Competitor Identification for Sustainable Survival Strategies: Illustration with Supply Chain Versus Supply Chain Competition

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Abstract: We describe a methodology for identifying competitors from first principles, drawing on the ecological niche theory which stipulates that competition arises from the dependence of interacting entities on the same limiting resources or, in ecological terms, from overlap in their niches. Depending on the context, the entities of interest may be species, products, firms, countries, or supply chains. We discuss the concepts of niche breadth and niche overlap and provide a mathematical expression for computing the competitive effects of interacting entities on one another from niche breadth and overlap measures. We illustrate the competitor identification procedure with simulated data mimicking a situation where supply chains compete over logistics modes on which they rely for moving goods from point to point. Competition identification is invaluable to business sustainability as it allows the entities involved to remain sustainable and persist in a competitive environment by crafting effective strategies that allow them to continuously adapt to changes and mitigate the negative impacts of competition.

Keywords: competitive advantage ecological niche; niche breadth; niche overlap; supply chain competition

1. Introduction

Competitor identification is essential to business sustainability and essential for gaining competitive advantage. In the business literature, it had been reasonably unproblematic to identify firms that compete against one another in a typical product-based or company-based competition. However, the notion that competition in the digital age is not only product- or company-based but also network-based takes the competitor identification process to new levels of difficulty. The range and types of relationships businesses and organizations must maintain and navigate to meet operations and performance targets makes it difficult for firms and corporations to keep track of who their competitors are. Further, as relationships between manufacturers, intermediaries and end-customers change, moving from physical locations to digital spaces, competitor identification within the business environment has become even more complicated. One of areas where such complexity abounds is the supply chains of companies and their interactions with supply chains of other companies, suppliers as well as service providers. Approaches to identifying competitors have always been of interest to scholars and analysts and several methods have been proposed to this end [1]. However, with a more accessible global business environment due to the ease of communication and movement, usual competitor identification methods become problematic. In this paper, we propose an approach to competitor identification from first principles, drawing on the ecological niche theory. Before delving into the details of our proposed method, a review of existing literature is in order.

A variety of methods have been proposed [1,2]. For example, Dixit [3] and Digby and co-workers [4] identify competition by means of differentiation with regard to the
country of origin of goods and services. However, with a more accessible global business environment due to the ease of communication and movement, identification methods using country of origin as an identifier of competition become problematic as many national labels and brands from a specific country are now manufactured in other countries outside its country of origin, e.g., Volvo cars. Easton [5] advocates the attenuation and the sector models which relate to the structure of the industry as a rationalization for differentiating competitors. The attenuation model assumes that competitors differ in terms of their activities in the market and hence, in their market share. As the activity of firms in the market reduces, a threshold point is reached beyond which firms are no longer perceived as competitors. The sector model on the other hand builds on the premise that firms concentrate their activities in specific market segments or sectors and identifies firms within these sectors as direct competitors.

Along the lines of Easton, Parmerlee [6] presents three models for identifying the competition, which include: (1) discerning the competitors by identifying their product line and target market. (2) Identifying competitors by performance power in the marketplace, i.e., trying to determine the area of distribution and percentage of market share, and (3) using sales and market share performance. Using a different methodology, Peteraf and Bergen [7] suggest a market and resource-based framework of similarities between organizations to identify competitors. Wu and Olk [8] propose a dynamic identification technique where they combine several methods including a relational approach, a decision-making (cognitive) approach and a competence-based approach to identify competitors in business. Peng and Liang [9] re-emphasize the idea of similarities in capability and nature of the market in which firms operate as a way of identifying competitors. More recently, the competitive playing field has progressively moved from the physical space to the digital arena encompassing advances in digitalization and the synergies of the so-called “networked economy”. Ye et al. [10] and Varma et al. [11] underscore the increasing influence of customer ratings and reviews of products and services as the basis upon which services and products may be judged. As more products and services are offered and carried out totally online, customer online reviews, ratings, etc. becomes an invaluable point of contact about products and services for marketers, producers, and end-customers [12].

Based on this brief review, we can deduce the following. First, a competitor identification analysis within business is ultimately required for the development and enhancement of competitiveness capabilities of organizations. Second, the literature largely utilizes the concept of similarity in the process of identifying competitors based on the following two premises (e.g., [13]).

(1) Firms compete with one another in product markets to the extent that they attract the same customers.

(2) Firms are rivals, to the extent that their products satisfy the same basic customer needs.

Existing frameworks for competitor identification have principally focused on marketplace techniques. While the nature of the interactions between key players and ultimate end-customer is changing, methods for competitor identification proposed in the literature are lagging the trend. As such, the literature has offered little guidance for competitor identification outside the traditional marketplace setting of location and physical products.

In this paper, we propose a methodology for identifying competitors from first principles, which goes beyond established marketplace techniques. Given the congruence of prevailing competitor identification methods on the concept of similarity, our proposed method draws on the ecological niche theory (coexistence by resource partitioning) (see, e.g., [14]) to identify competitors from first principles. From an ecological perspective, competition within ecological communities arises from the dependence of co-occurring species on the same limiting resources in their shared environment: the scarcer a limiting resource, the fiercer the competition between species whose survival depends on that resource [15]. The niche theory provides a unifying framework for competitor identification applicable to a variety of contexts.
The rest of this paper is organized as follows: In Section 2 we describe our niche-based approach to competitor identification. More specifically, we work out a mathematical formula for estimating the competitive effects of interacting entities on each other from measures of their niche breadths and niche overlaps. In Section 3, we illustrate the implementation of the proposed methodology by applying it to the conceptualizing of supply chain vs supply chain competition, using simulated data mimicking a situation where competition results from the reliance of multiple supply chains on the same logistics modes. We devote Section 4 to a discussion and close the paper with a brief conclusion where we pinpoint the promises and limitations of the proposed method.

2. Method

The core underpinning of competition within ecological communities is the concept of ecological niche defined by Hutchison [16] as the \( n \)-dimensional space determined by the resources and conditions under which a species can maintain a viable population. The niche concept is central to ecology and determines the competition that takes place between species in a specific environment as species rely on the same resources in limited supply [17].

The range of resources on which a species can exist, i.e., the resources within the reach of a species that allow the species to survive in a given environment, determines the species niche breadth or niche width [17]. The niche breadth determines how different species utilize the available resources in their environment. Species with wider niches, tagged as generalists, are able to rely on a wide range of resources for survival, whereas specialists rely on a narrow range of resources for survival. Specialization has far-reaching implications on how effectively a species can compete or withstand competition. The intersection of two species’ niches is called the niche overlap [18]. A larger overlap between the niches of two species augurs the potential for intense competition between them. However, the competitive effect exerted by a species on another depends not only on the extent of overlap in their niches, but also on the niche breadths of the species involved [19].

From a sustainability perspective, because the environment and hence niches are constantly changing, sustainable coexistence of competing entities requires them to realize that stable coexistence results from an interaction between two opposing forces: fitness differences, which should ultimately drive the best-adapted entity to exclude others within a particular niche, and stabilizing mechanisms, which maintains diversity via niche differentiation, according to the competitive exclusion principle [20]. In line with Miller [21], we view sustainability as a constant \textit{work-in progress}; a continuous process of defining, learning and adapting to changing conditions and uncertainties, and to the unending ambition to continuously modify behavior with regard to the competitive interactions that occur between entities. Hence, we argue that the degree to which coexistence between entities is considered sustainable should be linked to the ability of competing entities to firstly, adapt, as competitors, to the changing niches. Secondly, as a result of such changes to the niche, to meet current challenges brought about by and during such competition. For competition among firms, these challenges may be economic, social or environmental.

2.1. Evaluating Competition from an Ecological Niche Perspective

Measuring competition from an ecological niche perspective requires estimates of overlap between the niches of potential competitors along with their respective niche breadths. There are many ways of measuring the breadth of a species’ niche (see, e.g., [18,22]), but Levins’ [23] index remains the most popular. For a species \( i \) depending on resources that can be in \( n \) states, the Levins’ niche breadth index is given by:

\[
B_i = \frac{1}{\sum_{k=1}^{n} p_{ik}^2}
\]  

(1)

where \( p_{ik} \) is the proportion out of all resources used by species \( i \) that consist of items in resource state \( k \) or the frequency of utilization of resource in state \( k \) by species \( i \). Levins niche breadth measure (1) is the reciprocal of the Simpson’s diversity index. Unlike
specialists, generalists have broader niches as they use resources in different states with less discrimination, whereas specialists focus on few resource states. At one extreme, the niche breadth of a generalist that indiscriminately uses resources in all states so that $p_{ik}^2 = 1/n^2$ for $k = 1, \ldots, n$ is exactly $n$. At the other extreme, the niche breadth of a specialist that only uses resources in a single state is one. A standardised version of Levins’ niche breadth measure on a scale from zero to one is:

$$\hat{B}_i = \frac{B_i - 1}{n - 1} \quad (2)$$

Species with standardized Levins’ niche breadth $\hat{B}$ closer to zero have narrower niches and are more specialized, and those with $\hat{B}$ closer to one have broader niches and are more generalists. The overlap between the niches of species $i$ and $j$ is often measured using the following formula due to Pianka [24]:

$$O_{ij} = \frac{\sum_{k=1}^{n} p_{ik} p_{jk}}{\sqrt{\left( \sum_{k=1}^{n} p_{ik}^2 \right) \left( \sum_{k=1}^{n} p_{jk}^2 \right)}} \quad (3)$$

where $p_{ik}$ is defined as in Equation (1). Basically, $O_{ij}$ evaluates the probability that two species would use resources in the same state relative to the average probability that any of them would avoid the other (the denominator is in fact a geometric mean).

Niche overlap induces competition between species to an extent that depends on the amount of niche overlap and the niche breadths of the species involved. MacArthur and Levins [25] proposed the following formula for the competitive effect $\alpha_{ij}$ of species $j$ on species $i$:

$$\alpha_{ij} = \frac{\sum_{k=1}^{n} p_{ik} p_{jk}}{\sum_{l=1}^{n} p_{il}^2} \quad (4)$$

In essence, $\alpha_{ij}$ represents the probability of finding species $i$ and species $j$ in the same resource state, relative to the probability that species $i$ would avoid the overlap with species $j$. It is clear from Equation (4) that $\alpha_{ij} = 1$, which corresponds to complete niche overlap (the overlap of a species niche with itself). Therefore 1 is the upper bound of feasible competitive effects.

It is worth clarifying how the overlap between the niches of competitors and their respective niche breadths fit together to determine the competitive effects. Let us start by expressing the overlap $O_{ij}$ between the niches of species $i$ and $j$ in terms of the competitive effect $\alpha_{ij}$ of species $j$ on species $i$ and the niche breadths of the two species. To do this, we re-write the Equation (3) as

$$O_{ij} = \frac{\sum_{k=1}^{n} p_{ik} p_{jk}}{\sum_{k=1}^{n} p_{ik}^2} \times \sqrt{\frac{\sum_{k=1}^{n} p_{ik}^2}{\sum_{k=1}^{n} p_{jk}^2}}$$

and note that the first and second term on the right-hand side of Equation (5) are nothing but the competitive effect $\alpha_{ij}$ of species $j$ on species $i$ and the square root $\sqrt{\hat{B}_j/\hat{B}_i}$ of the ratio of the niche breadth of species $j$ to that of species $i$, respectively [19]. That is, $O_{ij} = \alpha_{ij} \times \sqrt{\hat{B}_j/\hat{B}_i}$, from which it follows that:

$$\alpha_{ij} = O_{ij} \times \sqrt{\hat{B}_j/\hat{B}_i} \quad (6)$$

Equation (6) establishes the dependence of the competition intensity on the overlap between the niches of potential competitors and the breadths of their respective niches.
2.2. Operationalization of Supply Chain versus Supply Chain Competition

The traditional context for similarity comparisons involves goods/products, customers, and markets and locations. However, along the supply chain and the competition that occurs therein, it is not readily obvious as to which type of customers a given supply chain will or intends to attract. Likewise, the end product of a supply chain can be difficult to determine when looking from a position three or more steps of the final product from the end-customers. Hence, the supply chain vs. supply chain competition framework presents complications for competitor identification. Even though competition is known to be important for economics and business, competition does not exist as a state of nature. Economic presumptions suggest that if buyers and sellers do not act in ways that creates pressure on others to innovate and improve, the gains of competition may never be achieved. In other words, competition must be created. In reference to this, Porter [26] affirms that the level of competition in a marketplace is neither determined by luck nor by coincidence, but rather by the dynamic participation of entities in the market. This participation is largely assumed to be carried out in the supply chain via interactions among entities of specific supply chains [27]. For competition identification as proposed here, supply chains are conceptualized to compete as whole entities and not as single units of suppliers, service providers, etc. because competition in one part of the supply chain affects other parts of the same supply chain. While it is possible for suppliers to enter into competition to supply a large manufacturer, such intra-supply chain competition works to the benefit of the supply chain while the struggle for scarce resources by supply chains that require the same resources at the same point in time to further their value creation activities does not necessarily benefit the supply chain if the competitive effect on it are considerable. The later form of supply chain competition is what is referred to as supply chain vs. supply chain competition in this study.

3. Illustrative Example

In this section, we illustrate the value of the ecological niche theory for competitor identification with computer-simulated data mimicking a situation where competition among four supply chains results from overlap in logistics mode utilization (see, e.g., [28]). More specifically, suppose that four hypothetical supply chains herein identified as SC1, SC2, SC3 and SC4 overlap in their utilization of four logistic modes namely, Road, Air, Rail and Sea.

We assume that each supply chain, on average, utilizes these modes in the following proportions: (0.63, 0, 0.12, 0.25) for SC1; (0.34, 0.45, 0.11, 0.10) for SC2; (0.34, 0.45, 0.11, 0.10) for SC3; and (0.12, 0, 0.08, 0.80) for SC4. Figure 1 displays boxplots summarizing the distributions of simulated proportions of logistic mode utilization by the four supply chains. It is worth emphasizing that these figures have been generated randomly for illustrative purposes with no pretense to reflect any real-world situation.

Table 1 shows Levins’ niche breadth measures $B_i$ of the four supply chains and standardized counterparts $\hat{B}_i$ resulting respectively from Equations (1) and (2) based on the simulated data whose empirical distributions are displayed in Figure 1.

The results shown in Table 1 reveal significant differences between the niche breadths of the four hypothetical supply chains. SC2 utilizes the broadest range of logistics resources in order to carry out its value creation activities, followed by SC3, while SC4 relies on the narrowest range of logistics resources. We can flag SC2 and SC3 as generalists as they rely on broader niches in contrast to SC4, which specializes on a narrower range of the niche space. Specialization has important implications for competitive efficiency.
Table 1. Niche breadth as estimated for the supply chains.

|       | SC 1 | SC 2 | SC 3 | SC 4 |
|-------|------|------|------|------|
| Breadth ($B_i$) | 2.11 | 2.94 | 2.30 | 1.51 |
| Standardized ($\hat{B}_i$) | 0.37 | 0.65 | 0.43 | 0.17 |

Pianka’s [24] overlap measures for logistic mode utilization patterns among the four supply chains appear in Table 2.

Table 2. Estimates of overlaps in logistic resource utilization patterns among supply chains.

|       | SC 1 | SC 2 | SC 3 | SC 4 |
|-------|------|------|------|------|
| SC 1 | 1    | -    | -    | -    |
| SC 2 | 0.63 | 1    | -    | -    |
| SC 3 | 0.56 | 0.48 | 1    | -    |
| SC 4 | 0.51 | 0.27 | 0.29 | 1    |

Since the overlap is largest between the niches of supply chains 1 and 2 and smallest between those of supply chains 2 and 4 according to the overlap measures shown in Table 2, one would expect the competitive effects between supply chains 1 and 2 to be larger relative to the corresponding effects between supply chains 2 and 4. However, according to Equation (5), the actual extent of competitive effects depends not only on the overlap in resource utilization patterns among competitors, but also on the niche breadths of the involved competitors. Table 3 shows the competitive effect across supply chains, with the entry $\alpha_{ij}$ in row $i$ and column $j$ representing the effect of the supply chain whose name appears in column $j$ on the one whose name appears in row $i$.

Table 3. Estimates of the mutual competitive effects among supply chains, with the value $\alpha_{ij}$ in row $i$ and column $j$ representing the competitive effect of the supply chain whose name appears in column $j$ on the one whose name appears in row $i$.

|       | SC 1 | SC 2 | SC 3 | SC 4 |
|-------|------|------|------|------|
| SC 1 | 1    | 0.53 | 0.54 | 0.60 |
| SC 2 | 0.74 | 1    | 0.54 | 0.38 |
| SC 3 | 0.58 | 0.42 | 1    | 0.36 |
| SC 4 | 0.43 | 0.20 | 0.24 | 1    |
According to Equation (6) which follows from Equations (1) and (2) and MacArthur and Levins’s [25] formula for competition coefficient (Equation (4)), the competitive effect of one supply chain on another is proportional to the niche overlap. If the niche breadths of the competitors are equal, then the competitive effect is symmetric and equal to the niche overlap. In most cases though, the niche breadths would widely differ among competitors, and following from Equation (6), the competitor with the narrowest niche (the specialist) would be better off. This is because the ratio $B_i / B_j$ of the niche breadths of the specialist $i$ to that of its competitor $j$, and hence the square root of this ratio which appears on the left-hand-side of Equation (6) will be smaller, and vice-versa. Considering for instance the competitive effects of supply chains 2 and 4 on each other displayed in Table 3, supply chain 2 has a broader niche with standardized niche breadth 0.65, while the niche of supply chain 4 is relatively narrow with standardized niche breadth 0.17. The overlap between the niches of the two supply chains is 0.27 (Table 2). However, the competitive effect of supply chain 2 on supply chain 4 is 0.20, which is roughly twice as small as the effect (0.38) of supply chain 4 on supply chain 2. This corroborates the benefit of specialization in a competitive environment as a strategy for mitigating competition. To further exemplify the connection between niche overlaps, niche breadths and competitive effects, Figure 2 shows on the $z$-axis the competitive effect of a hypothetical supply chain 2 on another hypothetical supply chain 1 when the niche overlap between the two supply chains is 0.20 and the niche breadths of the two supply chains assume different value appearing on the $x$- and $y$-axis.

![Figure 2](image)

**Figure 2.** Competitive effect $\alpha_{1,2}$ of supply chain 2 on supply chain 1 ($z$-axis) as a function of the niche widths $B_2$ and $B_1$ of supply chains 2 and 1 appearing on the $x$- and the $y$-axis, respectively. The overlap between the niches of the two supply chains is 0.20.

According to Equation (6), $\alpha_{1,2}$ is proportional to $\sqrt{B_1 / B_2}$. The interplay of the niche breadths of the two competitors in determining the competitive effect experienced by supply chain 1 is obvious from Figure 2. The competitive effect on supply chain 1 increases as its niche breadth gets larger and/or the niche breadth of supply chain 2 gets smaller.

4. Discussion

Identifying competitors and evaluating their negative impacts is critical to the design of effective strategies for the survival and resilience of the entities involved in competitive interactions. Depending on the context, the competing entities may be species [29,30], firms, or supply chains [27]. In this paper we proposed a methodology for identifying competitors from first principles drawing of the ecological niche theory. We worked out a mathematical formulae for assessing the competitive effects experienced by a given entity from measures of its niche breadth and overlaps between its niche and the niches of competitors, and demonstrated the interplay of niche breadths and niche overlaps in regulating the intensity of competitive effects experienced by potential competitors.
Porter [31] theorized that effective strategic decision-making in business requires an understanding of both the competitive forces at play and the overall industry structure. In Porter’s model, industry competition is shaped by five forces including, the competitive rivalry, the bargaining power of suppliers, the bargaining power of customers, the threat of new entrants, and the threat of substitute products or services. Competitive rivalry is the first of Porter’s Five Forces framework, making competitor identification essential to the design of effective business strategies. After the relevant axes of the shared niche space between rival businesses have been identified, the method proposed here provides the tools required for measuring niche breadths and overlaps and estimating ensuing competitive effects experienced by each business. Established businesses may be negatively impacted by new entrants struggling to fit in the niche space as this may cause a depletion of the market share of established businesses.

Once the competitor identification phase is complete, the next step is to implement appropriate strategies to adjust and ideally take advantage of the competition. Porter [32] identifies focus and differentiation as important strategies to this end. In our proposed framework, focus or specialization entails a reduction of the niche breadth by investing most effort in areas of competitive advantage, while differentiation implies a reduction of overlap with competitors’ niches by exploiting unchartered niche territories. Both of these strategies can be used to reduce the competitive impact of an entity, say the \( j \)-th entity on the \( i \)-th entity from say the \( j \)-th entity which, according Equation (6), is proportional to the product \( O_{ij} \times \sqrt{B_i} \) of the overlap between the niches of the two entities by the square root of the \( i \)-th entity’s niche breadth and inversely proportional to the square root \( \sqrt{B_j} \) of the \( j \)-th entity’s niche breadth.

In today’s environment, it is crucial for businesses to realize that competition is already occurring along such complex structures as the supply chains. Knowing potential competitors along the supply chain will allow for effective evaluation of the processes involved in managing the supply chain e.g., demand management, procurement, scheduling, manufacturing. The method presented here provides managers with an effective approach to identifying their potential competitors to various degrees, observe changing market preferences by identifying close competitors and their offerings including service quality and, based on these, develop effective marketing strategies. Thus, identifying potential competitors has extensive implications for firm’s bottom line and profit.

The illustrative example provides some insights into supply chain versus supply chain competition. The reduced number of logistics modes available to supply chains in the many territories that they must cross and the subpar conditions of many existing logistics modal infrastructures imply that many more supply chains are expected to overlap where there are viable and functioning logistics modes for moving goods and services from one point to another. These interactions are expected to amplify the competition between supply chains. Thus, researchers in business, logistics and supply chain management can use the method presented here to evaluate prospective problems of magnified competition beforehand or to deal with such problems when they become relevant. Two supply chains with extensive niche overlap may coexist by specializing in distinct areas of their fundamental niche space, a phenomenon known in the ecological literature as resource partitioning [33]. For example, when supply chains specialize in rail transportation, their customers and end-users might experience larger fractions of extended lead times for deliveries. This in turn would suggest that such supply chains specialize in this mode of transport by offering low-cost transportation which could result in an overall expansion of the market for lower total logistics cost solutions. In contrast, when supply chains specialize in partnering with high-end suppliers and Original Equipment Manufacturers (OEMs), their supply chains might show lower default rates in the supply chain processes they undertake. This could suggest that they seek to specialize by becoming better at identifying top quality supply chain partners for their supply chain processes, rather than by lowering the overall logistics or transportation costs. As such, when two supply chains evolve in slightly different niches, disparities in intrinsic limiting factors supersede competitive effects.
Being a different form of competition, supply chain vs. supply chain competition presents significant challenges regarding identification, rules of engagement and policy. These challenges stem essentially from the changing paradigm of competition as it applies to supply chains [34], and the need for regulation to adjust to this paradigm shift. Competition is important, and even necessary for developing and increasing standards of living. Thus, for supply chain vs. supply chain competition, regulatory and pragmatic guidelines that are sensitive to inter-industry differences in relation to the main drivers of competitiveness in different industries would be worthwhile in further understanding this new form of competition.

Competitor identification has far-reaching implications for supply chain sustainability. The design of effective strategies for survival and resilience in a competitive environment rests on the ability to identify competitors and their areas of competitive advantage. In today’s competitive business era, supply chains may collaborate for sustaining competitive advantage and ensuring efficiency and responsiveness [35]. In doing so, they need to identify as a group who their competitor would be.

5. Conclusions

Business sustainability in a competitive environment entails the ability of a focal business to maintain a viable level of activity by adopting managerial strategies that alleviate the negative impacts of competition. In a constantly changing environment, sustainable business are those that are able to adapt to changes and uncertainties so as to keep up and ideally take advantage of the competition. The changes in the environment may be gradual or unexpected like the COVID-19 pandemic which has negatively impacted supply chains [36]. Competitor identification will allow organizations to adjust their strategic agenda of actions to the level of competition they face.

While the competitor identification method presented in this paper is applicable to any context, it suffers from a few limitations worth mentioning. First, the mathematics involved in the evaluation of niche breadths, niche overlaps and competitive effects may be unwieldy, particularly when dealing with continuous niche axes in which case the integrals involved may be analytically intractable, calling for numerical approximation techniques. Therefore, the simplicity of our illustrative example should not eclipse the difficulty of applying the methodology in general settings. Second, real-world data on resource utilization by competing entities are often difficult to obtain, which explains our reliance on computer-simulated data in the illustrative example of supply chain vs supply chain competition. While real data are becoming increasingly available due to extensive digitization of supply chains, they are still considered strategic for obvious reasons. Because competition creates incentives for competing entities to specialize, or generalize, it would be interesting to further explore the strength of relationships across the supply chain to identify whether a supply chain is, on average, specializing or generalizing. This general classification can have market share implications for potential competitors along the supply chain. Once the data on resource utilization by different supply chains are available, the method presented in this paper provides a straightforward and practical approach to identifying potential competitors.

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