

**INDUSTRIES, INFORMATION, AND THE INTERNET:
AN INFORMATION-ORIENTED PERSPECTIVE OF INDUSTRIES**

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ABSTRACT

This study explores how the conceptualization of an “industry” is changing with the advent of the information age, and particularly how the Internet is enabling this change. We first lay out a high-level framework that describes the critical features that any conceptualization of an industry tries to define: the source of firm value, the definition of a firm (based on its source of value), the definition of an industry, and the supporting and opposing networks of related organizations. Using this framework, we examine the way industrial organization economics views industries, which is based on its focus on products (physical goods or services) as the source of firm value. Drawing from the literature on the resource-based view, comparative advantage theory of the firm, knowledge and learning orientation, and information as a competitive resource, we then describe an emerging view of what constitutes an industry, focusing on information as the critical resource of value. Finally, we examine how the Internet is contributing to this emerging view. From an industrial organization perspective, the Internet is seen to primarily erode the profitability of product-based competition. However, from an information-industry perspective, the Internet is providing a new resource for competitiveness in leveraging information for competitive advantage. This information-oriented perspective is redefining the conceptualization of industry based on a firm deriving value primarily from its information resource, in contrast to the product-centered perspective from industrial organization economics.

Keywords: Industries; information resources; Internet

INTRODUCTION

The information age is upon us; if there was any doubt of this, the Internet has presented itself as a visible testimony of the “new competitive landscape” (Bettis, 1998; Bettis & Hitt, 1995; Porter, 2001; Sampler, 1998). Innovations in computer-based technologies for information processing and telecommunications during the past several years have incrementally transformed the way we live and do business. The Internet has been an integral part of this new competitive environment. While it might not have actually caused the changes, it certainly intensified the speed and pressure of the transformation of competition (Sampler, 1998).

The changes in the competitive landscape are forcing companies to question their key assumptions about business and the business environment, even in something as fundamental as what industry they are in. A company’s definition or perspective of its industry is critical to understanding how it is to compete, the resources which are most valuable for competition, who its competitors are, and other important strategic issues. Traditionally, based on the industrial organization economics perspective (Porter, 1980), industries have been conceptualized along the lines of firms with similar products. The present information age is changing the practicality of this perspective, as information increasingly becomes the key competitive resource. Companies that do not accurately identify their industry—or the important dimensions of it—risk being blindsided by the changing bases for competition.

This study makes two important contributions to assist industry analysis in the information age. First, it traces the development of a focus of information as a key competitive resource in the theoretical literature, and analyzes how competition based on the information resource is changing the very concept of an “industry”. Second, it examines how the Internet is contributing to this shift in industry conceptualization, analyzing the different perceptions of the effect of the Internet based on the product-centered view of industrial organization economics and on the emerging information-oriented perspective.

In the following sections, we begin by presenting a high-level framework that identifies the key features of a conceptualization of an industry. We follow by analyzing the view of industry from industrial organization economics using this framework. Then we present some streams of research that are bringing forth a view of industries focused on information. Next, we assess this emerging view using

the framework we have presented. The final section examines how the Internet affects the conceptualization of industry, from both an industrial organization perspective and from an information-oriented one.

WHAT IS AN INDUSTRY?

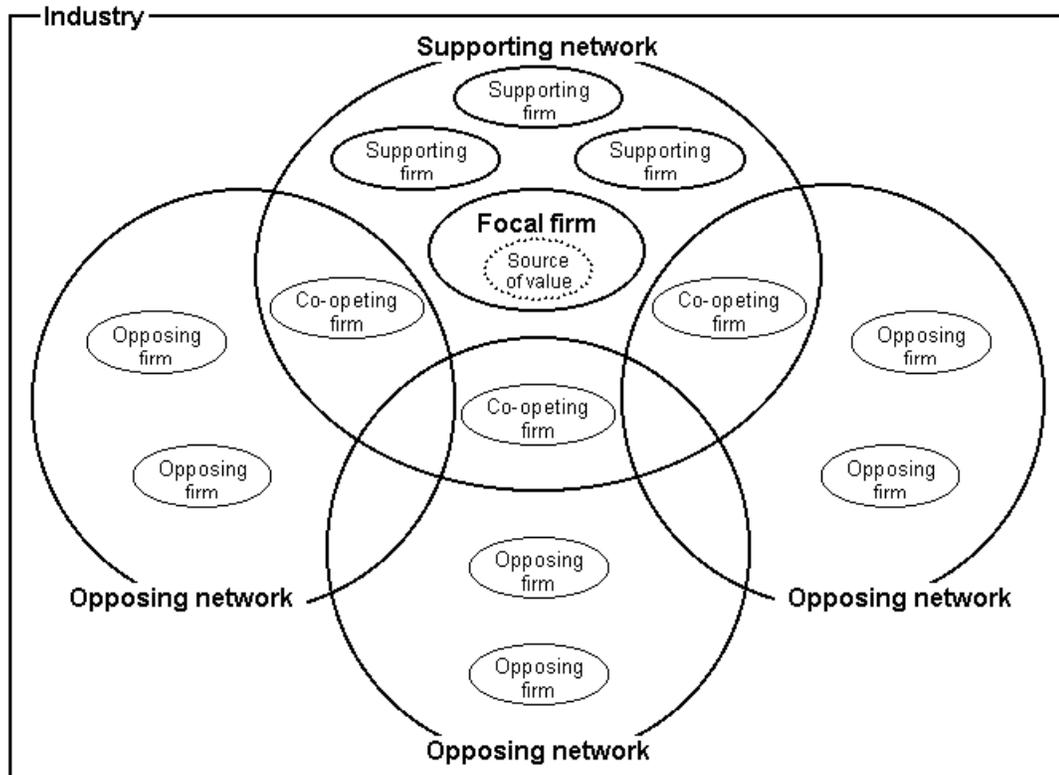
In this paper, we will compare two very different perspectives on what constitutes and industry. To make such a comparison, it is necessary to first develop a meta-description of what an industry is; that is, a description that describes conceptualizations of industries. Such a meta-description will necessarily be rather abstract, but it will establish a context that will permit the careful analysis of various definitions of “industry”. This analysis is applicable both to regular commercial enterprises and to most non-governmental non-profit organizations with definite goals, such as parochial hospitals and private schools (see Voss & Voss, 2000).

To begin this analysis of what an industry is, we must first ask, “Why do we even care about knowing what an industry is?” We begin by observing that an industry is an aspect of the environment in which a firm operates and competes (Porter, 2001). It is vital for a firm to recognize their environmental context so that it understands those factors external to itself that affect the carrying out of its organizational goals. An “industry” is the subset of the business environment that focuses on interrelated non-government organizations. The key here is “organizations”, specifically other organizations that each have their own goals that might either aid or hinder the focal firm as it carries out its own goals. For example, direct competitors harm the firm’s goals by depleting its market share and often driving down prices and profits; and partners in strategic alliances collaborate with the firm in some way to increase the profits of both firms. When two organizations affect the focal firm positively or negatively, it is likely that each will directly or indirectly have some effect (either positive or negative) on the other. Thus, organizations that affect the focal firm can be seen as operating in interrelated networks (Srivastava, Shervani, & Fahey, 1999), which might or might not be formally linked. The important point, as far as the concept of “industry” is concerned, is that these organizations or networks in some way or the other either support the focal firm in the pursuit of its goals, or hinder its achievement of these goals.

On this high level of abstraction, we define an industry thus: *An industry is a conceptualization of networks of organizations that either help or harm the focal firm in its goal of maximizing*

performance. To better understand this high-level definition, we will further clarify its key dimensions: the purpose of the firm and its key source of value; the firm as the unit of analysis, its definition and boundary; and the firm's supporting and opposing networks. The framework used in this paper is illustrated in Figure 1.

Figure 1. A meta-description for conceptualizing industries



Purpose of the firm and source of firm value

The classical economic theory of the firm postulates that the purpose of the firm is to maximize profits, and the contemporary refinement says it is to maximize the net present value of future cash flows. By definition, these perspectives define the organizational goal of the for-profit firm. However, a definition is preferable that is broad enough to encompass the purpose of non-profit organizations that measure their success in terms other than profits. Even some for-profit firms have different goals from this classical perspective (see, for instance, Voss & Voss, 2000). It is sufficient to simply say that the purpose of a firm is to maximize performance. Performance will be defined in different ways by

different firms. Most for-profit firms will define it in terms of profits. Note that an organization will probably have multiple measures of performance that are relevant to its goals. Because most of these measures cannot be simultaneously maximized, an organization might strive as its goal to reach an optimal position where most of the measures are maximized. The details of such an optimization process are beyond the scope of this study. However, “maximization of performance” in this paper should be understood to encompass multiple performance measures.

Once the performance metric (or metrics) are established for a particular kind of firm, it is necessary to identify what it is that the firm possesses or does that enables it to attain its performance goals, that is, what actually gives the firm its value. Various perspectives emphasize a firm’s products, its processes, its intangible resources, its market, or some other source of value. Whatever it might be, the item that is identified as giving value to the firm is a key point in how “industry” will be defined.

Unit of analysis: The “firm”

“Firm” is a term used for a business enterprise, common primarily in economics. This term is particularly valuable in this context for its abstraction, because it could refer to a sole proprietor, an incorporated enterprise, a consolidated enterprise of incorporated businesses, or a single product line strategic business unit within a corporation. When we consider specific conceptualizations of an industry, the specific definition of a firm will become more relevant. At this stage, however, the word “firm” suits the need for an abstract term that encompasses all of these forms of organization. At this abstract level, we define a firm as an organizational unit or entity that has strategic control over a competitive resource. The specific resource upon which the definition of the firm is based depends on the perception of the source of value. The boundary of the firm might or might not correspond to a legal entity (such as a corporation); the point here is that the firm is defined to focus on its source of value.

The supporting network

Based on network theory (Achrol, 1991; Achrol & Kotler, 1999; Webster, 1992), firms within an industry can be viewed as belonging to one of two kinds of networks: a supporting network or an opposing network. The supporting network consists of all the organizations that support a firm in its goal of maximizing performance. In a traditional conceptualization of industry, strategic alliances immediately come to mind, and the members of such alliances are certainly examples of such networks. However, what the traditional perspective often overlooks is that suppliers and customers are vitally

important elements in supporting the firm in maximizing its performance. Customers give the firm its revenue, the primary basis for its profits. Suppliers provide the inputs for the production process so that the firm can create value for its customers. Thus, in this high-level perspective of industry, we need a broad perspective of what constitutes the supporting network. All organizations that at least directly help a firm in achieving its goals are part of its supporting network. An interesting implication of this definition is that a firm's direct competitors can also be part of its supporting network, if they cooperate with it in some way to help it achieve its goals (Hamel, Doz, & Prahalad, 1989). Thus an organization can be simultaneously be a member of the focal firm's supporting and opposing networks, as we will discuss later in this paper.

The opposing network

The opposing network consists of the organizations that directly or indirectly oppose or impede a firm in its goal of maximizing performance (see Achrol & Kotler, 1999). No malicious intent is implied in the term "opposing", as members of this network by and large simply want to maximize their own performance at the expense of the focal firm. Most basically, this network consists of the firm's direct competitors who are pursuing similar ways in maximizing their performance such that their goals conflict with those of the focal firm. The opposing network also consists of the competitors' own supporting networks, whose members indirectly harm the performance of the focal firm, even if they are not direct competitors.

It is important to note that an organization can be a member of both a firm's supporting network and its opposing network. This situation can arise when a firm cooperates with its competitors to achieve some common purpose, such as establishing an industry standard. We will further discuss this situation of an organization being a member of both networks, particularly considering how the conceptualization of industry places a particular organization in either or both of the focal firm's supporting or opposing network. However, the key characteristic of members of a firm's opposing network is that these other firms have organizational goals that necessarily hamper the focal firm's pursuit of its own goals.

With this general framework for laying out what makes up an industry, we are in a better position to assess and compare conceptualizations of industry. In the rest of the paper we will describe and compare two important conceptualizations: the product-focused perspective of industrial organization economics, and the information-oriented view that has been emerging in recent literature in

strategic management. Table 1 summarizes the conceptualization of the two perspectives of industry examined in this paper using the framework we have presented.

Table 1. Framework for assessing conceptualizations of industries

	Industrial organization economics	Emerging information-oriented view
Source of firm value	Product features and/or cost (Porter, 1980)	Product leveraged by information
Definition of the firm	Strategic business unit—product centered (Pearce, 1967)	Holistic company: owner of the information
Definition of the industry	Similar firms offering similar products to similar customers (Deephouse, 2001)	Firms with critical information for the same customers (Sampler, 1998)
Supporting network	<ul style="list-style-type: none"> • Partners with non-substitutable products • Industry consortiums • Vertical integration 	<ul style="list-style-type: none"> • Partners with non-substitutable products • Industry consortiums • Vertical integration • Co-opetition (Hamel et al., 1989) • Customers and suppliers
Opposing network	<ul style="list-style-type: none"> • Competitors (existing and potential) defined by product • Customers and suppliers 	<ul style="list-style-type: none"> • Direct competitors: same information and competencies (Sampler, 1998) • Indirect competitors: rival networks (Achrol & Kotler, 1999; Srivastava et al., 1999)

INDUSTRIAL ORGANIZATION ECONOMICS

In the past two decades, the predominant perspective of “industry” that has been used in strategic management has been the one developed from industrial organization economics. The most popular version of this perspective in the past two decades has been that described by Michael Porter in his 1980 book, *Competitive Strategy*. A recent article by Porter concisely expresses this perspective of industry structure:

... [An industry’s] structural attractiveness is determined by five underlying forces of competition: the intensity of rivalry among existing competitors, the barriers to entry for

new competitors, the threat of substitute products or services, the bargaining power of suppliers, and the bargaining power of buyers. In combination, these forces determine how the economic value created by any product, service, technology, or way of competing is divided between, on the one hand, companies in an industry and, on the other, customers, suppliers, distributors, substitutes, and potential new entrants. (Porter, 2001, p. 66)

Since books abound which describe industrial organization economics in detail (for example, Porter, 1980; Shepherd, 1990; Shy, 1996), we will forego such a detailed analysis here and rather proceed directly to analyze it from the perspective of what constitutes an industry using the framework that we have presented in the previous section.

Source of firm value

Even before describing how industrial organization economics conceptualizes the “firm”, it is necessary to first highlight how it conceives that firms create value; that is, how they maximize their performance. From the industrial organization perspective, a firm creates value by producing valuable *products* that meet customer needs. As a matter of terminology, we will use the term “product” to encompass both physical goods and non-physical services—or both—rather than restricting the term to just physical products.

From the perspective of industrial organization economics, superior performance derives from the ability to sustainably provide a superior product offering. Again, it must be understood that the “product offering” includes not only the physical aspect of the product, but the entire product that the customer benefits from (see Davis & Meyer, 1999). The value of a product to customers is generally based on a tradeoff between features and price: to what extent the features of the product satisfy the customer’s needs, considering the price being charged (see Fornell, Johnson, Anderson, Cha, & Bryant, 1996). According to industrial organization economics, firms distinguish themselves by either minimizing their production costs, or by crafting product features to satisfy a profitable niche of customers (Porter, 1980). In either case, the key source of the firm’s value is its products.

Firm definition

Since the focus of industrial organization economics is on the value of products, a firm must be seen as an entity that produces a product, or a set of related products. Thus, the firm from an industrial

organization perspective is usually conceptualized as a strategic business unit, an entity that produces a single product or a product line of very similar and related products. Of course, for an undiversified corporation, the entire corporation is the firm, since it is a single business unit. A diversified, multiproduct corporation does not fit well in industrial organization economics for conceptualizing a firm (Roquebert, Phillips, & Westfall, 1996; Rumelt, 1991). Unrelated products might involve very different value chains and value models, and completely different sets of competitors, suppliers and customers apply to different product lines. If a firm is to keep track of which interrelated organizations affect its performance maximization from effectively deploying its products, it needs to limit the scope of the “firm” to an entity that deals only with a single product or related product line.

Industrial organization definition of an industry

With the product identified as the source of firm value, and the strategic business unit identified as the firm entity, the definition of an industry from the perspective of industrial organization economics naturally revolves around these concepts. Two representative definitions of an industry from an industrial organization perspective are, “a group of firms or business units producing close substitutes,” (Bettis, 1998) and, “a group of similar firms offering similar products to similar customers,” (Deephouse, 2001). The phrases “similar products” or “close substitutes” in these definitions underscore the fact that products are central to this perspective of industry.

Another important industrial organization perspective of industry, at least in the United States, is the approach that the U.S. government uses in developing standard classifications of industry. Since 1938, the Standard Industrial Classification (SIC) Codes have been the predominant classification system that most U.S.-based research on industries has adopted:

In the preparation of this Classification, the committees were guided by the following general principles:

1. The classification should conform to the existing structure of American industry.
2. The reporting units to be classified are establishments rather than legal entities or companies.
3. Each establishment is to be classified according to its major activity.
4. To be recognized as an industry, each group of establishments must have significance from the standpoint of the number of establishments, number of wage earners,

volume of business, employment and payroll fluctuations, and other important economic features. (Pearce, 1967)

More recently, this system has been updated as the North American Industry Classification System (NAICS), where “establishments that use the same or similar processes to produce goods or services are grouped together” (U.S. Census Bureau, 1998). Note that in both of these classification systems, the core focus on what makes firms similar is on their “major activity”: the production of goods or services. This is clearly an industrial organization perspective, identifying products as the fundamental source of economic value. A slight variation from majority industrial organization theory is that the SIC and NAICS both have a focus on “activity” or “processes” as being equally important in identifying similar firms. This perspective considers that firms that produce the same products using substantially different processes are sufficiently different to be regarded as members of distinct industries or sub-industries.

Firm’s supporting network

In an industrial organization-oriented firm’s quest to maximize its performance based on its products, there are three categories of related organizations that support the firm in its goals. First, a firm might enter into strategic alliances with other firms that have products (product-generating competencies) complementary to its own. In such situations, the firm will only partner with others whose products supplement but do not substitute or compete with its own products. Industry consortiums for mutually beneficial action represent a second form of relationship between a focal firm and supporting organizations; in such cases, competitors are part of the supporting network (Browning, Beyer, & Shetler, 1995; Olk, 1997).

A third category of supporting network in industrial organization economics is found in vertical integration. As we will argue in the next section, product-oriented, industrial organization-oriented firms tend to see suppliers and customers as antagonists who decrease their excess profits. Firms that contend with their suppliers and customers sometimes adopt a strategy of, “If you can’t beat them, join them,” and legally merge with their suppliers or customers to appropriate the lost profits that arises from the competition between members along the value chain. Transaction cost economics, a theory grounded in an industrial organization economics backdrop, argues that the boundaries of firms are largely determined by the relative cost of carrying out transactions within a firm versus between firms (see Rindfleisch, 1997 for a detailed review).

Firm's opposing network

While the members of the firm's supporting network support it in its maximization of performance, the members of its opposing network hinder and harm its performance. The most obvious instance of opposing organizations in an industrial organization-oriented industry is the competitors that produce similar products for similar customers, perhaps using similar processes (Deephouse, 2001). Since the firms in an industry are competing for the same customers providing similar products, the economic welfare of the focal firm causes the detriment of its competitors, and vice versa.

Other than competitors, industrial organization economics pits a firm against its suppliers and customers in its struggle to maximize performance. In Porter's five-forces model of industry competition (1980), two crucial forces that determine the average performance of firms in an industry are the bargaining power of suppliers and the bargaining power of buyers. It is especially interesting to note that because the focus is on similar processes for producing products, suppliers and buyers are not strictly considered to be "part" of the industry. The "firms in the industry" in the five-forces model are limited to those firms that deal with the product at more or less the same stage in the value chain. The value chain is the entire process that converts inputs into products and then eventually distributes the products to buyers. The five-forces model regards any single (general) level of this value chain as an industry, and considers the firms upstream and downstream as distinct industries (except that end consumers are not generally considered an industry). With this conceptualization of industry, suppliers and buyers are viewed as industry outsiders who struggle to maximize their own performance at the expense of that of the focal firm and the other members of the industry.

Summary of the Industrial organization perspective

The most fundamental point about industrial organization economics' conceptualization of industries is that it focuses on the product as the ultimate source of firm value, and thus defines industries around this concept. Firm performance is maximized by providing a superior product, and the firm is defined as a business unit that provides a single product or product line. An industry is comprised of a group of "similar firms providing similar products to similar customers" (Deephouse, 2001). Based on the product focus, the firm's supporting network comprises partners who provide complementary, non-substitutory products; members of industry consortiums (who might include direct competitors);

and former suppliers and customers who are consolidated by vertical mergers. The opposing network from this product-oriented perspective consists of direct competitors, suppliers and customers.

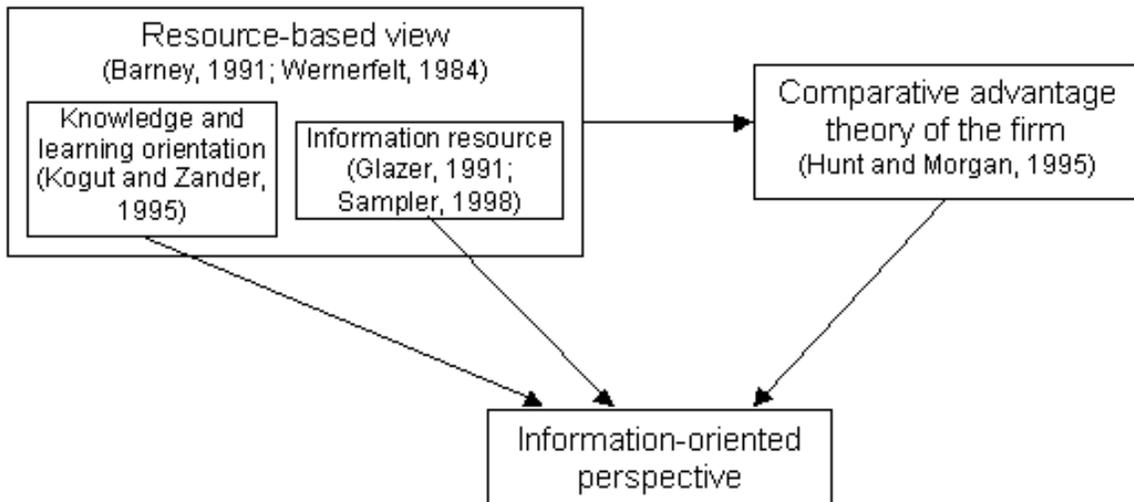
In stark contrast to this traditional perspective, we will now describe an emergent view that is drawn from many different streams in strategic management research. Table 1 outlines and contrasts the industrial organization and the information-oriented perspectives of conceptualizing industries.

THE EMERGING INFORMATION-ORIENTED PERSPECTIVE OF INDUSTRY

Bettis and Hitt (1995 p. 7) described a “new competitive landscape” that is radically changing the traditional modes of competing. The economic paradigms of the industrial age are giving way to new rules of competing, which has often been called the “new economy”. It is not that the fundamental rules of economics have changed (Porter, 2001; Shapiro & Varian, 1999), but rather that the basis for competition has shifted and continues to shift. The changing competitive landscape and the arrival of the information age are changing the boundaries of our traditional conceptions of industry (Bettis, 1998; Bettis & Hitt, 1995; Sampler, 1998). In this section, we will describe a number of important emerging theories that help frame these new developments with a focus on how competition based on information resources is shaping the competitive landscape. Note that information is by no means the only factor, nor necessarily the most important one, that is causing these dramatic changes (see Hamel & Prahalad, 1996). However, it is definitely one of the most central factors shaping the “information age”.

The root theory that explains these shifts towards information-centric competition is the resource-based view of the firm (Barney, 1991). Based on this view, we draw from literature on organizational knowledge and learning (Grant, 1996; Kogut & Zander, 1992; Slater & Narver, 1995), the “comparative advantage theory of the firm” (Hunt & Morgan, 1995), and from literature on information as a competitive resource (Bettis, 1998; Glazer, 1991; Sampler, 1998). The relationship between these streams of research is illustrated in Figure 2.

Figure 2. Theoretical bases for the information-oriented perspective on industries



Resource-based view

The resource-based view (RBV) of the firm stands apart from perspectives of competitive advantage that focus on products or other marketing-mix variables as the critical source of value for a firm (Wernerfelt, 1984). It holds the perspective that resources—especially intangible ones—are more intrinsic to the organizational character of the firm than tangible products, that resources are more enduring properties of a firm, and that the same resources can be converted into various products more readily and effectively than products into resources. “Resources” are to be understood as both tangible and intangible assets and capabilities of the firm, anything at all that the firm possesses that can be converted into value. Barney (1991; 1997) argued that a company’s resource can give sustained (as opposed to merely temporary) competitive advantage only if the resource is (1) valuable, that is, convertible to value; (2) rare, that is, not readily available; (3) difficult to imitate by competitors; and (4) organized in alignment with the organization’s capabilities.

Barney (1991) defines *firm resources* as “all assets, capabilities, organizational processes, firm attributes, *information* [emphasis ours], knowledge, etc. controlled by a firm that enable the firm to conceive of and implement strategies that improve its efficiency and effectiveness.” This definition is deliberately broad, because “resource” should capture the all-encompassing idea of anything that enables the firm to compete. Barney argues that one of the things that might make a resource hard to

imitate is its “social complexity”; that is, the fact that the interactions between people are so relationship-oriented that reduplication becomes very difficult.

Comparative advantage theory of the firm

Hunt and Morgan (1995) critiqued the neoclassical economic theory of competition, which postulates perfect competition as the long-term equilibrium state in a market economy. They examine its fundamental assumptions, which include homogenous demand within industries, optimal profit-maximizing behavior by entrepreneurs, and environmental determinism that negates the role of strategy in determining firm performance. They argue that this theory and others based on its assumptions cannot adequately explain economic abundance or firm diversity. Hunt and Morgan present a new theory of the firm they call “the comparative advantage theory of competition”, which has evolved from various streams of research: the resource-based view of the firm, competitive advantage theory in marketing and industrial organization economics, Austrian economic thinking, and the theory of differential advantage. The fundamental tenet of this theory is that firms are organized to achieve a marketplace advantage over their competitors. Such advantage arises from resource advantages, and results in superior financial performance at the firm level, and superior quality, efficiency, and innovation at the macroeconomic level. They argue how this theory gives more rational explanations for economic abundance and firm diversity than does the neoclassical model.

Knowledge and learning orientation

In the past couple decades, there has been a substantial amount of research focused on studying how the ability of an organization to learn affects its performance relative to its competitors. The general consensus has been that companies that are able to continually learn and to effectively manage their knowledge gain a competitive advantage in their respective industries (Day, 1994; Glazer, 1991; Menon & Varadarajan, 1992; Moorman, 1995; Sinkula, 1994; Sinkula, Baker, & Noordewier, 1997; Slater & Narver, 1995). Thus it is valuable for a company to understand how to nurture a learning culture where knowledge is recognized as an asset in its own right that must be valued, grown, and leveraged. Examined from the perspective of the resource-based view (Barney, 1991), knowledge is a valuable organizational resource that is uniquely configured in each organization (that is, rare), and is very difficult to imitate. One organization’s particular knowledge might or might not be substituted by the

knowledge or related competencies of another. Grant (1996) comprehensively reviews and consolidates the literature on organizational knowledge and learning.

Information as an organizational resource

One valuable resource that is much neglected in traditional research based on industrial organization economics is information. Information in and of itself often is not a valuable resource as the RBV defines it. While it might be valuable for increasing the value of the firm's products, it is becoming increasingly more difficult in the information age to obtain proprietary information that is not accessible to competing firms, except perhaps information about one's own customers. Even such information is relatively easy to replicate. However, the degree of integration between resources will make a significant difference. In their study of information technology (IT) usage in the U.S. retail industry, Powell and Dent-Micallef (1997) found that a business's integration of its IT with its human resources and business processes was significantly decisive in giving a performance advantage over competitors. This integration permits a hybrid resource to be forged that is very difficult to imitate, which can give above-average profits (Barney, 1991; Powell & Dent-Micallef, 1997). We will further explore how the strategic use of information is redefining industries by creating new bases for competing.

Glazer (1991) discussed the concept of information intensity of a firm. First, information can be valued in terms of excess revenues and reduced costs as a result of the information obtained either from suppliers, customers, or within the focal firm itself. The total value of information is the sum of these individual information values, and information intensity is defined as the ratio of the total information value to profits. Glazer argues that information intensity increases market attractiveness by shortening product life cycles, it shifts industry boundaries based on market characteristics, and it increases buyer power. It allows greater reliance on non-product marketing mix variables, permits simultaneously competing with mass market and narrow focus strategies, and increases the formation of strategic alliances. Thus, information-intense firms can achieve higher performance vis-à-vis their less information-intense competitors.

ASSESSMENT OF THE EMERGING INFORMATION-ORIENTED PERSPECTIVE

These four streams of research are common in their emphasis of intangible resources as the most important sources of firm value. The resource-based view (RBV) provides the groundwork for identifying and evaluating valuable resources (Barney, 1991; Wernerfelt, 1984). The comparative advantage theory postulates that firm value is attained and sustained by maintaining superior resources relative to competing firms (Hunt & Morgan, 1995). The knowledge and learning orientation literature identifies organizational knowledge as a valuable resource (Grant, 1996), as does the literature on information resources (Glazer, 1991; Sampler, 1998). These resource-oriented theories can be seen as subsets of the resource-based view. Through knowledge orientation and the information resource, the RBV and the comparative advantage theory together give rise to the information-oriented perspective of industry competition described in this study. These relationships are illustrated in Figure 2. Drawing from this theoretical background, we will now use the framework described earlier to assess how an “industry” is conceptualized from the information-oriented view that is emerging from this literature. At the same time we will compare this rather different perspective from the product-focused view of industrial organization economics.

Source of firm value

The preceding discussion on the elements of the emergent view identified various resources as potential sources of firm value, particularly based on the resource-based view of the firm and on the comparative advantage theory of the firm. However, this paper will focus specifically on information as a resource for competitive advantage. Glazer (1991) describes an “information intensiveness continuum” (p. 5) that features firms with varying degrees of focus on information as a product in its own right, as opposed to being simply an attribute of a product. On one end, there are firms where the information associated with the products adds no significant value to the offering. In the middle are firms where the information associated with the product does add value to the product, though it is not very useful apart from the product. On the other end, there are products whose associated information has become completely distinct from the product, to the point where the information is a valuable product in its own right. Whether information is itself a product or it simply enhances the value of a product, an information-oriented view recognizes that information about products and markets is valuable, and is an

integral part of the product offering. In either case, an information orientation increases the value of the product offering and thus increases the performance of the firm.

Firm definition

In the industrial organization perspective, the firm was defined to focus on the product as the source of value and the focus for strategy and competition. In the emerging information-oriented view, what is important is the information that can be leveraged to increase the performance of the firm. To leverage information, it is necessary to control it. The primary, though not sole, means of controlling access to valuable information is to own it (see Sampler, 1998). Thus, under this perspective of industry, the firm is best understood as the entity that owns the information that can be leveraged to improve performance. The owner is the holistic company—usually an entire corporation, or a partnership or sole proprietorship for smaller business units. Even if the corporation is diversified with multiple disparate product lines, such a multiproduct corporation is nonetheless the best conceptualization of the “firm” from an information-oriented perspective.

At first, the distinction between this conceptualization and that of industrial organization economics might seem trivial and arbitrary. However, the difference is crucial because of the underlying assumptions. Industrial organization economics restricts a firm to a single business unit because this is the largest unit that can practically control a product and make strategic decisions in the context of similar firms. In contrast, an information-oriented firm is not primarily interested in its products, whether they might be physical goods or non-physical services. The information-oriented firm has an eye for leveraging its information to create value and thus increase the performance of the firm—products are merely the means for creating value, not an end unto themselves.

Information-oriented definition of an industry

Sampler (1998) argued that the information age calls for a fundamental redefinition of industry that recognizes information as one of the most important competitive resources. He gave several instances of firms entering industries traditionally outside their domain, simply by leveraging the information now available to them. Based on such analyses, Sampler (1998) proposed, “Firms possessing sufficient amounts of critical information for the same market (e.g., customers) define the industry boundary” (p. 349). He further argued that industry concentration should be reconceptualized in terms of the breadth and depth of critical information, and that, “for certain types of industries”,

corporate diversification should be determined by the variety in types of information needed (p. 352). His argument is that when a firm has the right information about its market, it can easily leverage this knowledge to deliver any product needed by its information-base (that is, by the customers about whom it has information). Bettis (1998) further argued that industries ought to be defined in terms of common firm competencies, rather than in terms of products.

Firm's supporting network

The three general categories of supporting organizations found in the industrial organization perspective still apply for the information-oriented perspective—strategic alliances of non-competing firms, industry consortiums, and vertical integration. Moreover, from the perspective of the emergent view, we can identify three further general categories of organization in the supporting network. The first category consists of a firm's customers, who pay for the firm's products and thus give it revenue. In the industrial organization perspective, the relationship between the firm and its customers is seen as a struggle to maximize performance at the other's expense. In contrast, an information-oriented firm is especially conscious that its customers not only provide revenues for current or short-term transactions, but that they also provide information that generates long-term revenues and value. Similarly, suppliers of inputs for production—the second category of organization in the supporting network—also supply information about the product and product inputs that increases the value of the offering (Glazer, 1991). Thus, customers and suppliers must be seen as partners in the firm's goal of maximizing performance.

The third category of organization in the supporting network that does not occur in the industrial organization perspective is the case of co-opetition, when direct competitors cooperate for mutual benefit. Hamel et al (1989) discuss this phenomenon and give several practical strategic suggestions for managers to effectively collaborate with their competitors. In contrast with the industrial organization perspective, where direct competitors (that is, providers of substitute products) are seen as always mutually antagonistic, the emergent perspective recognizes that even when two firms produce very similar products, they often have distinct capabilities which could be leveraged for mutual benefit. Although the individual sales of each of their products might be harmed by such "co-opetitive" action, the value of the products are increased by the valuable resources that each partner brings to the table, resulting in increased overall performance for the partners.

Firm's opposing network

Although co-opetition provides opportunities for collaboration with competitors, an information-oriented firm certainly still has organizations it needs to identify that harm its performance. However, unlike in the case of industrial organization economics, such firms are not so easily identified by the similarity of competing products. Because information is the critical resource in this perspective, threats arise from other firms that have similar information resources as the focal firm, and similar capabilities to harness and exploit this information.

Another important dimension of opposing networks in the emergent information-based competition is that as firms form cooperative relationships and alliances with each other, firms in other supporting networks will become de facto, albeit indirect, competitors. There will be a level of competition between supporting networks of firms.

Summary of the information-oriented perspective

The key feature of the conceptualization of industries from the information-oriented perspective is that it focuses on organizational information resources as the ultimate source of firm value, and thus defines industries around this concept. The firm strives to maximize its performance by effectively leveraging its information to create valuable products; products are seen virtually as repositories of information. The firm is defined as a holistic company; that is, an entity (which might or might not be a legal entity) that owns information and has the managerial competency to creatively leverage it for maximal organizational performance. An industry in this perspective is comprised of a group of "firms possessing sufficient amounts of critical information for the same market" (Sampler, 1998). Based on this focus on information resources, the firm's supporting network comprises not only those identified from the industrial organization perspective, but also competitors with allied interests, and customers and suppliers. The opposing network in this case consists of direct competitors with the same information and competencies, and indirect competitors who are members of rival networks (Srivastava et al., 1999).

Table 1 outlines the key features of information-oriented perspectives of conceptualizing industries, contrasting it with the view from industrial organization economics. In the following section of this paper, we will discuss how the Internet, one of the most important technological developments of the late twentieth century, affects the conceptualizations of industries that we have discussed.

THE INTERNET IN THE NEW COMPETITIVE LANDSCAPE

The “new competitive landscape” that Bettis and Hitt (1995) describe is driven by “technology [that] is rapidly altering the nature of competition and strategy in the late twentieth century” (p. 7). The Internet—particularly the World Wide Web*—is an integral part of this new competitive playing field. In the 1990s, the Internet emerged as a revolutionary communications technology, with far-reaching effects in all spheres of society. By allowing for widespread and efficient information transfer, it has enabled businesses to improve their operational efficiency, reach wider markets, and implement many new information-focused strategies that were previously impossible (Porter, 2001; Sampler, 1998).

In the context of analyzing industry structure, the Internet has had significant impacts in changing the basis of competition (Porter, 2001; Sampler, 1998). For a firm trying to compete in the new landscape, these some of these changes are helpful, while others present new challenges. The effect of these changes, however, depends largely on a firm’s approach to competition, which in turn largely depends on how it views its core source of value and how it conceptualizes industries. The rest of this paper will focus on examining the effects of the Internet on industries, analyzing these effects from both the industrial organization and the information-oriented perspectives of industry that have already been presented.

Effects of the Internet on industries: An industrial organization economics perspective

In a discussion of how the Internet calls for new applications of the unchanged fundamental rules of strategy, Porter (2001) pointed out many ways in which Internet-induced changes erode the profitability of firms within most industries. He acknowledged a few important benefits that the Internet has made to industry, primarily by increasing efficiency, providing access to larger markets, and eliminating powerful intermediary distribution channels. However, Porter’s (2001) outlook on the effects of the Internet on competition within industries is mostly negative. He detailed several ways that the Internet decreases average industry profits:

* The Internet refers primarily to two things: the physical super-network of interconnected computers and networks all over the globe; and the suite of services that this physical infrastructure provides. The two most popular Internet services are e-mail, which sends messages between users; and the World Wide Web, an interactive graphical interface for exchanging information. Other popular Internet services are FTP for transferring files, “chat” for interactive real-time text communications, and USENET for group discussion and message forums.

- **Buyers' power.** The Internet gives consumers more bargaining power, and lowers their switching costs.
- **Suppliers' power.** It gives suppliers direct access to consumers, and it reduces any individual company's bargaining power over suppliers.
- **Barriers to entry.** It reduces barriers to entry because of the low cost of acquiring and implementing Internet technology.
- **Threat of substitute products.** The rapid innovation that the Internet fosters increases the development of substitute products.
- **Competitive rivalry.** The Internet intensifies rivalry among industrial competitors by minimizing product differences and encouraging competition on price.

When industrial competition is seen from the perspective of creating firm value from products, Porter's (2001) analysis persuasively highlights the threats that the Internet presents to industry profitability. The key points of his analysis are summarized in Table 2. This product-focused perspective based on industrial organization economics can be interpreted as evidence that this conceptualization of industry and its source of value cannot survive much longer with the changing landscape for competition. Porter clearly recognizes the need for firms to reassess their approach, arguing,

Because the Internet tends to weaken industry profitability without providing proprietary operational advantages, it is more important than ever for companies to distinguish themselves through strategy. The winners will be those that view the Internet as a complement to, not a cannibal of, traditional ways of competing. (Porter, 2001 abstract)

Porter offers Internet-aligned strategy as the solution to the threat that the Internet poses against industry profitability. However, a reconceptualization of industry based on information as the critical value-generating resource presents a different picture of the effect of the Internet: the Internet presents itself more as an opportunity than as a threat. Thus, a reconceptualization of industry from an information-oriented perspective could help in identifying some of the strategic opportunities that Porter (2001) calls for.

Table 2. Industrial organization economics perspective on effects of the Internet on industry (Porter, 2001)

	Positive effects	Negative effects
Buyers' power	<ul style="list-style-type: none"> Eliminates or weakens intermediaries 	<ul style="list-style-type: none"> Gives consumers more bargaining power Lowers switching costs
Supplier's power	<ul style="list-style-type: none"> Raises bargaining power over suppliers 	<ul style="list-style-type: none"> Gives suppliers direct access to customers Electronic markets reduce leverage in supplier relationships
Barriers to entry		<ul style="list-style-type: none"> Efficiency reduces barriers Internet applications are assessable to new entrants
Threat of substitute products	<ul style="list-style-type: none"> Internet efficiency expands the size of the market 	<ul style="list-style-type: none"> Flexibility of Internet creates threats of new substitutes
Competitive rivalry		<ul style="list-style-type: none"> Minimizes product differences Encourages price competition Widened market increases number of competitors

Effects of the Internet on industries: An information-oriented perspective

In contrast to the somewhat pessimistic perspective on the effects of the Internet that an industrial organization analysis elicits, an information-oriented approach views the Internet as an enabler of information-centered competitive strategies that have been impossible until now. In the following sections we will use the industrial analysis framework previously presented to assess various important effects, both positive and negative, that the Internet has on industries from an information-oriented perspective. This analysis is summarized in Table 3.

Table 3. Information-oriented perspective on effects of the Internet on industry

	Positive effects	Negative effects
Source of firm value	<ul style="list-style-type: none"> • Focus on information as a critical resource (Glazer, 1991) • Enhances information separability (Sampler, 1998) 	<ul style="list-style-type: none"> • More challenging to compete on information than on products (Porter, 2001; Sampler, 1998)
Definition/ boundary of the firm	<ul style="list-style-type: none"> • Helps to focus on information as core competency • Application service providers (Yao & Murphy, 2002) 	
Industry definition	<ul style="list-style-type: none"> • Information separability shifts industry boundaries to information focus (Sampler, 1998) 	<ul style="list-style-type: none"> • Lack of information separability leaves products as basis of industry definition (Porter, 2001)
Supporting network	<ul style="list-style-type: none"> • Supply chain management • Application service providers • Electronic markets • Customer-direct 	<ul style="list-style-type: none"> • Disintermediation • Competition between networks (Achrol & Kotler, 1999; Srivastava et al., 1999)
Opposing network	<ul style="list-style-type: none"> • Competitors can become outsourcing partners 	<ul style="list-style-type: none"> • More difficult to identify relevant competitors • New challenges in competing against rival networks (Srivastava et al., 1999) • Commoditization of information

The Internet focuses information as the source of value

The Internet is an ideal tool for acquiring and disseminating information. Of course, not all kinds of information can be transferred on the Internet, only those kinds that can be converted to digital format. The Internet’s ability to focus information as a competitive resource has a lot to do with the concept of *information separability*, which Sampler (1998 p. 346) defines as “the extent to which information can be meaningfully separated from the transaction generating the information and captured in digital form”. Porter’s (2001) observations of the erosion of industry profits due to the Internet will be most evident for industries where it is difficult to get past the tangibility of the products. Even when companies try to use information for competitive advantage, they are constrained in how they can use this information apart from the product itself to meet customer needs (see Glazer’s (1991) information-intensity continuum).

Although such information-based competition gives new opportunities to information-oriented firms, it is more challenging to compete on information than on products. Information is an intangible resource that is not valued strictly in terms of quantitative measures such as volume (e.g., number of customers in the database) or time currency (e.g., how recently the information was gathered). It requires expert qualitative analysis to appreciate which information is valuable for what purposes, and how best to leverage it for competitive advantage.

The Internet helps the firm focus on its information

The information-oriented perspective of industry conceptualizes a firm as a holistic company that owns and has access to valuable information. Because of how it enhances efficient information transfer, the Internet helps a firm to use its information more flexibly. In general, though, it doesn't fundamentally change the conceptualization of an information-oriented firm.

However, application service providers (ASPs) are one noteworthy Internet-enabled arrangement that uniquely help a firm focus on information as its core resource (Yao & Murphy, 2002). These online outsourcing vendors provide routine functions such as payroll and payments processing. The basic philosophy behind outsourcing is that a company should not bog itself down with functions that are not core to its mission. Because of the efficiency of the Internet, the cost of transferring information between the ASP and the focal firm is much lower than with traditional outsource vendors. By making it easier to outsource peripheral business processes, a firm can better focus on information as its core resources.

However, outsourcing arrangements always carry a risk of outsourcing a function that creates tacit knowledge or other non-explicit sources of value. This concern is especially pertinent when a firm focuses on information and intangible resources as its most valuable resource. Thus information-oriented firms must be especially cautious in weighing the costs and benefits when trying to justify an outsourcing relationship.

The Internet does not impact all industries equally

Porter's (2001) observations of the erosion of profits from the Internet might be accurate, but they apply primarily to industries where it is difficult to get past the tangibility of the products. Even when companies try to use information for competitive advantage, they are constrained in how they can use this information apart from the product itself to meet customer needs. This dynamic is manifest in the automobile and grocery industries, for example, where it is difficult to sell products to customers

over the Internet because of the low information separability of automobiles and groceries (Sampler, 1998).

Supporting the supporting network

In the information-oriented conceptualization of industry, the supporting network consists of those organizations that help a focal firm. Here we will discuss how the Internet helps establish and build the supporting network with respect to certain kinds of industry consortiums and with customers and suppliers.

Industry consortiums. The Internet provides an standardized physical infrastructure for *electronic data interchange* (EDI), and it provides support for the development of industry-wide standards. In particular, XML has been developed as an Internet computer language that can be used to easily develop standards for EDI (Lu, 2001). With this backbone that enables the efficient creation of standards for information transfer, the Internet enables a much higher degree of inter-firm collaboration than has been previously feasible. Several industry consortiums have been developed whose purpose is to establish EDI standards for the industry (usually defined along product lines), often using XML.

Customer and supplier networks. *Supply chain management* (SCM) focuses on delivering a product all the way from the extractors and processors of the raw materials, through the various intermediary manufacturing and distribution processes, to the final use by the end-consumer (see Larson, 1998 for a brief overview). The processes involved in SCM can be exceedingly complex, since a firm usually does not have control over its suppliers or customers. Vertical integration is often used to acquire this control as a means of more effectively managing supply chain processes (Rindfleisch & Heide, 1997), but vertical mergers are not always desirable, as it can lead a firm into lines of business that are not central to its mission. The Internet has proven to be a powerful tool for SCM with its increased efficiency of information transfer. Using EDI and other standard and automated communications procedures between businesses, a firm can effectively communicate with its suppliers and customers, and coordinate inter-firm processes.

We have previously discussed *application service providers* (ASPs) as Internet-based outsourcing vendors, and as an important part of a firm's supporting network. The Internet also provides the opportunity for *electronic markets*, Web-based forums that match suppliers of products (both goods and services) or information with buyers (Daniel, 1999; Grewal, 2001). One other noteworthy positive effect of the Internet on supporting networks is how it enables a firm to bypass downstream

intermediaries to directly deliver products to consumers. Amazon.com is based on the model of presenting products to customers (retail function) and delivering them directly from its own warehouses (wholesale). Also, although Dell has been selling computers directly to consumers via telephone and mail order before the Internet grew to its present size, the Internet has ballooned the effectiveness of its *customer-direct* model.

Negative effects of the Internet. The Internet has also had a couple noteworthy negative effects. First, customer-direct is a two-edged sword: A focal firm that traditionally needs intermediaries to deliver its products to consumers benefits from the Internet's ability to help cut out the middleman and reach consumers directly. But if the focal firm *is* the middleman, then this *disintermediation* effect of the Internet can threaten its very survival (Jaworski, Kohli, & Sahay, 2000).

Also, as the Internet strengthens a firm's supporting networks, it will find that its basis of competition will shift from being focused primarily on its direct competitors (who are now often part of the supporting network) to focusing on competing against rival networks (Srivastava et al., 1999). We will discuss a few of these changes in the next section on how the Internet affects the information-oriented conceptualization of a firm's opposing network.

Supporting the opposing network

Just as the Internet enhances the supporting network of firms that aid a focal firm in achieving its organizational goals, it also enhances the opposing network of firms that harm and hinder its goals. The primary reason that the Internet strengthens this opposing network lies with the difficulty of identifying other firms with the same information and competencies. Information is held within a firm, and outside firms cannot usually tell what data the firm might have. Another damaging trend that the Internet promotes is the commoditization of information. As it becomes easier to gather, process and disseminate information with contemporary information and communication technologies, it will become more difficult to garner valuable market information that is proprietary only to one firm.

On a positive note, because the Internet favors an information-oriented perspective of value creation, a firm can shift the focus of its strategy from product competition to information leveraging. Thus it makes more sense than before to outsource product manufacturing and distribution to other firms, even to firms that would be considered direct competitors if products were strictly considered the basis of competition. The information efficiency of the Internet should enable more firms to follow this approach, thus turning potential competitors into partners.

CONCLUSION

In this study we have explored how the conceptualization of an “industry” is changing with the advent of the information age, and particularly how the Internet is enabling this change. We first laid out a high-level framework that describes the critical features that any conceptualization of an industry tries to define: the source of firm value, the definition of a firm, the definition of an industry, and the supporting and opposing networks of related organizations. Equipped with this framework, we examined the way industrial organization economics views industries, which is based on its focus on products (physical goods or services) as the source of firm value. Drawing from the literature on the resource-based view, comparative advantage theory of the firm, knowledge and learning orientation, and the information resource, we then described an emerging view of what constitutes an industry, focusing on information as the critical resource of value. Finally, we examine how the Internet is contributing to this emerging view.

An increasing amount of research has been written on how different aspects of the competitive landscape are changing and the need to reassess strategy accordingly (Bettis & Hitt, 1995). One important aspect of the competitive landscape that has not been examined much has been the very definition of an industry, one of the most fundamental environmental variables (Sampller, 1998 is an exception). This paper presents a high-level framework for analyzing conceptualizations of industry. Such an analytical tool is important as it enables the consideration of how information as a competitive resource is changing traditional conceptualizations. Moreover, although there has been a large amount of work on how the Internet can be used for competitive advantage (see Dewan, 2000; Piccoli, 2001 for recent examples), there has not been much work specifically on how the Internet is changing the very conceptualization of what constitutes an industry. This paper provides a valuable contribution in examining these important aspects of the ongoing change.

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