

# Becoming a “best value supply chain”? The case of the Greek food chain

## Abstract

The purpose of this study is to shed light on the differences in value outcomes within the Greek food chain by examining its key members and to illustrate which members are contributing towards value creation. Greek food companies evaluated the value outcomes of their supply chain based on key competitive priorities. The primary producers were found to have the worst value outcomes, the best outcomes were noted for the catering firms whilst the other members had strong results in specific value outcomes. Other findings show the chain members and their core activities responsible for value creation. They also suggest that the Greek food chain has still many characteristics of a traditional chain and many improvements are required to reach the “best value chain” status. The authors provide specific managerial implications emanating from this work and suggest future research avenues.

**Keywords:** Traditional supply chain; Best value supply chain; Value creation; Value outcome; Food supply chain

## INTRODUCTION

The concept of “value” is of paramount importance in marketing (Anderson & Narus, 1998; Lindgreen & Wynstra, 2005) and numerous studies have demonstrated the key benefits that it can generate for customers, companies and shareholders. Specifically, some of these benefits include enhanced customer loyalty (Reichheld, 1996), increased profitability (Zeithaml, 2000) and superior propositions to shareholders (Doyle, 2000).

The relevant literature on value has been examined thoroughly by Lindgreen & Wynstra (2005) who illustrated the relevance of this concept not only to marketing but to purchasing and supply management too. More importantly, they noted two major research streams emerging in the literature: value of goods and services and value of buyer-seller relationships.

Whilst within the first stream, the focus is on the value of the actual offering (being either the product / physical good and / or service), the emphasis of the second stream is on “relationship value” including key relationship aspects such as reputation of the supplier and its innovation capability (Lindgreen & Wynstra, 2005). They also note that for this second stream, managers pay further attention to managing relationships with other companies in the respective networks and supply chains. They mention categorically that “value is created within these interactions, relationships and networks” (Lindgreen & Wynstra, p. 738) and suggest key avenues for future research. One of those avenues is value creation and delivery which relates strongly to supply chain management (SCM) and they recommend that future research can be directed towards examining “which actors in the chain create value, and which delivery process provides the best value for which customers” (Lindgreen & Wynstra, p. 742).

The current paper focuses on the latter issue aiming to identify the actors of the Greek food supply chain that create value. Our view is that, in modern markets, value creation is not a dyadic issue that can be analysed by examining the buyer-supplier interface only. Hence, value creation should be analysed within the whole supply chain by examining all supply chain members responsible for value creation and for the final product offered to the consumer.

The paper is organised as follows: the next section discusses the role and importance of SCM for the current research and introduces the concept of “best value supply chain management” where the empirical research is based. It is followed by a section on the methodological approach employed whilst another section analyses the key findings. Towards the end of the paper, the managerial implications and research limitations are discussed followed by a concluding section.

### **SUPPLY CHAIN MANAGEMENT (SCM) & BEST VALUE SCM**

According to the Global Supply Chain Forum, SCM is defined as: “*the integration of key business processes from end user through original suppliers that provides products, services, and information that add value for customers and other stakeholders*” (Lambert & Cooper, 2000, p. 66). Therefore, the ability to deliver and create superior value is of large importance in the SCM field and it is this ability that provides supply chains with a competitive advantage in the marketplace (Li *et al.*, 2006; Hult *et al.*, 2006).

In the past, traditional supply chains aimed to become leaner and more cost efficient looking to achieve, *inter alia*, shorter lead times and lower costs (see for example, Christopher, 2005). However, they became more vulnerable to unexpected events such as strikes or adverse natural phenomena (e.g. earthquakes, floods etc) to name a few and as a result, they faced major problems such as stock outs, disruption of activities etc (Lee, 2004). Therefore, an efficient supply chain does not necessarily imply that it has become more competitive. On the contrary, supply chains which aimed to become agile, to adapt over time with market changes and to align the interests of all supply chain members have more chances to become competitive and to develop a sustainable competitive advantage. Specifically, agile supply chains can respond both quickly and cost-effectively in the rapid demand and supply fluctuations. A best value chain identifies the market structural shifts and modifies supply chain design and strategies to adapt to the changes in the environment. In addition, a traditional supply chain can transform itself to a best value chain only if it is capable of aligning the interests of all the chain members with their own (Lee, 2004). These supply chains with the above characteristics can be defined as best value supply chains (Ketchen & Hult, 2007). Hence, best value supply chains do not aim to improve only one supply chain characteristic but aim to maximise the total value added to the customer (Ketchen *et al.*, 2008) and to use supply chain as a means to create a competitive advantage and enhance firm performance. Therefore, these supply chains excel in their performance in relation to a set of competitive priorities and at the same time, they achieve superior success (and competitive advantage).

Ketchen & Hult (2007) highlight speed, quality, cost and flexibility as these key competitive priorities within the best value supply chains. Specifically, speed is the ability to deliver products or services according to a set schedule whilst quality is focused on increasing product reliability and customer satisfaction. Flexibility is related with the ability of a chain to respond to the changing needs of the customers and cost refers to the creation of customer value through expenses reduction or benefits increase at the same cost level (Ketchen *et al.*, 2008). The value outcome (performance) of the chain considered in each of these four priorities could provide crucial results while the balancing of these four priorities can give to the chain the ability to achieve the highest level of total value added to the final consumer and the firms involved (Ketchen & Hult, 2007). It is worth noting that in the mainstream SCM literature, these four competitive priorities (speed, quality, cost, flexibility) have been discussed in relation to performance measurement and many authors have proposed similar

priorities or supply chain performance indicators (see for example, Panayides & Lun, 2009; Shin *et al.*, 2000). In addition, Van Hoek (1998) points out that measuring supply chain performance requires measurement of performance indicators on different levels and between organizations. It also needs cross-functional measures that can be applied to the entire supply chain as the optimization of the performance focuses on the total chain and not on the individual chain member (see Bechtel & Jayaram, 1997; LaLonde & Pohlen, 1996). Other researchers have proposed new performance measures and metrics considering the changes in markets and supply chain environments including the impact of globalization, the quest for extra efficiency chains and the increasing role of information technologies. However, there is a lack of empirical analysis on performance metrics and measurement assessing the actual performance of specific chains and its members (Gunasekaran *et al.*, 2004). This suggests another research gap that this paper will fill and subsequently the paper will shed light on value creation per actor in the Greek food chain and the value outcome (or performance) against the four competitive priorities.

Based on these notions, the four competitive priorities for the best value supply chains are stated below and are measured against key value outcomes (indicators) found in the relevant SCM performance literature (including the food-related one). This approach was necessary as there is no relevant work in the appropriate “value” literature and, as mentioned earlier, the concept of value outcome is perceived as being similar to performance not only in this paper but even within the “value” literature (see for example, Lindgreen & Wynstra, 2005). Specifically, the four priorities are:

1. Cost with four value outcomes considered: production / operational/ raw materials cost, storage cost, delivery and distribution cost, financial cost (see Molnar & Gellynk, 2009; Aramyan *et al.*, 2007; Shepherd & Gunter, 2006; Chen & Paulraj, 2004; Chan, 2003; Beamon, 1999).
2. Flexibility with two value outcomes considered: flexibility in extra volume orders and flexibility in delivering in extra point of sales (see Aramyan *et al.*, 2007; Lohman *et al.*, 2004).
3. Speed / Ability to deliver in a timely manner with the following value outcomes considered: ability to deliver within the arranged lead time, ability to deliver timely at the arranged point of sale, ability to deliver timely the ordered type of product in terms of exact code and quality (Sanchez & Perez, 2005; Chen & Paulraj, 2004; Gunasekaran *et al.*, 2001).
4. Product quality including the following value outcomes: raw material quality, quality of the firm’s product, product conservation time, consistency in using a traceability system, storage and delivery conditions and quality of packaging for firm’s products (Aramyan *et al.*, 2007; Van der Vorst, 2005; Tracey *et al.*, 2005; Chen & Paulraj, 2004; Beamon, 1999).

We believe that following this approach, we will obtain important results about the value outcomes and the actual value delivered to the customers from that supply chain. In this work, we also evaluate the total value outcome (supply chain performance) in the Greek food supply chain. In order to achieve this, our analysis includes the overall perception of a firm’s total value outcome as well as the perceived market opinion about the firm’s total value outcome as suggested by the same respondent in that firm. We may have some contrasting differences about how a company is perceived by its general manager and how that manager expects the market to perceive his / her company.

Ketchen *et al.* (2008) also stress that “best value chains” differ from the traditional ones in how they approach key issues such as agility, adaptability and alignment (3As) in their operations and note that these three As support the four competitive priorities. In addition, a

strong value outcome in these four priorities is possible only if the chain members successfully coordinate strategic sourcing, logistics management, supply chain information systems and relationship management. Hence, organizations that develop best value supply chains enhance their value offering although these authors note that, currently, they are not familiar with any firms (and chains) that have achieved a “best value chain” status (Ketchen *et al.*, 2008).

The current work will analyse the value creation process in the Greek food chain. The authors believe that this chain can be an ideal “laboratory” to shed light on value creation and, hence, to also examine the “best value chain” concept. This is due to the fact that, although this food chain has been considered a traditional one, in the past two decades, a range of major events have taken place including the entrance of many multinational manufacturers and retailers into the Greek market. This has resulted in a large investment in logistics and information technology infrastructure and its further sophistication and advancement (see for example, Bourlakis & Bourlakis, 2001). Some members of this food chain (e.g. manufacturers, retailers) have also become more efficient in their supply chain operations during the past two decades (see Vlachos *et al.*, 2008; Menachof *et al.*, 2009). Manufacturers and retailers in the Greek market have also started to collaborate more extensively and have been working together (and with the rest of the food chain members) as part of the Efficient Consumer Response (Greece) initiative (Vlachos *et al.*, 2008). This initiative aims to improve collaboration, coordination and performance between its food chain members by harnessing their logistics, information technology and marketing capabilities (see Fiddis, 1997). Overall, we believe that the Greek food chain has been transformed substantially over the past two decades.

To summarise, the current study will analyse the Greek food chain by addressing the following research questions:

- In which value outcomes (and competitive priorities) does each food chain member excel or underperform?
- Which member of the Greek food chain is responsible for value creation?
- Can the Greek food chain become a best value supply chain?

## **METHODOLOGY**

To address the above research questions, we used a number of quantitative and qualitative value outcomes and we evaluated them for every individual member of the Greek food chain separately as well as for the whole food chain. We also aimed to illustrate the chain members that excel or underperform in the delivery of value via analysing specific aspects of value outcomes in relation to the key competitive priorities (speed / ability to deliver in a timely manner, product quality, cost and flexibility). In that way, this comparative analysis between the various stages of the Greek food chain (and its members) will provide insights for the workings and value creation activities of that chain and the value elements where the chain members are significantly differentiated. We focused on “value” creation and delivery within this national food chain context aiming to illustrate a detailed picture of possible opportunities for “value” creation and delivery within that national boundary level as well as other issues that will emerge for specific competitive priorities. Hence, we aimed not to consider any international elements or dimensions of that chain if possible as this may have created further challenges for pinpointing value creation within that national food chain per se. Therefore, the results can inform us about the workings of the whole Greek food chain and will illustrate the areas where improvement is needed.

Specifically, we conducted a survey facilitated by the use of a structured questionnaire. Anderson & Narus (1998) mention that this method is very appropriate for value evaluation and assessment studies whilst other researchers have used these types of surveys in the past regarding performance evaluation in supply chain and logistics environments (see for example Molnar & Gellynk, 2009; Chow *et al.*, 2008; Lai *et al.*, 2004).

The questionnaire was divided in two sections. The first section included questions for the four competitive priorities (cost, flexibility, speed/ability to deliver in a timely manner, product quality) and two questions for the perception of the total value outcomes. The respondents were asked to evaluate their firms regarding these value outcomes. Cost was assessed as a percentage (%) of the total turnover of a firm whilst the other priorities and total value outcomes were evaluated against a seven point Likert-type scale (1=Very satisfying value outcome to 7= Very unsatisfying value outcome). The second section included demographics for the food chain members. It is useful to stress that any self-reported, perceptual measure is subject to bias. However, a similar approach has been followed by several studies in the past resulting in the generation of very insightful findings (see for example, Tan *et al.*, 2002; Gunasekaran *et al.*, 2001).

The empirical work focused on four key sectors of the Greek food chain: dairy, fruit, meat and vegetables. These are the largest sectors in the Greek food chain in terms of total number of companies involved, employment and production at upstream level (both primary production and manufacturing) notwithstanding the fact that these four sectors share similar characteristics within the downstream level (wholesale, retail, catering) of that chain (ICAP, 2007a, b, c). Overall, the food sector has a significant role in the Greek economy although it is highly fragmented with most businesses being small and medium sized enterprises (Matopoulos *et al.*, 2007). Many major international manufacturers and retailers operate in the Greek food chain although national companies still command a strong presence (Bourlakis & Bourlakis 2001; Menachof *et al.*, 2009; Tatsis *et al.*, 2006). The importance of the sector can be evidenced by the fact that it employs approximately 25% of the national workforce and grows just under 5% on average each year (Matopoulos *et al.*, 2007).

In the empirical work, the following members / stages of the Greek food chain were examined: breeders / growers / grower associations, manufacturers, wholesalers / importers / exporters, retailers and catering firms. The catering firms were found as key members only within the dairy and the meat chain (ICAP, 2007: a, b). These firms were identified via relevant business directories and each firm was contacted by telephone to indicate potential respondents or “key informants”. Depending on the size of the firm, only the general manager or the owner was targeted. This was deemed as appropriate considering that these persons will have an expert and holistic knowledge of the firm and the issues under examination. Data collection was carried out by a professional research agency by means of a Computer-Aided Personal Interviewing system (CAPI) and a total of 1,121 responses were obtained via a telephone survey. Twenty seven of these responses were not usable because significant amounts of data were missing and / or had outlier responses and at the end, 1,094 responses were analysed. In Table 1, the number of firms in every key food chain stage and their core product are illustrated including 255 firms dealing with dairy products, 310 firms dealing with fruit, 303 firms dealing with meat products and 226 firms dealing with vegetables.

**“Insert Table 1 here”**

## RESULTS / ANALYSIS

### Profile of the respondent firms

Table 2 illustrates the profile of the respondent firms and their characteristics. Specifically, 14.99% of the sampling firms were first tier suppliers of the food chain (Breeders / Growers / Grower Associations), 21.30% of the firms were food manufacturers, 40.31% of the firms were into the wholesaling / importing / exporting business, 16.18% of the firms were retailers and 7.22% were in catering. Breeders and growers were family-based companies. The grower associations were having 28 employees on average whilst the rest of the chain members were employing various numbers of employees, with retailers employing the highest average number (89 employees).

The average turnover was between €500,000 and €1,000,000 for the growers' associations, manufacturers and catering firms. The growers' associations had the biggest number of warehouses whilst the retailers had the smallest number. All examined firms were using trucks for their operations. The breeders / growers and the growers' associations are grouped together in our analysis as they showed similar behavior regarding value outcomes and because they are all first tier suppliers. The number of catering firms was relatively low but a separate group was created due to their distinctive value outcomes.

“Insert Table 2 here”

### Food chain value outcome

We obtained the average score for seventeen value outcomes of the four competitive priorities. Table 3 provides these average scores and a summary of means and standard deviations for these value outcomes.

“Insert Table 3 here”

In terms of the cost priority, the producing / operational / raw material cost was the highest (46.05%) followed by the financial costs (almost 10%) and the storage and distribution costs representing 13% of turnover. For the flexibility priority, the average outcomes were moderate whilst the speed priority / ability to deliver in a timely manner had higher scores for all three value outcomes (scores below 2) indicating that the food chain members were very satisfied with their outcomes.

Food chain members evaluated very highly the raw material quality (1.55) whilst the quality of the firm's product was evaluated lower (2.20); the product conservation time had the worst value outcome score in the specific priority (3.56). Consistency in using a traceability system had an average of 2.13 while storage and delivery conditions were evaluated higher (1.69). On the contrary, quality of packaging had a moderate average score (2.93). Finally, the two average scores in connection with the perception for the total value outcomes were similar (2.25 and 2.23 respectively) indicating a consensus of what is perceived at firm and chain level.

### Differences in value outcomes between food chain members

Analysis of variance (ANOVA) was employed to determine whether any significant score differences were present between the chain members for the seventeen value outcomes under examination. ANOVA is a widely used statistical method for this kind of investigation and many examples can be found in the relevant literature where appropriate metrics are analysed for the four competitive priorities (see Greer & Ford, 2009; Kahn *et al.*, 2006; Lai

*et al.*, 2004). Table 4 illustrates significant differences between food chain members for most value outcomes (12 out of 17).

**“Insert Table 4 here”**

Regarding the cost priority, the food chain members expressed significantly different value outcomes in two out of the four items (delivery and distribution cost and financial cost). The delivery and distribution cost was higher for manufacturers, wholesalers / importers / exporters and catering firms and lower for retailers and breeders. This can be explained by the fact that breeders and growers don't take part in the product distribution and another chain member is responsible for that function. For example, in the dairy chain, the manufacturers collect the milk from the breeders directly. Similarly, the retailers obtained lower scores due to their high expertise in these activities accumulated over the years.

The financial cost was found to be significantly higher for manufacturers and breeders / growers / growers' associations (12.28% and 11.45% respectively) and lower for retailers (4.91%) and this is due to fact that growers and manufacturers have higher loan repayments than other chain members.

The flexibility competitive priority received a low evaluation in Table 3. However, in Table 4, we have found differences in the flexibility value outcomes between chain members. The breeders / growers / grower's associations had the worst scores, probably due to the nature and characteristics of their products (i.e. seasonality in production). On the contrary, the catering firms, wholesalers / importers / exporters and manufacturers were more flexible. Retailers obtained moderate value outcomes in terms of flexibility. Our sample included many small retailers which do not pay large attention to that aspect in their operations.

The catering firms had better results than every other chain member for three value outcomes in relation to the speed / ability to deliver priority (1.34; 1.29 and 1.34 respectively). They were followed by the manufacturers and the wholesalers/ importers / exporters whilst worst scores were found for the breeders / growers / grower's associations and the retailers. This is a unique and original finding as, according to our knowledge, no other study has demonstrated the excellent performance of catering firms in relation to the speed / ability to deliver priority.

In terms of the product quality priority, the product conservation time was the value outcome that had the worst scores as indicated by every food chain member. This is not a surprising result as managing perishable food products is an extremely challenging task including managing conservation time. In addition, even though traceability is a very important factor for food quality, only manufacturers had a high score (1.89). Manufacturers play a key role in the implementation of the traceability systems in the chain and in many occasions this implementation is largely supported by their expertise, know-how and ability to support other smaller chain members such as the primary producers. On the other hand, the retailers returned the worst score in this value outcome (2.51). This is explained by the fact that, in the Greek food chain, the retailers have a small role in relation to traceability implementation. A similar result is found in connection to the quality of packaging where the manufacturers return the best score (1.89). Packaging processes are driven and implemented largely by manufacturers; however, during the delivery and distribution of products towards the end consumer, the packaging quality deteriorates.

In terms of the total value outcomes, the catering firms returned a higher evaluation than every other food chain member followed by manufacturers and wholesalers / importers / exporters. The catering firms are closer to the end demand than any other chain member (with the possible exception of the retailers) and that may suggest why they perceive their contribution higher in terms of value delivery.

### **Value outcome analysis between food chain members & the average food chain**

The previous results illustrated the key differences between the food chain members. In addition, we employed a T-test to show the differences in value outcomes produced by chain members in comparison to the average results for the whole food chain. Table 5 presents the results from the T-test analysis and the results clearly show that the breeders / growers / grower's associations evaluated their value outcomes lower than the average of the food chain. In particular, these chain members noted that they lacked flexibility and had the worst scores in relevant outcomes (flexibility in extra volume orders, 3.12 and flexibility in delivering in extra point of sales, 3.28) when compared to similar obtained by other chain members (e.g. catering firms) and the average scores for the food chain (2.57 and 2.74 respectively). Breeders / growers / grower's associations do not seem to be able to respond in a timely manner (ability to deliver timely at the arranged point of sale, (2.20) and ability to deliver timely the ordered type of product in terms of exact code and quality, (1.97)) compared to other chain members and the average food chain (1.89 and 1.75 respectively). Overall, the perceived evaluation score of their total value outcome was lower (2.45) than the relevant average score for the food chain (2.25).

#### **“Insert Table 5 here”**

The results also show that the food manufacturers enjoyed slightly better value outcomes than the average chain in many priorities. For example, that was the case for the priority of speed / ability to deliver in a timely manner. More specifically, the manufacturers had slightly better scores for delivering within the arranged lead time (1.67 in comparison with the chain average: 1.87) and on delivering timely the ordered type of product in terms of exact code and quality (1.62 in comparison with the chain average: 1.75). Regarding product conservation time, they had significantly better value outcomes (3.11 in comparison with the chain average: 3.56) and were more consistent in using a traceability system (1.86) than the rest of the chain (2.13). For quality of packaging, a large difference was found between manufacturers (1.89) and the chain average (2.93) and this is explained by the fact that the packaging activity is critical for the manufacturers. Overall, manufacturers play a key role in this food chain and as they lead many major activities (e.g. packaging, processing, traceability implementation etc). Unavoidably, they accumulate increased producing / operational / raw material costs (52,19%) in comparison to the average score for the chain (46.05%).

The wholesalers / importers / exporters were the largest group in our sample (N=441) and this may justify the small difference found between their value outcomes and the average chain. Wholesalers / importers / exporters had slightly better scores in flexibility (flexibility in delivering in extra points of sales: 2.46 in comparison with the chain average: 2.74) and in product conservation time (3.31 in comparison with the chain average: 3.56).

Managers from retailers perceived their operations as accumulating low costs. Specifically, their producing / operational / raw material cost is lower (40.08%) than the chain average cost (46.05%). Retailers returned significantly better scores for storage cost (4.49), delivery and distribution cost (4.18) and financial cost (4.91) compared to the average scores for the chain. This may be due to the fact that our sample included many small and medium sized retailers that had small storage capacities, enjoy a small role in the logistics operations of the food chain and accumulate low costs. But even the large retailers in our sample are major multinational and domestic retailers that have large expertise in managing logistics operation in the food chain. Most of these retailers enjoy a healthy financial situation too. On the contrary, retailers had worst value outcomes compared to the whole chain in flexibility in delivering in extra point of sales (3.40 in comparison with the chain average: 2.74), in their



ability to deliver within the arranged lead time (2.15 in comparison with the chain average: 1.85), in consistency in using a traceability system (2.51 in comparison with the chain average: 2.13) and in quality of packaging (4.01 in comparison with the chain average: 2.93). These results are not surprising as the retailers in the Greek food chain still need to improve some key parts of their logistics operations and a similar finding was reported in another study (see Menachof *et al.*, 2009). Contrary to the manufacturers, these companies do not have a major role for traceability implementation and monitoring whilst packaging is still a key activity for the primary and middle layers of the chain (e.g. growers, manufacturers).

Finally, managers from catering firms noted value outcomes for their firms which were much better than any other chain member in some key competitive priorities. Specifically, they were more flexible than the chain in average in both value outcomes and in terms of the priority of speed / ability to deliver in a timely manner, the results were better than the average results for the whole chain in each of the three outcomes. This is an expected result as these firms deal with a small number of clients and their orders are prearranged far in advance. The demand for their products has no fluctuations as can be expected sometimes for other chain members (e.g. for retailers and manufacturers during a promotion); therefore, their logistics operations are not overstretched and can “go the extra mile” if required. Product quality is a competitive priority where catering firms had worst scores in value outcomes than the whole food chain. In particular, catering firms had lower scores in product conservation time (5.27 whilst the average score for the chain was 3.56) and in quality of packaging (3.52 in comparison with the chain average: 2.93). Again, an expected result as these firms are not involved largely with packaging as they receive the product quantities they need from other chain members (and in their preferred type of packaging); they are also closer to the final demand and, subsequently, conservation time is not perceived as highly as for other chain members (e.g. manufacturers having the best score: 3.11) who need to conserve / keep their products for some time before they “push” them further down the chain.

Finally, catering firms showed better perceived total value outcomes than the chain as a whole (1.87 and 1.99 in comparison with the average score of the chain: 2.25 and 2.23 respectively). As mentioned earlier, this is a key result and this may be related to the fact that these firms are closer to the end demand than any other chain member (with the possible exception of the retailers).

## **DISCUSSION, IMPLICATIONS FOR PRACTITIONERS & LIMITATIONS**

The paper examined the perceived value outcomes for members of the Greek food chain and revealed the differences between these members. Specifically, the primary members (breeders / growers / grower’s associations) are the weak link in the Greek food chain as poor results were evident for most value outcomes and their dependence on subsidies and government support could be the reason behind that.

The retailers enjoy strong results for many value outcomes of the cost priority including the distribution and logistics elements whilst the manufacturers excel in three value outcomes of the product quality priority. The wholesalers / importers / exporters, which together with the manufacturers represent the middle part of the food chain, returned good results for many value outcomes. The above suggests that the middle part of the Greek food chain is performing satisfactorily in terms of both value creation (the manufacturers) and value delivery (the wholesalers / importers / exporters followed by retailers); however, this is not the case for the primary part of the chain that underperforms. The catering firms had the best results in numerous value outcomes and excelled in two competitive priorities: flexibility and speed / ability to deliver in a timely manner. The catering firms had also the best results

in relation to total value outcome suggesting their key contribution in terms of value delivery in the Greek food chain.

The above discussion has addressed succinctly the first two research questions (in which value outcomes (and competitive priorities) does each food chain member excel or underperform? Which member of the Greek food chain is responsible for value creation and delivery?). Regarding the third research question (can the Greek food chain become a best value supply chain?), it is clear that the Greek food chain is still closer to the traditional chain concept and many improvements are required to reach the status of a “best value chain”. This is not a disappointing outcome considering that, currently, there are no firms (or even chains) which possess all the required “best value” features (Ketchen *et al.*, 2008). Future improvements could emanate by following the practices of the chain members which excel on specific value outcomes including the catering firms and the middle chain members. The latter suggestion will be of particular importance to managers, practitioners and industry professionals. At the same time, this chain had one of its members underperforming in most value outcomes. That member (breeders / growers / grower’s associations) will need to actively engage with the rest of the chain members and to dramatically ameliorate its performance. Right now, this member represents a weak link of that chain and if that continues to be the case then it is very doubtful whether that chain will ever achieve the “best value chain” status. Overall, this study has produced many insightful results that will be useful to managers, practitioners and industry professionals. For example, the results from the T-test analysis could be used as benchmark points and can guide companies towards achieving highest scores in specific business areas; some of those areas comprise the competitive priorities. Finally, every chain needs to create and deliver value to the final customer and our paper has demonstrated the value successes and failures related to specific members of the Greek food chain. Managers need to be fully aware of the results (value outcomes) of the other members of their chain and especially by knowing the members that excel or underperform, managers will be able to modify the firm’s strategy accordingly. The current paper has demonstrated a logical methodological process for obtaining these results.

There are a few limitations to this study. The most important one is the relatively large number of wholesalers / importers / exporters and the small number of catering firms considered in our sample; there was no representation of catering firms from the fruit and vegetables sectors as they do not operate in the respective chains. We should note that it has been very challenging to guarantee equal representation and, in many cases, this was due to the limited number of companies operating in the specific food sector and the chain structure (for the case of the catering firms). Nevertheless, we are confident that our survey has provided a balanced analysis of the Greek food chain. Another limitation is that our study examined only the four key sectors of the Greek food chain: dairy, fruit, meat, vegetables. Although these sectors are the largest ones in the Greek food chain, future work could consider other sectors too and illustrate the chain strengths and weaknesses. Future work could also reveal which sector (out of these four) performs better and identify the strength and weaknesses of each of the respective chain members.

## CONCLUSIONS

In this study, we compared the value outcomes of the key food chain members of the Greek food chain and we revealed the key differences between the five chain members.

It is evident that the Greek food chain cannot be characterised as agile as the results indicate low flexibility in the workings of many of its members. The primary producers (breeders / growers / grower associations) command the worst flexibility scores and on the contrary, the catering firms and wholesalers/ importers/ exporters were more flexible, probably due to the

nature of their business. The retailers lacked flexibility in their operations which is a surprising result. Interestingly, all chain members returned better scores for ability to deliver under a timely manner as evidenced by the results for the value outcomes of the speed priority. The above indicates that the Greek food chain has a long way to go before becoming a “best value chain”. At the moment, it has still many characteristics of a traditional chain as it focuses on responding well to prearranged issues but lacks the flexibility to “go the extra mile”.

Poor results were obtained for the product conservation time especially for members that are closer to the final consumer (e.g. retailers, catering firms). This is an unexpected result and it is an area where food chain members should improve their coordination and collaboration. Overall, our study clearly revealed a chain champion regarding value outcomes. The catering firms were performing better in seven out of the seventeen value outcomes when compared with the average scores of the whole food chain. These companies operate under low volumes and in a business to business environment only and which could be a reason behind high value outcomes.

Finally, previous papers (see Aramyan *et al.*, 2006; Aramyan *et al.* 2007; Gunasekaran *et al.*, 2004; Gunasekaran & Kobu, 2007; Van der Vorst, 2005) have emphasized the lack of empirical analysis on performance (value outcome) metrics and measurement when assessing chain performance including its members. To our knowledge, this is the first research paper providing an overall view of value outcomes of various chain members altogether and of the chain they are part of. We believe that the paper has filled a major gap in the “value” literature by providing an empirical comparison of the perceived value outcomes for several tiers in a food chain.

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## TABLES

**Table 1: Examined Firms and Key Food Product Involved**

<b>Firm</b> <b>Food product</b>	<b>Breeders/ Growers/ Growers' Associations</b>	<b>Manufacturers</b>	<b>Wholesalers / Importers/ Exporters</b>	<b>Retailers</b>	<b>Catering firms</b>	<b>Total</b>
<b>Dairy</b>	35	75	70	49	26	255
<b>Fruit</b>	44	54	163	49	-	310
<b>Meat</b>	47	79	104	20	53	303
<b>Vegetables</b>	38	25	104	59	-	226
<b>Total</b>	164	233	441	177	79	1094

**Table 2: Profile of the respondent firms**

Type of firm (N=1094) (% of the chain)	Breeders/ Growers/ Growers' Associations		Manufacturers	Wholesalers / Importers/ Exporters	Retailers	Catering firms
	N=164 (14.99%)		N=233 (21.30%)	N=441 (40.31%)	N=177 (16.18%)	N=79 (7.22%)
	Breeders/ Growers N=45	Growers' Assoc. N=119				
Number of employees (Mean)	Family- based	28	41	23	89	23
Turnover (more frequent responses relevant groups, euros)	40,000- 50,000 <sup>a</sup>	500,000- 1,000,000	500,000- 1,000,000	> 1,000,000	200,000- 500,000	500,000- 1,000,000
Size of warehouses (in sq.m.) (Mean)	N/A (61,6) <sup>b</sup>	3,587	2,488	1,747	610	1,085
Number of trucks (Mean)	5 <sup>c</sup>	4	6	6	3	5
<sup>a</sup> Annual income, <sup>b</sup> Farm size in hectares, <sup>c</sup> Number of agricultural trucks.						

**Table 3: Average value outcomes of the Greek food chain**

Value outcome <sup>a, b</sup>	Score Mean (%) (SD) (N=1094)	Value outcome <sup>c</sup>	Score Mean (SD) (N=1094)
Producing operational raw material cost	46.05 (27.24)	Flexibility in extra volume orders	2.57 (1.58)
		Flexibility in delivering in extra points of sales	2.74 (1.78)
		Ability to deliver within the arranged lead time	1.87 (1.30)
		Ability to deliver timely at the arranged point of sale	1.89 (1.45)
Storage cost	6.15 (7.39)	Ability to deliver timely the ordered type of product in terms of exact code and quality	1.75 (1.10)
		Raw material quality <sup>d</sup>	1.55 (0.75)
Delivery and distribution cost	7.13 (6.99)	Quality of the firm's product	2.20 (2.05)
		Product conservation time	3.56 (2.16)
		Consistency in using a traceability system	2.13 (1.68)
		Storage and delivery conditions	1.69 (1.09)
Financial cost	9.82 (11.74)	Quality of packaging for firm's products	2.93 (2.34)
		Firm's total value outcome	2.25 (1.03)
		Firm's total value outcome from the market point of view	2.23 (1.06)
<sup>a</sup> % of turnover, <sup>b</sup> Costs do not sum up to 100% of the turnover as we measure different dimensions and there could be other costs that are not part of this study <sup>c</sup> Seven points in Likert scale (lower values indicate higher value outcome), <sup>d</sup> Related to manufacturers only.			

**Table 4: Differences in value outcomes between food chain members**

Value outcome	Breeders / Growers / Growers' Associat. Mean (SD) (N=164)	Manuf-acturers Mean(SD) (N=233)	Wholesalers / Importers/ Exporters Mean(SD) (N=441)	Retailers Mean (SD) (N=177)	Catering firms Mean (SD) (N=79)	ANOVA <i>F-statistic</i> <sup>c</sup>
Delivery and distribution cost <sup>a</sup>	5.83 (6.75)	8.11 (6.95)	8.04 (7.26)	4.18 (5.18)	7.76 (7.42)	6.198
Financial cost <sup>a</sup>	11.45 (13.37)	12.28 (13.77)	9.70 (11.10)	4.91 (6.42)	9.65 (10.81)	5.235
Flexibility in extra volume orders <sup>b</sup>	3.12 (1.97)	2.50 (1.54)	2.45 (1.43)	2.63 (1.53)	2.18 (1.46)	7.202
Flexibility in delivering in extra points of sales <sup>b</sup>	3.28 (2.15)	2.57 (1.73)	2.46 (1.50)	3.40 (1.97)	2.20 (1.35)	15.697
Ability to deliver within the arranged lead time <sup>b</sup>	2.05 (1.51)	1.67 (0.94)	1.90 (1.26)	2.15 (1.69)	1.34 (0.58)	7.826
Ability to deliver timely at the arranged point of sale <sup>b</sup>	2.20 (1.76)	1.83 (1.39)	1.81 (1.26)	2.15 (1.79)	1.29 (0.54)	7.234
Ability to deliver timely the ordered type of product in terms of exact code & quality <sup>b</sup>	1.97 (1.38)	1.62 (0.94)	1.79 (1.08)	1.78 (1.18)	1.34 (0.60)	5.371
Product conservation time <sup>b</sup>	3.74 (2.20)	3.11 (2.10)	3.31 (2.04)	3.84 (2.14)	5.27 (2.00)	18.552
Consistency in using a traceability system <sup>b</sup>	2.35 (1.93)	1.86 (1.52)	2.04 (1.49)	2.51 (1.97)	2.16 (1.72)	4.826
Quality of packaging for firms' products <sup>b</sup>	2.97 (2.39)	1.89 (1.43)	2.93 (2.34)	4.01 (2.57)	3.52 (2.57)	23.974
Firm's total value outcome <sup>b</sup>	2.45 (1.10)	2.15 (0.95)	2.26 (0.98)	2.33 (1.21)	1.87 (0.74)	5.215
Firm's total value outcome from the market point of view <sup>b</sup>	2.38 (1.13)	2.12 (1.02)	2.24 (1.07)	2.31 (1.11)	1.99 (0.84)	2.748

<sup>a</sup> % of turnover, <sup>b</sup> Seven points in Likert scale (lower values indicate higher value outcome),  
<sup>c</sup> p< 0.05



**Table 5: Value outcome differences between chain members & the average food chain**

Value outcome	Breeders/ Growers/ Grower's Associations Mean(SD) N=164 ( <i>T-test</i> )	Manufacturers Mean(SD) N=233 ( <i>T-test</i> )	Wholesalers / Importers/ Exporters Mean(SD) N=441 ( <i>T-test</i> )	Retailers Mean (SD) N=177 ( <i>T-test</i> )	Catering firms Mean (SD) N=79 ( <i>T-test</i> )	Food chain Mean N=1094 ( <i>T-test</i> )
Producing/ operational / raw material cost <sup>a</sup>		52.19 (2.869)		40.08 (-2.045)		46.05
Storage cost <sup>a</sup>				4.49 (-2.185)		6.15
Delivery and distribution cost <sup>a</sup>				4.18 (-5.151)		7.13
Financial cost <sup>a</sup>				4.91 (-6.751)		9.82
Flexibility in extra volume orders <sup>b</sup>	3.12 (3.597)				2.18 (-2.397)	2.57
Flexibility delivering in extra points of sales <sup>b</sup>	3.28 (3.216)		2.46 (-3.853)	3.40 (4.460)	2.20 (-3.531)	2.74
Ability to deliver in arranged lead time <sup>b</sup>		1.67 (-3.334)		2.15 (2.228)	1.34 (-8.168)	1.87
Ability to deliver timely at arranged point of sale <sup>b</sup>	2.20 (2.266)				1.29 (-9.954)	1.89
Ability to deliver timely ordered product type & exact code & quality <sup>b</sup>	1.97 (2.042)	1.62 (-2.085)			1.34 (-6.081)	1.75
Product conservation time <sup>b</sup>		3.11 (-3.285)	3.31 (-2.594)		5.27 (7.588)	3.56
Consistency in using traceability system <sup>b</sup>		1.86 (-2.737)		2.51 (2.557)		2.13
Quality of packaging for firms' products <sup>b</sup>		1.89 (-11.097)		4.01 (5.572)	3.52 (2.040)	2.93
Firm's total value outcome <sup>b</sup>	2.45 (2.334)				1.87 (-4.522)	2.25
Firm's total value outcome from market viewpoint <sup>b</sup>					1.99 (-2.569)	2.23

<sup>a</sup> % of turnover, <sup>b</sup> Seven points Likert scale (lower values indicate higher value outcome),  
<sup>c</sup> p < 0,05.