two previously distinct markets (tax return preparation, selling securities) through internal coordination leveraging electronic integration. Another example is the weak tie between tax refunds and their use by taxpayers for consuming goods. Retail firms can benefit from this weak interdependence by offering instant credit on a store credit card against anticipated refunds on tax returns. This way retailers convert a weak interdependence between activities into a strong interdependence. We note that the exploitation of weak interdependencies across markets and roles is a key new source of competitive advantage from electronic integration. As firms must incur extra costs for such coordination it establishes barriers to entry⁶ for new firms and also increases the scale and capital requirements of existing firms in the inter-related markets. At the same time these ties lower the consumers coordination costs to access services across many markets.

Finally, we observe that firms will seek to develop strategies which effectively combine information leverage with technology leverage as a means for electronic integration. For example, we note a shift in this marketplace from technology leverage (e.g., the Rapid Refund product) to strategies combining technology and information leverage (e.g., the coupling of rapid refunds with product sales by retailers, etc.). In contrast to technology leverage strategies which may be quickly matched by competitors [11], information leverage strategies increase in value as more useful information is acquired and utilized as an asset by the firm.

5.4 Electronic Integration and Business Network Transformation

⁶Prior examples on the role information technology as creating industry barriers focused on economies of scope or scale in information processing (see [18, 61]).

The net effect of firm-level strategies attempting to shift roles and redefine linkages in the business network is to shift network boundaries. As a consequence, new information processing based roles become strategically relevant, creating new sources of value. New linkages can be seen to emerge to integrate these new roles into the network. The expansion of roles and linkages is exemplified by changes observed in the tax preparation marketplace as illustrated in Figures 4 & 5.

We have noted earlier, the emergence of new roles and suggested factors which influence role creation and role differentiation. A factor not discussed in detail here, but suggested by observations from our case and extant work in network analysis, is the relationship between network expansion and *network complexity*. We note the increasing complexity of the pattern of inter-role linkages in the tax preparation network, with firms diversifying and/or acquiring equity positions in these new roles, and developing linkage strategies across roles (see discussions of American Express's IDS unit and strategies for technology and information linkage above). While we have not attempted to systematically address the issue of network complexity in our analysis here, we suggest it as an important dimension to consider for those interested in mapping network expansion and/or contraction, and the dynamics of firm structure and strategies in business networks.

6. The Roles-Linkage Perspective: Evaluation and Research Extensions

The case study and our observations in applying the roles-linkage perspective illustrate its potential as an abstraction tool for studying business network transformation. Our findings identify how electronic integration alters roles, linkages, business strategies and the structure of business networks.

Our analysis suggests ways in which electronic integration makes available new information and information processing resources in the business network. Firms reorganize networks to utilize and take advantage of these resources. Specifically, technology and information were used to construct new routines or automate existing routines, thereby altering the skill requirements and population of role providers. Routinization served to reduce costs or improve the quality of service or product. New information resources, the routinization of roles, as well as coordination capabilities

enabled new ways of managing interdependence between roles. Hence the pattern of linkages between roles moves toward more complex, information intensive mechanisms.

Electronic integration also provided firms with new strategy options for differentiating products and services through information and technology leverage. Firms can also engage in new modes of competition through coordination and exploiting complementarities across different product-market segments and roles. The exploitation of weak ties across previously discrete markets also serves to create barriers to entry. Exercising these strategies leads to transformation of the business network - increasing its size and complexity as defined by the number of strategically relevant roles and pattern of linkages across roles. Some roles become less important as new information processing based roles become a strategic asset in the business network.

We began with the premise that new organizational forms enabled by electronic integration blurred traditional boundaries between firms and their environments, or boundaries between industries. Thus the study of emerging organizations therefore required greater consideration for how firms managed interdependence in environments and organizational analysis at the level of business networks. By using the roles-linkage abstraction we were able to focus research attention on a few roles and linkages and thereby simplify the study of otherwise complex business network structures and patterns of transformation. The roles-linkage model also provided a simple representation model for visualizing networks. However, we note that research at the level of the business network still remains complex. Our study of the tax preparation network required defining thirteen roles, with consideration for over thirty-five linkages. The large number of business entities and linkages involved required considerable data collection and significant field time. Thus while the roles-linkage model provides a basis for simplifying traditional network analysis, many challenges remain toward building empirical knowledge.

Two possible research extensions to address the above limitations include:

- Defining standard individual and group protocols. Protocols for efficiently eliciting senior executive knowledge about strategically relevant roles and linkages will enable researchers, industry experts, and other informants to quickly specify network structures using consistent, cross-validated methods. This will allow researchers to build cases across different industries as a basis for cross case analyses [27, 82] and theory construction on the effects of electronic integration at the level of the business network.

- Constructing software tools for business network representation, visualization and analysis. Computer-based methods for collecting, storing, transforming and displaying network-level data seem promising as tools to support efficient model construction and analysis. These tools can help researchers and managers to visualize network structures and to contrast the role and linkage-based strategies of different organizations enabling the systematic representation and analysis of changes in emerging organizational forms.

We believe the above research extensions will allow us to capture and represent managers cognitive models of business network structures and strategies. However attractive this option, though, much work is needed to develop appropriate methods to integrate the views of multiple network data informants and to test the reliability and validity of cognitive models of strategy.

7. Conclusions

Managers in the increasingly turbulent business environments of the 1990s will be required to manage interdependencies between firms that cut across traditional industry boundaries. Indeed, as electronic integration reduces buffers between the firm and its environment, managers must design new organizations that redefine their firm's roles and relationships with other actors in the business network. Like the tax preparation example, electronic integration is reshaping firms and environments in many industries leading to various new organizational forms, and new patterns of business strategy. Other industries that are seeing dramatic shifts in structure from electronic

integration vary from complex industries such as health care where health maintenance and preferred provider organizations represent new forms of network organizations, to smaller industries such as floristry where small firms such as Calyx and Corolla [81] use electronic integration to dramatically alter the business network by leveraging the capabilities of various other organizations and previously separate business networks through contracts.

As these complex new organizations are developed, the business network is an increasingly important level for the study of how electronic integration shapes organization structures and strategies. The roles-linkage perspective provides a useful heuristic for constructing models and organizational analysis at this level. It focuses research and management attention on the way firms create value in networks through information technology based roles, and helps to identify different firm-level strategies for linkage across roles. However, many methodological issues remain in making network analysis tractable from a research and management perspective.

Increased understanding of these more complex forms of network roles and relationships should prove useful to policy makers setting strategies for investment and product and service positioning in emerging business networks. Firms successful in managing this increasing complexity will gain relative advantages over those firms who cannot.

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