Supply Chain Competitiveness in Food Industry: An Indonesian Case

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Abstract In this study, it is of great interest to determine the supply chain competitiveness in Indonesia. We limit our study to the food industry only, due to the facts that the food industry is a major industry in terms of its contribution to national GDP and is still lacking in its supply chain competitiveness. The objective of this paper is to present the current state of supply chain competitiveness of the food industry in Indonesia. We use four perspectives to measure the supply chain competitiveness: cost, differentiation, sustainability, and infrastructure. While cost and differentiation measure the performance perspective of supply chain competitiveness, sustainability measures the demand perspective of the future supply chain, and infrastructure is the requirement perspective of supply chain competitiveness.

Using the Analytic Hierarchy Process (AHP) and Analytic Network Process (ANP), our empirical analysis in the food industry finds that infrastructure is the most important perspective that determines supply chain competitiveness, followed by differentiation, cost and sustainability. Having learned that the infrastructure is a major constraint in Indonesia, the players in the food supply chain place more emphasis on differentiation rather than on cost in creating their supply chain competitiveness. Our calculation using 12 criteria from the four perspectives shows that the food supply chain in Indonesia is highly competitive with the weight factor of 0.825. These findings suggest that even in markets lacking good logistics infrastructure, the players in the supply chain can still be competitive.

1 Introduction

In today's globally fierce competition, companies are extremely pressurized to improve their product quality, product variety and responsiveness to satisfy customers' requirements. At the same time, in order to secure profitability, they need to respond all pressures by being able to reduce production cost, shorten lead time, and

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eliminate all forms of waste. However, for companies in a developing country like Indonesia, competitiveness becomes too great to pursue.
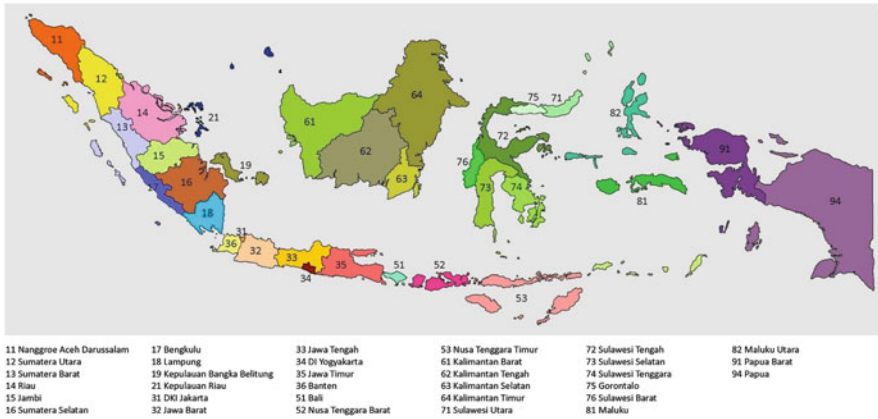
In this study, it is of great interest to determine the supply chain competitiveness in Indonesia. We limit our study to the food industry only; due to the fact that the food industry is a major industry in terms of its contribution to national GDP and is still lacking its supply chain competitiveness. It is reasonable to argue that the food industry, especially in the context of Indonesia, is an appropriate choice for this investigation. Several reasons can be highlighted: a large number of suppliers, the importance of optimizing the process and cost reduction initiatives, product differentiation, globalisation effects that increase food supply chain complexity and contribution of the food industry to the national economy.

We applied four perspectives to measure the supply chain competitiveness, i.e., cost, differentiation, sustainability and infrastructure, applying the analytic hierarchy process (AHP) and analytic network process (ANP). The AHP model was developed and validated. Data from eight case companies were used in the model, to illustrate the application of the diagnostic tool. This chapter is structured as follows. Firstly, Indonesia and the importance of the food industry are presented, including two illustrative short case studies. This is followed by the literature review which is focused on supply chain competitiveness and performance. The third part describes the process of model creation, which is followed by model validation. Results from the empirical work are discussed and concluding remarks are written.

2   Indonesia

Indonesia is the largest archipelago country in the world that is composed of over 17,000 islands (Fig. 1), 300 languages, and over 100 cultures. It is the fourth most populous nation in the world after China, India and the United States. About 60 % of the population resides in Java, the centre of the country's economic and political power; the total population is over 237.6 million people (BPS-Statistics 2012). The motto of the country is "*Bhinneka Tunggal Ika*", meaning "Strength through Diversity". The 'glue' that binds the people together is Bahasa Indonesia, the national language, and Pancasila, the national philosophy, which stresses the doctrine of unity and universal justice for all Indonesians (State Secretariat of the Republic of Indonesia 2010). Formal Bahasa Indonesia is expected to be used in every business communication. Newspapers and television news also use formal Bahasa Indonesia. English may be spoken in international and high-level business contexts in large cities, for example, in Jakarta, the capital city of Indonesia. The currency of Indonesia is the Rupiah; 1 GB pound sterling is worth around 14,641 rupiah (Bank Indonesia 2012).

The main exports of Indonesia are oil & gas, coal, copper ore, palm oil, coffee, tea, tobacco, cocoa beans, shrimp, tuna, plywood and garments. The major imports are capital goods, transport/motor vehicles for industry, machinery for special

11 Nanggroe Aceh Darussalam	17 Bengkulu	33 Jawa Tengah	53 Nusa Tenggara Timur	72 Sulawesi Tengah	82 Maluku Utara
12 Sumatera Utara	18 Lampung	34 DI Yogyakarta	61 Kalimantan Barat	73 Sulawesi Selatan	91 Papua Barat
13 Sumatera Barat	19 Kepulauan Bangka Belitung	35 Jawa Timur	62 Kalimantan Tengah	74 Sulawesi Tenggara	94 Papua
14 Riau	21 Kepulauan Riau	36 Banten	63 Kalimantan Selatan	75 Gorontalo	
15 Jambi	31 DKI Jakarta	51 Bali	64 Kalimantan Timur	76 Sulawesi Barat	
16 Sumatera Selatan	32 Jawa Barat	52 Nusa Tenggara Barat	71 Sulawesi Utara	81 Maluku	

Fig. 1 Map of Indonesia. *Source*: BPS-Statistics (2009)

industry, rice, fertilizers, cement, petroleum products, iron and steel (BPS-Statistics 2009). In 2008, the export of products from Indonesia to the United Kingdom was worth 986.5 million GBP (9,855.3 million GBP for the European Union) while the import of products from the United Kingdom was worth 680.8 million GBP (6,734.1 million GBP for the European Union) (BPS-Statistics 2009). Most exports from Indonesia go to Japan (17,692.3 million GBP) while most imports are from Singapore (13,895.2 million GBP)—(note: the exchange rates used are 0.6448 GB pound sterling for 1 US dollar, Bank Indonesia (2012)). The large number of islands means that there is more water than land, which makes managing supply chains very challenging.

2.1   The Importance of the Food Industry in Indonesia

The food industry is a very important contributor to the economy of Indonesia, estimated to represent 33.61 % of Gross Domestic Product (GDP) of the total Manufacturing Industry (BPS-Statistics 2011). Given the importance of the food industry to the Indonesian economy (see Table 1), finding ways to improve this supply chain is important, because improving this industry would bring positive benefits to the economy of Indonesia.

The main stakeholders of the food supply chain in Indonesia generally consists of local producers (e.g. farmers), food manufacturers, logistics (i.e., local and national-wide distributors), retailers (traditional markets and modern retail channels) and end-customers. Major food products are prepared food and beverages, cereals, tobacco and betel, fish and vegetables; these food products represent 70 % of consumer expenditure for food (BPS-Statistics 2010). The other food products are tubers, meat, eggs and milk, legumes, fruits, oil and fats, beverages and miscellaneous food items.

Table 1 The contributions of manufacturing sectors to the gross domestic product (GDP) of Indonesia (billion rupiahs)

No.	Sector	2006	2007	2008	2009	2010	2010 (%)
1	Food, beverage & tobacco	212,738	264,101	346,186	420,363	465,368	33.61 %
2	Textile, leather goods & footwear	90,117	93,598	104,830	116,547	124,204	8.97 %
3	Timber & forestry products	44,603	54,881	73,196	80,198	80,542	5.82 %
4	Paper & printed products	39,637	45,403	51,912	61,155	65,822	4.75 %
5	Fertilizer, chemical & rubber goods	94,079	110,770	154,117	162,879	176,212	12.73 %
6	Cement & non metal quarry products	29,013	32,814	40,179	43,531	45,515	3.29 %
7	Base metal, steel & iron	20,687	22,908	29,213	26,807	26,854	1.94 %
8	Means of transport, machine & equipment	209,460	254,278	329,912	346,403	389,600	28.14 %
9	Other goods	7,111	7,577	9,126	9,818	10,524	0.76 %
	Total	747,444	886,330	1,138,670	1,267,700	1,384,640	100 %

Source: BPS-Statistics (2011)

The food industry suffered heavily when an economic crisis occurred in Indonesia in 1997/1998. This is because consumer purchasing power declined and the food and retail industry faced a major decline in sales (Data Consult 2007; Bank Indonesia 2011); it took many years before sales increased to the normal level. Food processing industries were among the hardest hit by an increase in production and logistics costs.

Data Consult (2011) reported that despite the global financial crisis, Indonesia has been able to avert the impact of global financial woes and grow steadily with an annual economic growth of more than 6 % in the past 3 consecutive years after the 2008 crisis. A stable government and a pro-market economy have helped to improve macroeconomic conditions, e.g., stable exchange and inflation rates, although global recession was still affecting Indonesia. For example, government initiatives to simplify procedures and reduce bureaucracy helped to reduce manufacturing costs, which were increasing because of soaring oil prices. Low interest rates also helped businesses to grow and increased consumer spending. Therefore it is reasonable to assume that the retail trade has begun to revive and the demand for retail goods, including foods, has increased.

The retail industry is very important in the food supply chain because most consumers buy food through retailers. There are two types of retailers in Indonesia,

i.e., traditional retailers and modern retailers. Traditional retailers consist of traditional markets (called *pasar*) and traditional stores (called *warung*). Here, the sellers gather (usually) in the morning, in a rough, temporary structure or building provided by the local authority and perform transactions with buyers from nearby area. Prices are not usually marked and often buyers have to bargain to get the best price. Modern channels (e.g., supermarkets, wholesalers and mini markets) usually have a fixed price and are located in strategic areas, which are easily accessed and offer a better shopping experience. In Indonesia, traditional retailers have 70 % of the market share and modern retailers have a share of 30 % (Data Consult 2007). This means that traditional retailers still play an important role in the retail business in Indonesia although Data Consult (2007) reported that modern retailers continue to expand with new retailer outlets in cities all over Indonesia. Most modern retailers, including both local and foreign companies, are located in Java, the most densely populated island of the country (Data Consult 2007).

There is a trend for players of modern retailers to practice food commoditization, for example, by selling private label products, to boost profitability through efficiency. Of course, this current practice offers a serious threat to local food producers. Arguably, decommoditization of the product may play an increasing role in the future as an alternative strategy for food producers to differ from their competitors. Differentiation strategy is also compatible with the demand factor coming from people who love to eat.[1] Short case no 1 illustrates the special case of food commoditization in the food industry in Indonesia.

> **Short Case 1**
> **Food Commoditization: A Threat to Supply Chain Competitiveness?[2]**
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> Efficiency is a strategy many companies use these days because of the pressure of market changes, intensity of global competition and increasingly savvy buyers which have led to a shortened product life cycle and increases in pressure on the profit margin of a company. Efficiency helps to maintain competitiveness by enabling companies to sell products with cheaper prices and to remain attractive in the eyes of customers.
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> Chasing cheap prices can indeed help companies to have a very strong position in the market. But this option may not be suitable for all companies, as there is the possibility of a conflict between business strategy and
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> (continued)

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[1] Indonesia is like typical countries in the region where food establishments are all over the place, especially in the big cities. The food supply chains are reliant on people's appetite of food. In all modern shopping malls, there are always many food courts offering many kinds of foods, from local Indonesian food to Oriental and Western food. Not only in the food courts do people enjoy the food but they can also go anywhere else with cheaper prices. This strong demand factor helps food supply chains remain competitive in spite of poor infrastructure.

[2] This case is developed based on the co-author, Elliot Simangunsong's research in 2008 and 2012.

efficiency activities. Efficiency efforts may also contain another serious risk, i.e. the commoditization of the product. Commoditization is a process where competitive differentiation of a product is dynamically eliminated and has a negative impact on the profitability of the company. For example, when a product that an enterprise produces can also be produced by other companies, then commoditization of the product occurs, which makes price the main factor in choosing a product.

Food products in Indonesia are increasingly vulnerable to commoditization. One of the major causes is an increasing presence of private label in modern retailers. Private label is defined as generic product offerings, usually produced by the retailers, that compete with local brand counterparts by means of a price-value proposition. Indonesia, the fourth most populous country in the world with a low income, is a potential market target for cheap private label food products. An interview with a purchasing manager of a major retailer in 2008 showed that private label items, i.e., products with plain packaging and cheaper prices, were becoming more important for them to gain more sales and market share. She gave an example how in 2008 they already have 500 products of private label and a target of 200 new private label products for the following year. An executive director of a major processed food, in an interview with the author] in February 2012, expressed his concern about market pressure of these private label products against his company products offering.

Arguably, modern retailers in Indonesia will continue to push more and more private label products to the market because they represent high margins and the promise of profitability with little to no marketing effort. The growing popularity of private label products brings challenge to local food producers on how to differentiate their products and avoid products commoditization.

Business ethics is another problem in the food supply chains in Indonesia. At the normative level, all players in the supply chain should include business ethics in building a strong relationship with others; in practice that is not the case. For instance, a monopolistic foreign supplier heavily dominates the buyer-supplier relationship in which the supplier exploits the buyer through price. The other case illustrates a business cartel practiced by transportation service companies. They can change the price easily for no particular reason. Short case no 2 provides an example of such an issue.

Short Case 2
Business Collusion in Food Supply Chains in Indonesia[3]

Complexity in a supply chain exists because of two unique characteristics within the boundaries of the supply chain: firstly, the number of components and type of organisations involved in a supply chain; secondly, the interdependent nature of interactions between components that potentially produces complex behaviour (Amit et al. 2005). The food industry in Indonesia is an example of a complex, interconnected system with a large variety of relationships. It is common in food supply chains, organisations may play different roles in different chain settings and therefore collaborate with differing chain partners, who may be their competitors in other chain settings. For example, hypermarket retail is a supplier of local-traditional retailers, but in another context are competitors (traditional retailers usually have advantage in terms of proximity to the target customer).

The complexity of the food supply chain in Indonesia may also initiate another issue, i.e., parallel interaction, as discussed in a study by Wilding (1998). Parallel interaction, in terms of collusion of suppliers, increases uncertainty in the supply chain. Ellis et al. (2010) explains that collusion of suppliers would increase vulnerability of a supply disruption because sourcing organizations are not in a position to easily switch suppliers. Moreover, suppliers who collaborate in terms of price-fixing, for example, would effectively prohibit free market competition and put buyers in a disadvantaged position. Price-fixing may also raise ethical issues such as promoting anti-competitive business practices.

It is interesting to note that the eight respondents in our interviews in 2012 have faced these issues regularly in their supply chains. One of the reasons is the lack of a number of suppliers, and these suppliers control the market. The other reason is infrastructure problems (mainly transportation) that enable suppliers to speculate in the market. It is reasonable to conclude, at least in the context of food supply chains in Indonesia, that power in a supply chain is one of the key elements that affects the balance in buyer-supplier relationships, and the balance of power could be changed because of parallel interaction issues. Ethical issues, such as price fixing, are also identified in the interview, as a result of the approaches employed by the supply chain members to change the balance of power to their advantage, and may reduce overall supply chain competitiveness.

With all the strategic importance of the food industry to the Indonesian economy, it is of great interest to examine how strong the food supply chain is. The objective of this paper is to present the current state of supply chain competitiveness

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[3] See Footnote 2.

of the food industry in Indonesia. From the current picture of the competitiveness, any stakeholder in the food industry can take more justified actions in strengthening the supply chain competitiveness.

3 Literature Review

This literature review section briefly covers two interlinked topics. Firstly the importance of the food industry in the global context is discussed, then supply chain competitiveness and performance are overviewed.

Webster (2001) explains that the food supply chain generally consists of primary producers (e.g. farmers), food manufacturers (e.g. dairy, ice cream, and bakery manufacturers), distributors, retailers and end-customers. In addition to these primary players, a food supply chain also includes other participating partners such as packaging companies, third party logistics providers, or shipping companies. Maloni and Brown (2006) find that the food industry is an extremely complex supply chain, where the path of a specific food product may vary. Reiner and Trcka (2004) also find that supply chains within the food industry have different structures from each other, which require detailed analysis in evaluating the possible improvements of the supply chain. Another important characteristic of the food industry is the high frequency of the new product (Fisher et al. 1994; Beer 2001; Maloni and Brown 2006); this increases choice for consumers and initiates uncertainty related to product issues such as high product failure rates, short product life cycles and high inventory holding costs.

Food supply chains have also become global (Beer 2001); for example, nowadays it is common to buy food which originates from other countries in a local supermarket. One can buy rice which originates from Thailand or chocolate from Belgium. The global nature of food supply chains, with all of the complexity and uncertainty of global supply chains, means that there is a particular need for management techniques to improve the competitiveness of the food supply chain.

It is widely believed that in this interconnected global economy, the competition is no longer between companies, but between supply chains (Schorr 1998). Continuous improvement in an enterprise with collaborative and strong relationships among players within the supply chain becomes mandatory for any supply chain to stay competitive. Hence, supply chain competitiveness becomes a common objective for any company to pursue. The challenge of this work is how to measure accurately the competitiveness of a supply chain. Previous works have included performance measurement in supply chain. Beamon (1999) identifies three types of performance measures: resources, output, and flexibility. Gunasekaran et al. (2001) develop a framework for respectively measuring the performance from strategic, tactical, and operational levels in supply chains; this framework deals mainly with supplier, delivery, customer service, and inventory and logistics costs.

Most critics of existing performance measurement in SCM suggest that they are financially focused, encourage local optimization, and fail to support continuous improvement (Holmberg 2000; Kaplan and Norton 1992; Toni and Tonchia 2001).

Several works consider flexibility as a determinant factor of supply chain competitiveness. Duclos et al. (2003) use six dimensions for measuring flexibility: production system, market, logistics, supply, organizational and information systems. Swafford et al. (2000) and Pujawan (2004) use four dimensions for assessing supply chain flexibility: sourcing, product design, manufacturing/production and delivery.

As the green issue becomes global, any company and its supply chain are pressurized to become sustainable through green initiatives. However, little work has been done to analyze the impact of a sustainable supply chain on company performance and firms' overall economic well-being (Markley and Davis 2007). A green supply chain is a sustainable enterprise that integrates social, environmental and economic responsibilities (Carter and Rogers 2008). This is also termed "the triple bottom line" (Markley and Davis 2007). Today many companies have accepted their responsibility to do no harm to the environment (Cruz and Matsypura 2009). The increased focus on the environment is significantly influencing supply chains. Environmental pressure from consumers has, in part, affected the behavior of certain manufacturers so that they attempt to minimize their emissions, produce more environmentally friendly products and/or establish sound recycling network systems. Poor environmental performance, at any stage of the supply chain process, may damage a company's most important asset—its reputation. As a result, organizations are expanding their responsibilities to include managing the corporate social responsibilities of their partners within the supply chain. Carter and Rogers (2008) propose that supply chain management is in an "outstanding position" to impact industry green practices. For example, the relationship with chain partners may initiate efforts to reduce packaging, improve working conditions in warehouses, use more fuel efficient transportation, and introduce a code of conduct for suppliers to understand the environmental impact of economic activity in the supply chain.

While most studies in supply chain performance have focused on developing and proposing frameworks to measure supply chain performance, there is also a need to analyse the effectiveness of any proposed performance measurement system in different supply chain contexts (Cuthbertson and Piotrowicz 2011). To understand how a supply chain performance measurement system has developed and is used, there is a need to capture its context, process and content.

The challenges for supply chain competitiveness in Indonesia are mainly referred to logistics. A recent study has reported that companies operating in Indonesia face difficulties to gain competitiveness due to the high cost which is mainly caused by poor logistics performance (Arvis et al. 2010). According to the report, the logistics performance index (LPI) of Indonesia is 2.76 (out of 5) in 2010 and dropped from 3.01 in 2007. This result is more or less in accordance with the Global Competitiveness Index for Indonesia which is 4.4 out of 7.0 (Geiger 2011).

There are six dimensions used in calculating LPI: (1) efficiency of customs clearance process, (2) quality of trade and transport-related infrastructure, (3) ease of arranging competitively priced shipments, (4) competence and quality of logistics service, (5) ability to track and trace consignments and (6) timeliness. Therefore it is of great interest to determine the supply chain competitiveness in

Indonesia. In this paper, we limit our study to the food industry only, due to the fact that the food industry is a major industry in terms of its contribution to national GDP and is still lacking in its supply chain competitiveness.

4 Methodology

Measuring supply chain competitiveness, by its nature, is a Multi-Criteria Decision-Making (MCDM) problem. When dealing with MCDM problems, it is commonly assumed that decision makers can assign accurate weights to criteria and scores to alternatives with respect to each criterion. In practice, the evaluation process becomes difficult due to the ill-structured situations, conflicting multiple objectives from players within the supply chain and imprecise information used by them for making a judgment. The intent of the decision-making process is then to provide decision makers with an insight into their preferences as they relate to the relative priority which they place among objectives, criteria, a set of sub-criteria, constraints and alternative decisions. In order to build a good decision-making model, decision makers will most likely use their judgment in identifying key variables explaining the objective of the decision-making problem. Decision makers also need to find the relationships between those variables. In attacking a multi criteria decision-making problem, we structure it in such a way that the objective determines the criteria and the criteria determine choices (Aziz 2005).

We develop a multi-criteria decision-making model to determine the current supply chain competitiveness of the food industry in Indonesia based on the Analytic Hierarchy Process (AHP)/the Analytic Network Process (ANP) approach. The model is built on four perspectives of supply chain competitiveness: cost, differentiation, sustainability and infrastructure. Using the ANP allows us to exercise dependence so that the supply chain competitiveness can depend on the perspectives as in a hierarchy but they may also depend on each other.

An empirical study has been completed based on eight interrelated case companies from the food sector. We conducted a semi-structured interview with top decision makers representing the whole supply chain, to obtain their judgments on determining the supply chain competitiveness (more details about sampling and interviewees is presented later in the chapter). Their judgments were then used to perform the routine pairwise comparisons in the ANP process.

The model developed based on the AHP/ANP approach was then validated. It is expected from this work that the supply chain competitiveness can be explained by its performance: responsiveness and efficiency (Fisher 1997) which are in line with two generic strategies pursued by any company in the supply chain: cost and differentiation (Porter 1980). It is also of great interest to note how the other two perspectives, infrastructure and sustainability, affect the supply chain competitiveness. Knowing how all the perspectives influence, and are interdependent on, each other will help any stakeholders in the supply chain to set the right approach to improve their supply chain competitiveness.

This research lays the foundation of determining the supply chain competitiveness using a decision-making model with interdependence among variables and imprecise information. However, further research needs to be done to accommodate the dynamics of supply chain competitiveness in the future. The refinement of the model can be done by adding more criteria and changing the degree of interdependencies among perspectives and criteria.

5 Development of the Model

As seen in Fig. 2, the first level states the objective that is to determine the supply chain competitiveness. All elements representing criteria and sub-criteria used in our model are based on existing literatures in the field of supply chain performance and current practices as well.

At the second level there are four perspectives—COST, DIFFERENTIATION, SUSTAINABILITY and INFRASTRUCTURE—that are used in determining the supply chain competitiveness. The first two perspectives, COST and DIFFEREN-TIATION, explain the supply chain performance. Any player in the supply chain can pursue competitiveness either in cost or differentiation. This choice is in line with the generic strategy any company can choose (Porter 1980). The choice in cost or non-cost for any player in the supply chain also depends on the product type, either functional or innovative (Fisher 1997). The SUSTAINABILITY perspective explains how any player in the supply chain spends some effort in assuring that their business is sustainable in the long run. The last perspective, INFRASTRUCTURE, is the requirement perspective that any supply chain is equipped with. The yearly report of the nation's logistics performance index by World Bank explains how the logistics infrastructure determines the supply chain competitiveness. At this level, we assume that each perspective depends on the other as it does in reality. For instance, there is always a trade-off between cost and differentiation, differentiation and infrastructure, and so on.

The third level in the model contains the competitiveness criteria for each perspective. Procurement, operations and transportation costs are the competitiveness criteria within the COST perspective. It is of great interest to see how players in the supply chain reduce their cost; whether it is from procurement, operations or their transportation.

The DIFFERENTIATION perspective contains availability, quality and service level. In the food's supply chain, any players can attach more importance either to availability, quality or service level. As the pressure on companies to become more green becomes inevitable, the supply chain is also pressurised to become more green. Also, increased business ethics and corporate social responsibility become demanded more of companies in Indonesia. These green, business ethics, and social responsibility related issues are within the SUSTAINABILITY perspective. The INFRASTRUCTURE perspective will guarantee the supply chain competitiveness
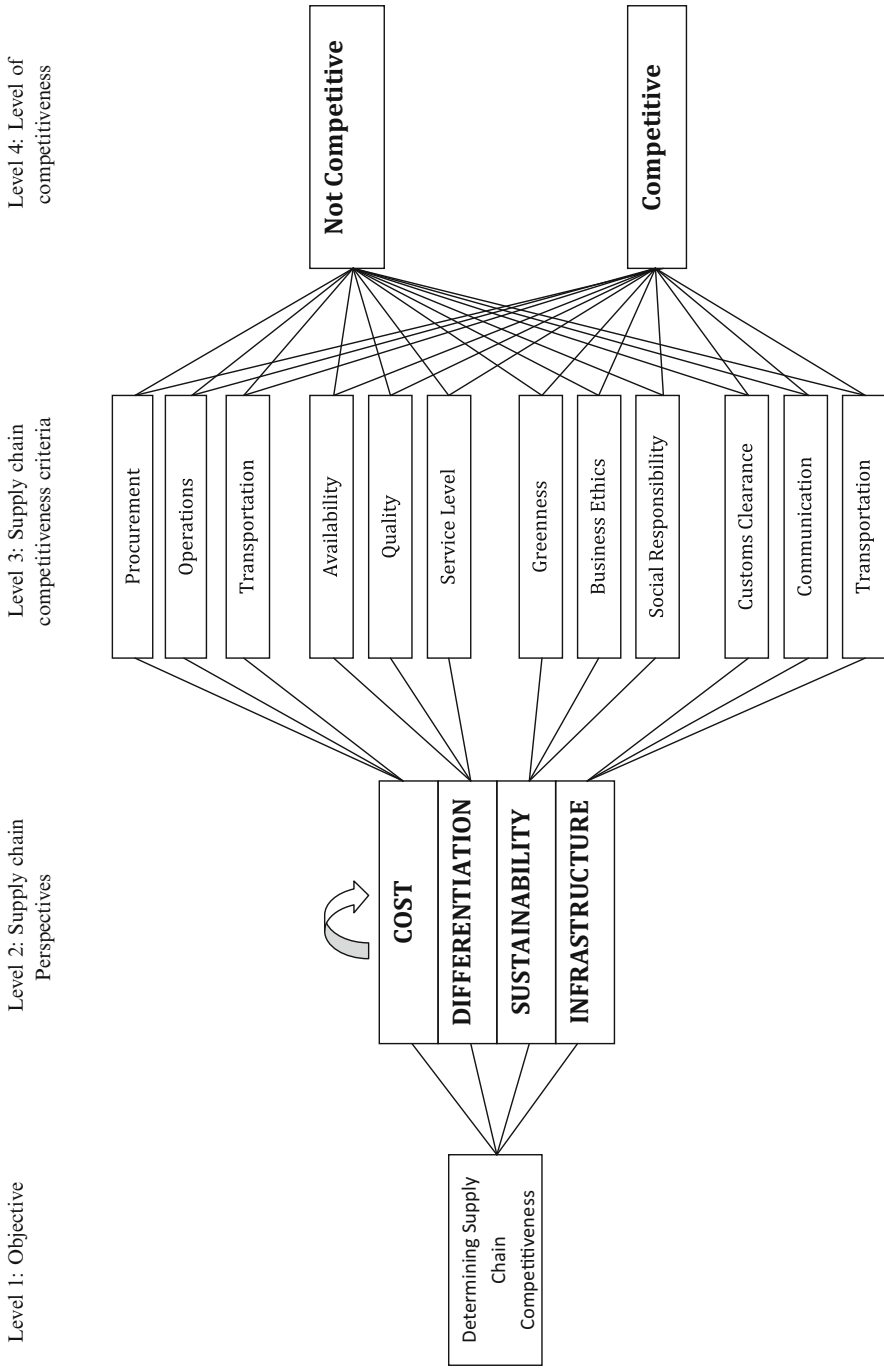
Fig. 2 Supply chain competitiveness model

from the quality of the customs clearance process, communication and transportation infrastructure.

The fourth level in the model explains the level of competitiveness of a supply chain. Based on the perspectives and the criteria, the supply chain competitiveness will be measured.

6   Model Validation

There are two considerations with regard to the applicability of the proposed model of determining supply chain competitiveness. First, it is worth questioning whether or not the decision hierarchy containing four levels, namely objectives, perspectives, perspective criteria and degree of supply chain competitiveness, sufficiently represents the real problem. Starting from the four perspectives being used— COST, DIFFERENTIATION, SUSTAINABILITY and INFRASTRUCTURE— the validation should be on the appropriateness of those four perspectives in determining supply chain competitiveness.

The first two perspectives are seemingly the most frequently used perspectives in previous works in the area of supply chain performance. These performance perspectives pursued by any player in the supply chain are also in accordance with the two generic strategies. Hence, COST and DIFFERENTIATION are clearly the appropriate perspectives to be included in the model. The next validation that should be made is on SUSTAINABILITY. While COST and DIFFERENTIATION are pursued by any supply chain to remain competitive, SUSTAINABILITY is just beyond the performance that must be achieved by a supply chain. Sustainability is the competitiveness perspective that will secure the supply chain competitiveness in the long run. In the long run, the supply chain can no longer be managed as it not only maximizes monetary value, but environmental and social value as well. Any efforts in sustainability made by players in the supply chain are not for short-term benefit in terms of cost or differentiation. The last perspective, INFRASTRUCTURE, is considered to be the qualifier that must be readily available for any supply chain to be competitive.

The next validation should be on the criteria being used for each perspective. Within the COST perspective, we use the criteria of procurement cost, operations cost and transportation cost. With a typically huge procurement cost spent by any player in the supply chain, it is evident that cost saving from procurement activity becomes a priority in order for companies to reduce their cost. Inefficient operations have traditionally become a common problem in any company. Cost reduction programs then become a major theme for most companies in Indonesia.[4] Besides

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[4] Prasetiya Mulya Business School, a leading business school in Indonesia, has coached and supervised many companies in implementing business improvement projects. Most of the projects are in the area of cost reduction.

procurement and operational costs, transportation cost is also a real challenge for any company in Indonesia to stay competitive. As the largest archipelago country in the world still with poor transportation infrastructure, the transportation cost is too tough to reduce.[5] The hike of fuel price with a high variability across the country has a spiralling effect on many sectors, including transportation.

We place criteria including availability, quality and service level within the DIFFERENTIATION perspective. In the food industry, for a certain product like poultry or raw material of milk, availability is something that cannot be bargained for; it must be available at any cost. On the other hand, quality and service level have become a competitive weapon for a company when cost is not an order winner.

The SUSTAINABILITY perspective includes criteria such as greenness, business ethics and social responsibility. While, traditionally, supply chain performance focuses on the performance perspective covering cost and differentiation, the future supply chain is considering sustainability as its competitiveness factor. Since the increasing pressure nowadays to any company is to be more environmentally friendly, it becomes inevitable to pursue greener strategies. Business ethics is normatively taught in any supply chain course or training, but in practice it is easily broken by any player in the supply chain. The last criterion that guarantees sustainability is social responsibility. Like greenness and business ethics, social responsibility is still expensive for companies in emerging economies. But for the sake of company's sustainability, these three criteria cannot be neglected.

The last perspective of supply chain competitiveness is INFRASTRUCTURE. While infrastructure is still a major constraint in emerging economies, the improvement on the customs clearance process, the communication infrastructure and the transportation infrastructure starts gaining attention from the government. The stakes are high; if the infrastructure within the three criteria is not well developed then supply chain competitiveness is too difficult to reach.

6.1 Pairwise Comparison and Relative Importance-Weight Factors

Pairwise comparison is at the heart of the AHP/ANP process in which the decision maker will compare two entities at one level with respect to a 'control' factor at the higher level. Then pairwise comparisons are made systematically including all the combinations of element/cluster relationships. This comparison scale enables the decision maker to incorporate experience and knowledge intuitively (Harker and Vargas 1990).

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[5] In a current interview (January, 2012) with senior supply chain practitioners in the Indonesian food industry, it is known that transportation cost is in the range of 20–30 % of COGS.

Table 2 The fundamental scale of AHP/ANP (Saaty 1980)

Intensity of importance	Definition	Explanation
1	Equal importance	Two activities contribute equally to the objective
3	Moderate importance	Experience and judgment slightly favor one activity over another
5	Strong importance	Experience and judgment very strongly over another, its dominance demonstrated in practice
7	Very strong importance	An activity is favored very strongly over another, its dominance demonstrated in practice
9	Extreme importance	The evidence favoring one activity over another is of the highest possible order of affirmation
2,4,6,8	For compromise between the above values	Sometimes one needs to interpolate a compromise judgment numerically because there is no good word to describe it

The decision maker can express his or her preference between each pair of elements verbally as equally important, moderately more important, strongly more important, very strongly more important and extremely more important. These descriptive preferences would then be translated into numerical values 1,3,5,7,9 respectively, with 2,4,6 and 8 as intermediate values for comparisons between two successive judgments. Table 2 shows the comparison scale used by AHP/ANP.

Following all pairwise comparisons, the local priority showing the relative importance of one element over another with respect to the element at the higher level of hierarchy will surface. Finally, the global priority, which is a set of priorities of the alternatives, is obtained by synthesizing all local priorities.

Here are the steps to determine the degree of supply chain competitiveness:

Step 1: Model Construction The first step is to structure the decision problem of measuring supply chain competitiveness. The hierarchical structure of the problem is previously seen in Fig. 2.

Step 2: Pairwise Comparison at the Perspective Level Firstly, assuming that there is independence among the perspective factors, pairwise comparison of the perspective factors is performed with respect to the objective. The following question, "*What is the relative importance of COST when compared with DIFFERENTIATION in determining supply chain competitiveness?*" is a typical question used in pairwise comparison. The result from completing this step is the perspective-importance eigenvector, w_p.

Step 3: Inner Dependence Among the Perspective Factors Inner dependence among the perspective factors is determined by analyzing the impact of each perspective on every other perspective using pairwise comparison. The previous eigenvector is obtained from the assumption of independence among the perspective factors, which is not the case in practice. More appropriate and realistic results can be obtained by applying the ANP approach in which there is dependence among the perspective factors. The following question, "*What is the relative importance of*

DIFFERENTIATION when compared with SUSTAINABILITY on reducing COST?" is a typical question in pairwise comparison. Completing this step will result in the inner dependence eigenvector, W_i.

Step 4: Adjusting the Eigenvectors of Perspective Competitiveness In this step, the interdependent priorities, $w_{factors}$, of perspectives of supply chain competitiveness are calculated:

$$w_{factors} = W_i \times w_p$$

Step 5: Calculating Local Priorities/Relative Importance of the Criteria In this step, the local priorities or relative importance of criteria of each perspective are calculated. The typical question in pairwise comparison is "*What is the relative importance of PROCUREMENT COST when compared with TRANSPORTATION COST in reducing COST?*"

Step 6: Calculating the Overall Priorities of the Perspective Criteria In this step, the overall priorities of the criteria of supply chain competitiveness, $w_{criteria}$, are calculated by multiplying the interdependent priorities of the perspectives, $w_{factors}$, obtained in Step 4 with the local priorities of the perspective criteria obtained in Step 5.

Step 7: Determining the Degree of Supply Chain Competitiveness with Respect to the Perspective Criteria We perform pairwise comparisons using the typical question as follows: "*What is the relative importance of COMPETITIVE when compared with NOT COMPETITIVE in explaining supply chain competitiveness with respect to QUALITY?*". The result is the eigenvector of competitiveness degree, W_c.

Step 8: Determining the Overall Degree of Supply Chain Competitiveness In this last step, the overall degree of supply chain competitiveness is calculated as follows:

$$w_{competitiveness\ (overall)} = \begin{bmatrix} Not\ competitive \\ Competitive \end{bmatrix} = W_c \times w_{criteria\ (overall)}$$

6.2 An Illustration Determining Supply Chain Competitiveness

Using the supply chain competitiveness diagnostic model (Fig. 2), an empirical study has been conducted in the food industry in Indonesia with eight inter-related companies (eight cases). Eisenhardt and Graebner (2007) explained that random sampling is not recommended for selecting cases because the number of cases is usually small; using a random selection process may result in a set of cases which is not sufficient or appropriate for the purpose of the study. Therefore, the selection of companies should be focused on the suitability or usefulness of the potential case

companies for the purpose of this study. In addition, other reasons for choosing these eight companies are that:

- All companies are major players in their respective market; this means that they have relatively strong market competitiveness or influence which is important for this study.
- All companies have long business experience in Indonesia, they have established their presence and endured business dynamics and crisis in Indonesia.
- The companies selected represent major chains in the food industry i.e., one supplier, four food manufacturer, two third party logistics provider and one retailer. This enables rich data collection and analysis with supply chain coverage.
- These companies have supply chains in the market; it is interesting to learn how competitive their supply chains are.

The respondents selected from these eight companies are senior managers and all of them also have direct influence ton supply chain operations. The respondents understand the scope of their businesses well, have sufficient supply chain knowledge and are experienced decision-makers. The respondents and their companies are briefly explained as follows:

- The first respondent is a head of division of a plastic packaging company; this company owns the largest market share in Indonesia for plastic packaging at the time of interview. It is a public listed company with headquarters in Jakarta. This company supply rigid plastic for packaging in many industries all over Indonesia, including food, electronics, automotive and home ware. For food manufacturers, for example, this company supplies bottle packaging for soft drinks and milk.
- The second respondent is a director of an integrated pineapple plantation and factory; this company is one of the largest in the world. It mainly produces canned pineapple to serve local market and exports to over 50 countries in Europe, America, Asia Pacific and the Middle East.
- The third respondent is a production manager for a food manufacturer that was established in 1958. This company produces many food products such as crispy peanuts, jelly, snacks, beverages and soy milk. They are one of the major food manufacturers in Indonesia and some of their products are market leaders in Indonesia, e.g. crispy peanuts and jelly.
- The fourth respondent is a director of a food and poultry manufacturer. Established in 1985, this company is one of the major players in the retailing of food processing, poultry feed and animal pharmaceuticals in Indonesia.
- The fifth respondent is a director of a company which has three business units i.e. Third Party Logistics distribution (3PL), food manufacturing and investment. Established in 1988, the company distributes local and imported products such as food and beverages, household products and many others. The distribution network covers the whole country. For manufacturing, they produce milk powder, air freshener and garments.

- The sixth respondent is the general manager of one of the major players in Indonesia for transportation and logistics services, better known as a 3PL provider. Established in 2003, this company has over 6,000 vehicles that serve the whole country. The services include transportation/logistics solutions, car rental and driver management services. One of their main customers is the food industry.
- The seventh respondent is also a general manager of a 3PL provider, which provides varied logistics services including land transport, distribution, custom clearance, warehousing activities (such as general warehouse and bonded warehouse), stevedoring, international and domestics freight forwarding. This company also handles ship brokerage to facilitate exports/imports. One of their main customers is their parent company, a major palm oil producer in Indonesia, and also other food manufacturers.
- The eighth respondent is an executive director of an association of traditional retailers, which has about 350 members. A member is usually a shop owner in a wet market; in Indonesia, a wet market still constitutes a larger retail share than modern retail.

Table 3 summarises the interviewee and company profiles. The seniority of the interviewees means that it is reasonable to assume that they have knowledge or opinions regarding the research questions. These invited companies come from the most upstream to the most downstream in supply chain. A semi-structured interview, with eight top executives from their respective companies, has been conducted. Therefore, their expert judgment can be regarded as reliable in explaining the competitiveness of food supply chain in Indonesia. The interview was audio recorded and video recorded. Three research assistants helped to take notes during the discussion and later finalized the data. Where necessary, a follow-up telephone call or email was conducted with the interviewee to clarify vague or ambiguous responses.

In this research, the interview questions were a series of predetermined but open-ended questions, as suggested by Ayres (2008) for semi-structured interviews. The supply chain competitiveness model (see Fig. 2) is used as the basis of the interview questions. For example, to get information about the importance of the four perspectives (Cost, Differentiation, Infrastructure, and Sustainability) in supporting supply chain competitiveness, six questions were generated to obtain respondent answers as shown below (Fig. 3).

The interview questions were tested in a pilot interview with three interviewees: a director of food manufacturer and two senior researchers. The objective of the pilot was to test and develop the interview protocol. Following the pilot, several improvements were made to the interview questions to make the protocol more concise and the questions easier to understand.

For the purpose of this study, it was important to select companies that represent many parts of the food supply chain. Selecting companies that represent supplier, manufacturer, distributor and retailer brings many advantages, i.e., it facilitates

Table 3 Interviewee and company profiles

Interviewee	1	2	3	4	5	6	7	8
Type of company	Supplier	Manufacturer	Manufacturer	Manufacturer	Distributor & trading	Logistics	Logistics	Retail
Typical product	Plastic packaging	Canned food	Food & drinks	Processed food	Food & imported food	4PL	3PL	Traditional market
Managerial position	Division Head	Director	Senior Manager	Director	Director	General Manager	General Manager	Director
Scope of business	International	International	National	National	National	National	International	National
Headquarter	Jakarta	Jakarta	Jakarta	Jakarta	Jakarta	Jakarta	Jakarta	Jakarta
Number of employees	1,000–5,000	>10,000	>5,000	1,000–5,000	500–1,000	500–1,000	500–1,000	350
Sales (2011) in billion Rps	500–1,000	N/A	>1,000	500–1,000	100–500	100–500	100–500	N/A
Sales (2007) in million £*	35–70	N/A	>70	35–70	7–35	7–35	7–35	N/A

*This data uses an exchange rate of 1£ = 17,000 rupiah (rounded value), data accessed from http://finance.yahoo.com/q?s=GBPIDR=X on March 20, 2009.

Fig. 3 Sample of interview question

(in your opinion) Which perspective is more important in determining supply chain competitiveness?

    1. COST or DIFFERENTIATION

    2. COST or SUSTAINABILITY

    3. COST or INFRASTRUCTURE

    4. DIFFERENTIATION or SUSTAINABILITY

    5. DIFFERENTIATION or INFRASTRUCTURE

    6. SUSTAINABILITY or INFRASTRUCTURE

richer data analysis, provides data triangulation and is important in gaining a better understanding of the phenomenon being studied.

We develop the supply chain competitiveness diagnostic tool which contains two categories of question: the importance of perspectives and the degree of supply chain competitiveness. In the first category, we perform pairwise comparisons at Levels 2 and 3 of Fig. 2. The participants are asked to compare each perspective with one another using a scale from 1 to 9. From this comparison process, we will obtain the most important perspective in supply chain competitiveness. Assuming there is an inner dependence among perspectives, we also ask the participants questions related to inner dependence. For each perspective, we ask the participant to compare one criterion with the other one using a scale of 1–9.

The pairwise comparison matrix is shown in Appendix 1. Using the Expert Choice software, all pairwise comparison values are transformed into the following eigenvector that explains the importance of each perspective to the supply chain competitiveness.

$$w_p = \begin{bmatrix} Cost \\ Differentiation \\ Sustainability \\ Infrastructure \end{bmatrix} = \begin{bmatrix} 0.207 \\ 0.455 \\ 0.106 \\ 0.231 \end{bmatrix}$$

Assuming independence among the perspective factors, it is determined that 'differentiation' is the most important perspective determining supply chain competitiveness, followed by infrastructure, cost and sustainability. This finding is quite interesting since, due to the lack of infrastructure performance, companies consider differentiation to be the determinant factor for supply chain competitiveness.

Due to inner dependency among the perspective factors, the eigenvector above is to be adjusted. The pairwise comparison matrices for inner dependence among the perspective factors is shown in Appendix 2. As infrastructure is the qualifier perspective in determining supply chain competitiveness, no pairwise comparison is performed with respect to infrastructure. The resulting eigenfactors, W_i, obtained from inner dependence among the perspective factors are as follows:

$$W_i = \begin{bmatrix} 1.000 & 0.317 & 0.158 & 0.000 \\ 0.258 & 1.000 & 0.519 & 0.000 \\ 0.061 & 0.099 & 1.000 & 0.000 \\ 0.681 & 0.584 & 0.323 & 1.000 \end{bmatrix}$$

Using the eigenfactors W_i, we can obtain the interdependent priorities, $w_{factors}$, of perspectives of supply chain competitiveness as follows:

$$w_{factors} = W_i \times w_p = \begin{bmatrix} 1.000 & 0.317 & 0.158 & 0.000 \\ 0.258 & 1.000 & 0.519 & 0.000 \\ 0.061 & 0.099 & 1.000 & 0.000 \\ 0.681 & 0.584 & 0.323 & 1.000 \end{bmatrix} \times \begin{bmatrix} 0.207 \\ 0.455 \\ 0.106 \\ 0.231 \end{bmatrix}$$

$$= \begin{bmatrix} 0.208 \\ 0.319 \\ 0.093 \\ 0.380 \end{bmatrix}$$

There is a significant difference from the first-obtained eigenvector. INFRA-STRUCTURE (with the a weighting factor of 0.380) replaces DIFFERENTIA-TION as the most important perspective determining supply chain competitiveness, followed by DIFFERENTIATION (0.319), COST (0.208) and SUSTAINABILITY (0.093).

Pairwise comparison process continues to the third level. The pairwise comparison matrices for the perspective criteria are shown in Appendix 2. Table 4 shows the results of the priority of the criteria.

By calculating the priority of each criterion with its priority of the perspective, the overall priorities of the perspective criteria are as follows:

Table 4 Priority of the criteria

Perspectives	Priority of the perspective	Perspective criteria	Priority of criteria
COST	0.208	Procurement cost	0.340
		Operations cost	0.354
		Transportation cost	0.305
DIFFERENTIATION	0.319	Availability	0.187
		Quality	0.686
		Service level	0.127
SUSTAINABILITY	0.093	Greenness	0.087
		Business ethics	0.662
		Social responsibility	0.251
INFRASTRUCTURE	0.380	Customs clearance	0.135
		Communication	0.198
		Transportation	0.667

$$w_{criteria\ (overall)} = \begin{bmatrix} Procurement \\ Operations \\ Transportation \\ Availability \\ Quality \\ Service\ Level \\ Greenness \\ Business\ ethics \\ Social\ responsibility \\ Customs\ clearance \\ Communication \\ Transportation \end{bmatrix} = \begin{bmatrix} 0.071 \\ 0.074 \\ 0.063 \\ 0.060 \\ 0.219 \\ 0.040 \\ 0.008 \\ 0.061 \\ 0.023 \\ 0.051 \\ 0.075 \\ 0.253 \end{bmatrix}$$

In the second category, we ask the participant to determine whether or not their supply chain is competitive with respect to each criterion of the perspective. The pairwise comparison table for the criteria competitiveness is shown in Appendix 3. The eigenvectors of competitiveness degree, W_c, are as follows:

$$W_c = \begin{bmatrix} 0.167 & 0.121 & 0.219 & 0.231 & 0.181 & 0.175 & 0.357 & 0.197 & 0.203 & 0.325 & 0.136 & 0.130 \\ 0.833 & 0.879 & 0.781 & 0.769 & 0.819 & 0.825 & 0.645 & 0.803 & 0.797 & 0.675 & 0.864 & 0.870 \end{bmatrix}$$

Finally in the last step, we calculate the overall degree of supply chain competitiveness as follows:

$$w_{competitiveness\ (overall)} = \begin{bmatrix} Not\ competitive \\ Competitive \end{bmatrix} = W_c \times w_{criteria\ (overall)} = \begin{bmatrix} 0.175 \\ 0.825 \end{bmatrix}$$

The AHP/ANP analysis shows that the supply chain competitiveness of the food industry in Indonesia is highly competitive with an overall priority value of 0.825.

6.3   Validation of the Results

The reliability of the AHP/ANP model depends on the quality of the subjective judgment of the experts. In determining the supply chain competitiveness we ask senior supply chain practitioners coming from the upstream to the downstream parts of the supply chain. In performing pairwise comparisons, we use the judgment of experts who sometimes cannot easily assign a numerical value to the comparison. This is due to the ambiguous nature of objects being compared or the unavailability of past data that can be used as a reference in assigning numerical values during pairwise comparisons. Nevertheless, AHP/ANP is still widely used to solve multi criteria decision problems. One of the strengths of the AHP is the ability to measure the degree of consistency of pairwise comparisons during the process. The inability of decision makers in assigning accurate measurements during

pairwise comparisons should not be viewed as a major shortcoming of the model. Another challenge in using the AHP/ANP model is to get a consensus from a group of experts during the pairwise comparison process. It is not unusual for a group of experts to come up with different scales of 1–9 when performing pairwise comparisons. When this happens, it is the task of the facilitator in a group's decision-making process to firstly bring all experts to a converged scale before finding the geometrical mean of the different experts' scales.

Using the software Expert Choice, the validity of the model can be verified by the consistency ratio (CR) of the pairwise comparison matrices. It is calculated using the so-called consistency index and the random index (Saaty 1980). If the consistency ratio is no greater than 0.10, the pairwise comparison matrix is (or matrices are) generally acceptable. For all pairwise comparisons in which all the numbers are based on experts judgments, we find that the CR of all pairwise comparison matrices are still less than 0.10. Therefore, we are confident that the results obtained in this study are appropriate.

7 Discussion

The first challenge in measuring supply chain competitiveness is in selecting the main perspectives of competitiveness for the supply chain. We select infrastructure as the requirement perspective for any supply chain to be competitive, followed by cost and differentiation, as the performance perspective that is widely used in the works of supply chain performance. As more pressures of greenness, social responsibility and business ethics in companies are higher than ever, we include sustainability as the demand perspective for the supply chain to be competitive in the future.[6]

From the current interview with senior supply chain practitioners in the food industry, it is found that infrastructure is considered the most important perspective that determines supply chain competitiveness, followed by differentiation, cost and sustainability. The finding of infrastructure as the major determinant factor is in accordance with the logistics performance index that put Indonesia in a poor position with regard to infrastructure, including customs clearance, communication infrastructure and transportation infrastructure.

Infrastructure that is a prerequisite for supply chain competitiveness needs serious attention and intervention from government. After the political turmoil in 1998, Indonesia is still in the reformation phase. Bureaucracy reformation is being conducted in all ministries including those related to infrastructure development.

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[6] For any local companies partnering with foreign principal companies, green campaigns and corporate social responsibility become their effective selling point to the public. Even though the degree of importance of sustainability is the lowest among the perspectives, sustainability is likely to be the determinant factor in future supply chain competitiveness.

Any effort to make the customs clearance process more efficient and transparent is to be welcomed. It is a real challenge but already shows a major improvement. While the infrastructure of communication is considered sufficient based on the current interview with senior supply chain practitioners, transportation infrastructure still generates a huge amount of work for (the) government. The acceleration in infrastructure development is a must to improve (the) supply chain competitiveness.

However, given the serious problem from infrastructure, any players in the food industry are still creative in finding ways to remain competitive. The binary choice between differentiation and cost is exercised very well. Depending on where their position is in the supply chain, the choice could be about either differentiation or cost. For any companies in the supply chain, there is no clear cut guidance in selecting the supply chain strategy.[7] Consumer goods companies and retailers put more emphasis on differentiation rather than on cost while distributors are more cost-effective. It becomes evident that in the food supply chain in Indonesia, each player at a different tier of a supply chain has a different supply chain strategy to the other. As the supply chain goes downstream, it is more about differentiation; at the more upstream side of supply chain, players are more focused on cost. The finding is in accordance with the legalities that can occur in a supply chain (Christopher and Towill 2000; Mason-Jones et al. 2000; Qi et al. 2009). The current finding of the study shows that differentiation is more important than cost in affecting supply chain competitiveness.

8   Concluding Remarks

This paper has presented the current study on supply chain competitiveness of the food industry in Indonesia. Due to its strategic importance to the Indonesian economy, it is of great interest in this study to find out what makes food supply chains competitive. Through the analysis and synthesis of the experts' judgment of senior supply chain practitioners, it is found that infrastructure is the most important perspective that determines supply chain competitiveness. It is no surprise, since infrastructure in Indonesia is still a major constraint for any supply chain to be competitive. This finding is in accordance with the result of the logistics performance index (LPI) for Indonesia based on the World Bank in 2010 that gives a score of 2.76 out of 5.0. Given the poor infrastructure, nevertheless, players in the food supply chain are playing the mixed differentiation-cost supply strategy. The differentiation strategy is chosen by players at the more downstream end of the

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[7] Fisher (1997) on "What is the right supply chain for your product?" gives two mutually exclusive supply chain strategies for companies. Depending on the types of the product, either functional or innovative, the supply chain strategy is efficiency for functional products and responsiveness for innovative products.

supply chain, while cost strategy is preferred by players at the upstream end of the supply chain. Besides those performance perspectives that must be excelled by any players in the supply chain, current pressures on sustainability mean that companies in the supply chain cannot run business as usual but have to start thinking of implementing green business, social responsibility and business ethics.

Given the status quo of the ongoing poor performance in infrastructure, the food supply chain is still highly competitive. This finding shows that players in the supply chain find the competitiveness through differentiation and cost. Differentiation can be justified due to the demand factor of the food appetite of Indonesian people. This strong food appetite makes food supply chains competitive. However, the pressure of making food cheaper makes modern retailers practice commoditization through private labels. This practice on the one hand favours modern retailers' profitability, but on the other hand (it) scraps the local food producers' market and profitability. Hence, the decommoditization strategy taking advantage of the strong appetite of Indonesian people becomes a good choice for local producers to stay in business. Innovation in food products seems to be a pivotal key to making food supply chains competitive.[8]

Even though sustainability is still not the most important factor in supply chain competitiveness, a few companies have already started campaigning for green business. In the near future, as customers become more sophisticated and aware of the importance of greenness, companies will have no choice but to start making their supply chain green. As social conflicts often occur involving companies and local people, large companies, in particular, have started running corporate social responsibility programs. Lastly, from the senior supply chain practitioners, it is found that some business ethics problems are still the status quo in the buyer-supplier relationships. The practice of exploiting others with weaker positions cannot be avoided. The normative form of the win-win solution is hardly found in practice. With regard to the buyer-supplier relationships that will affect supply chain sustainability, the trustworthiness factor is still an elusive thing to pursue.

Questions for Review and Discussion

1. What are the four perspectives used in determining supply chain competitiveness in this study? Can those perspectives be used for sectors other than the food industry?

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[8] Many foreign franchised food restaurants like KFC, McDonalds and Pizzahut differentiate their products from their principals by offering more products that are more tasteful to the Indonesian's tongue. For example, as fried chicken is the favorite food of many Indonesian, not only does KFC serve fried chicken, but McDonalds serves it as well. This kind of product innovation works very successfully in Indonesia.

2. Since infrastructure is still the major problem in emerging economies, how can players in the food industry in Indonesia still be competitive? What is their supply chain strategy?
3. How can players in the food industry learn from the findings of this study?
4. What is the multi criteria decision-making approach employed in this study? What are the advantages and shortcomings of this approach in determining supply chain competitiveness?
5. It is found from this study, that there is no clear cut strategy in the whole supply chain of the Indonesian food industry. As the supply chain goes downstream, it is more [on?] differentiation; at the more upstream side of supply chain, players are more [on?] cost. Will it happen in other industry's supply chains too, i.e. in the automotive or electronics industries?
6. Sustainability is still considered to be the least-important perspective in determining the competitiveness of the food supply chain in Indonesia. However, some problems in business ethics are identified in this study. Collusion among suppliers is one of them. Do you think that this problem is typical in emerging economies (or not)? Is there any simple and innovative way to alleviate the problem?
7. Even though differentiation outweighed cost as the influential perspective of supply chain competitiveness, the practice of product commoditization is inevitable leading to the practice of chasing a cheap price. How can players in the supply chain differentiate themselves from others? What kind of differentiation strategy is worth pursuing?
8. Of all the elements explaining perspectives for supply chain competitiveness, greenness is still trivial to players in the supply chain. Do you think that this is the case in emerging economies?

Appendix 1: Pairwise Comparison Matrix for the Degree of Importance of Supply Chain Perspectives

w.r.t Supply chain competitiveness	Cost	Differentiation	Sustainability	Infrastructure
Cost				1.50
Differentiation	1.55		3.00	3.51
Sustainability	2.00			
Infrastructure			2.80	

Appendix 2: Pairwise Comparison Matrices with Respect to Each Perspective of Supply Chain Competitiveness

w.r.t Cost	Differentiation	Sustainability	Infrastructure	Procurement	Operations cost	Transportation cost
Differentiation		5.76				
Sustainability						
Infrastructure	3.60	8.20				
Procurement						1.20
Operations cost				1.12		1.08
Transportation cost						

w.r.t Differentiation	Cost	Sustainability	Infrastructure	Availability	Quality	Service level
Cost		2.80				
Sustainability						
Infrastructure	1.60	6.82				
Availability						2.00
Quality				4.99		3.98
Service level						

w.r.t Sustainability	Cost	Differentiation	Infrastructure	Greenness	Business ethics	Social responsibility
Cost						
Differentiation	2.40		2.20			
Infrastructure	2.80					
Greenness						
Business ethics				6.43		3.11
Social responsibility				3.39		

w.r.t Infrastructure	Cost	Differentiation	Sustainability	Customs clearance	Communication	Transportation infrastructure
Cost						
Differentiation						
Sustainability						
Customs clearance						
Communication				1.64		
Transportation infrastructure				4.41	3.77	

Appendix 3: Level of Competitiveness with Respect to Elements of Supply Chain Perspectives

w.r.t the criteria below	Importance of high competitiveness compared with low competitiveness
Procurement	4.99
Operations cost	7.26
Transportation cost	3.57
Quality	4.51
Availability	3.33
Service level	4.72

(continued)

w.r.t the criteria below	Importance of high competitiveness compared with low competitiveness
Greenness	1.80
Business ethics	4.07
Social responsibility	3.93
Customs clearance	2.08
Communication	6.37
Transportation infrastructure	6.69

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