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## THE FACTORS OF MARKETING CHANNEL SELECTION OF QUEEN PINEAPPLE FARMERS IN CAMARINES NORTE

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### ABSTRACT

**Purpose** - Pineapple cultivation provides sustainable livelihood to many smallholder farmers in developing countries like the Philippines. However, income is affected by the selection of marketing channels. This article assessed the factors affecting the selection of marketing channels of Queen Pineapple farmers in Camarines Norte.

**Methodology** - A mixed data collection process was used, including semi-structured questionnaires and key informant interviews. Primary data gathered from 96 randomly sampled farmers and 32 purposively sampled buyers were used to characterize the nature of the channels. Profitability was measured by calculating the marketing costs, net profit, and profit margin per channel. The Chi-square statistics were used to test the influence of socio-economic variables on the marketing channels, while descriptive statistics were used to interpret the factors affecting the selection of marketing channels.

**Findings** - Among the five identified channels, respondents preferred the wholesaler channel despite low profitability. Quick cash was identified as the major factor in the selection of marketing channels. A significant relationship relative to marketing channels was traced to the interplay of the following key factors: gender, civil status, location, and sources of income. Profitability analysis dictates that the optimum channel for farmers is the direct channel, but requires higher capital for added marketing costs. Income analysis showed that the majority of the farmer respondents were living below the poverty threshold.

**Conclusion** - Financial pressures hinder most pineapple farmers from choosing the most profitable channel. It is hereby recommended to sell via direct channel by batch through synchronized harvesting; adopt a multi-crop pineapple production system to maximize land utilization; secure off-farm employment for an added source of capital and income; explore a joint marketing system to sell in bulk inside and outside the province; seek logistical and technical assistance from the LGUs, cooperatives, and DA to strengthen market linkage; and adopt the value chain concept to add value to the product.

**Keywords:** Profitability analysis, income classification, type of marketing channels, poverty threshold

**JEL Codes:** L10, O13, P42

### 1. INTRODUCTION

The Philippines is considered one of the leading exporters of pineapple globally (Reinhardt, 2009; Balito, 2011; Hossain, 2016) which makes the pineapple industry one of the most significant contributors to the country's Gross Domestic Product (GDP). The pineapple industry shared 7.2% of the Agriculture, Fishery, and Forestry (AFF) Sector (Statistica, 2022). AFF contributed one-fifth (20%) of the economy's aggregate domestic output (Habito & Briones, 2005), translated to the livelihood of around 60% of the Philippine population living in the rural areas (Laure, 2003), including smallholder pineapple farmers.

Pineapple, a perennial herb in the botanical family *Bromeliaceae* (Bartholomew et al., 2002; Tewodros et al., 2018) and a globally popular fruit, is one of the top export commodities in the Philippines (PSA, 2019). It has four common pineapple varieties which thrive in the country namely: a) Hawaiian, b) MD2, both produced heavily in Mindanao by giant companies such as DOLE and Del Monte mainly for export, c) the Red Spanish variety popularly grown in the province of Aklan for fiber production, and d) the Queen Pineapple in South Luzon primarily produced for domestic demand.

Queen Pineapple production is concentrated in the province of Camarines Norte due to land and climate suitability. Recent records estimate that said variety is cultivated on around 4,070 hectares in the province which comprises 88% of the total pineapple production area in the Bicol region (PSA, 2020). Production of this variety is of backyard type with an average yield per hectare of 25,650 pcs or 20.5 MT. Of this estimated production yield, around 95% of the harvest is sold as fresh fruits. Pineapple, being a perishable good can last for only two weeks after harvesting, hence, should be marketed in its prime condition or be subjected to processing to extend its shelf life.

Specifically, the Queen Pineapple which comprised 5.3% of the total national production (PSA, 2020), is generally smaller in size ranging from 0.7 to 1 kg in medium to large classification (PNS, 2004) but sweetest at 14-degree Brix. The said pineapple variety is widely characterized by a tapering shape, deep eyes, and fresh yellow color and is known for its characteristic aroma, crisp flesh, and sweet juice. In addition, it has strong fiber which is excellent for cloth material and an alternative for animal leather.

In reality, the marketing of pineapple is laborious, entails high capital requirements, and needs adequate information. These factors put some tolls on farmers' decisions on which marketing channel to take. Furthermore, the lack of market information, poor negotiating skills, limited resources, loyalty (Galvez 2019), perishability of products and yield (Segei et al. 2014), higher price (Kaido, 2020), transportation cost, and time (Apandi et al., 2017), are added constraints that beset the farmers from making sound marketing decisions. The bottom line is for the farmer to decide on the best marketing channel which will reduce losses or costs, thus, maximizing profit or increasing income (Apandi et al., 2017).

Most pineapple products and by-products are delivered in Metro Manila, where demand is high, and consumers have higher purchasing power. However, prime market outlets in high-demand areas are dominated by varieties such as Hawaiian and MD2 produced by large corporations such as DOLE and Del Monte. In addition, traders (i.e., wholesalers and retailers) who are well funded dominate the market for the pineapple to the detriment of resource-poor farmers who have very limited capital to operate and market their produce.

This current market condition resulted in low profitability and left farmers struggling to bail themselves out of poverty. Many smallholder farmers live in small houses and survive by doing multiple jobs such as labor to neighboring farms, tricycle driver, or construction worker, among others. In contrast, intermediaries such as wholesalers and retailers who corner the bulk of income from production and marketing have visible socio-economic transformations, i.e., huge houses, vehicles, and a larger budget for food, education, and entertainment.

Most articles related to this subject attributed the low productivity of farmers to the poor quality of the product (Bime et al., 2014; Mina et al., 2021). Low productivity could also be traced to the low participation rate of farmers in the marketing of their goods, unlike wholesalers and cooperatives, who devote more time to marketing activities (Galvez 2019). However, according to Panda (2012), marketing of pineapple depends on the appropriate selection of marketing channels or the choice of non-traditional channels (Naseer et al., 2019).

This paper analyzed the characteristics of existing market channels and channel intermediaries in the pineapple market in Camarines Norte to validate some findings that this factor has a more significant attribution to the productivity of pineapple farmers. The value chain segment of each channel was likewise analyzed as well as the profit shares among farmers and intermediaries. The marketing practices of pineapple farmers particularly on the logic behind their marketing decisions and how will this contribute ultimately to the improvement of their quality of life were further explored and assessed.

## **2. REVIEW OF LITERATURE**

In the marketing of agricultural products, profitability depends on the selection of marketing channels according to Panda (2012). Essentially, a sound channel selection decision is based on sufficient marketing information, strong negotiation skills, and a more comprehensive network. Several studies were conducted along this line to understand profitability in different channels (Gessesse et al., 2019; Wijesooriya, V.R. et al., 2020; and Kaido, 2020) and the factors affecting the selection of channels (Sigei et al. (2014) Apandi et al. 2017, Galvez, 2019; Nahar et al. 2020). However, no specific study on the profitability and the factors affecting the selection of marketing channels for the Queen pineapple variety was ever been conducted.

There are ten pineapple farmers' associations and four cooperatives actively involved in enhancing the pineapple industry in Camarines Norte (Office of the Provincial Agriculturist). The industry is known for its high potential (Balite, 2011), mainly as table fruit. Value creation and product development are still at a fledgling stage initiated by the cooperative. At present, majority of the farmers are focused on the production and have limited market participation.

There are several studies about pineapple marketing channels. Some of them analyzed the profit margins of farmers and intermediaries. A study in Southern Ethiopia indicated the participation of primary and secondary actors in the production and marketing of pineapple. Findings from these studies showed that the highest profit margin was cornered by processors at 33.43%, retailers at 26.96%, wholesalers at 18.33%, and assemblers at 11.86%. The producer had the lowest share of profit margin among the actors at 9.41% (Gessesse et al., 2019).

In Sri Lanka, the highest profit margin went to the retailer at 14-20%, the farmer at 9-13%, and collectors at 5-7%. The lowest share of profit margin went to the wholesaler at 4-8% (Wijesooriya, V.R. et al., 2021). However, a study in Jambi Province Indonesia (Kaido, 2020) indicated that farmers had the highest profit margin among actors at 36.25%, followed by middlemen – 26%, wholesalers – 17.82%, local home industry at around 11%, while the lowest share was cornered by the local trader at 8.93%. In the previous studies conducted, the profit share among concerned sectors was vastly different. This was due to differences in marketing channels and market competitiveness among concerned sectors.

The factors affecting farmers' selection of marketing channels were also analyzed in previous studies. In Isabela, Philippines, there were six (6) marketing channels and four (4) intermediaries, namely: canvassers, traders, processors, and retailers. The factors identified in choosing a marketing channel were based chiefly on loyalty (usual buyers), quality (in terms of size and product handling), and price (based on volume and win-win terms). Galvez (2019) concluded that most of the farmers in Isabela were not keen on prioritizing the marketing activities of their produce.

There were seven marketing channels identified in Sarawak Malaysia, but farmers were inclined to use limited channels due to a lack of awareness. Several factors affecting the choice of channels were identified in Malaysia, these included: 1) price, quantity, and quality of the product; 2) distance between the farm and market center, and 3) service rendered by buyers. Apandi et al. (2017) believed that appropriate marketing channels reduce losses and increase income; hence, marketing information on the availability of marketing channels was crucial. A more recent study by Nahar et al. (2020) in the same area showed five factors affecting farmers' choice of marketing channels, similar to the findings of Apandi et al., with the addition of product perishability.

In Jambi Province, Indonesia, there were only three (3) marketing channels. Farmers sold large quantities of pineapple directly to the wholesaler while the other two channels passed through the intermediaries. Factors affecting the choice of channels based on channel description were a) grading, b) marketing arrangement, and c) the urgent need for money (Kaido, 2020).

In West Bengal, India, there were six (6) marketing channels. Two (2) had the complete chain mechanism. Only one channel is attached contractually with the private processing unit, for which information seems to be limited for analysis; the sector has a high capacity to provide rural employment. The factor affecting the choice of marketing channel was not discussed.

In Kericho County, Kenya, the number of channels was not identified. However, Sigei et al. (2014) identified six factors affecting the choice of marketing channels of smallholder pineapple farmers, namely a) gender, b) group marketing, c) price information, d) pineapple yield, e) contract marketing, and f) vehicle ownership. The findings suggested that males as heads of the household are more risk-taker and market-oriented than the female head of the households.

Most of the previous studies indicated several marketing channels and various factors affecting farmers' selection of the channels in the study areas wherein the dominant factors zeroed in on issues related to market information and the quality of products.

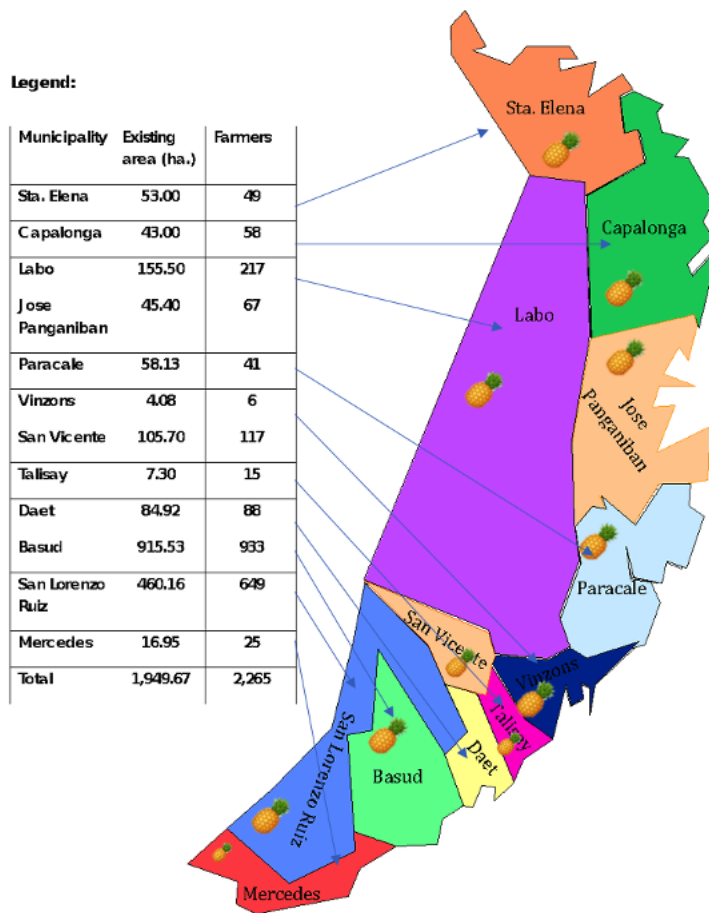
### **3. METHODOLOGY**

The study was purposively conducted in Camarines Norte, where 96% of the total Queen Pineapple production in the country is being produced (PSA 2020). Camarines Norte is located in the Bicol Region in Luzon. Pineapple farmers are scattered in its 12 municipalities with a higher concentration in the first district or southern portion. A total of 96 respondents out of 2,265 farmers were randomly selected for the farmer's survey based on the number of pineapple farmers per municipality.

Primary data were obtained through a survey using semi-structured questionnaires and key informant interviews. Due to the pandemic, the survey was conducted using face-to-face interviews through enumerators for 86 respondents (90%) and telephone interviews for ten respondents (10%) from January-May 2021. For intermediaries, 32 respondents composed of an agent, wholesaler, retailer, and processor were purposively selected. Secondary data were gathered from Local Government Unit offices, the Department of Agriculture, and refereed journals. Chi-square Statistics and cross-tabulation analysis were done using IBM SPSS v 25 to determine the association of socioeconomic variables to marketing channels. Descriptive statistic was used to interpret the factors that influence the selection of marketing channels. Profitability analysis was estimated using marketing costs, net profit, and profit margin. Income was classified according to sources (on-farm and off-farm) and analyzed based on the concept of International Poverty Threshold and Purchasing Power Parity.

In the farmers' survey, more than half of the respondents were male (65%), aged 41-60 (64.5%), with a mean age of 48. This figure is slightly lower than the average age of a total number of farmers at 51, which indicates higher participation of middle age farmers than younger and old-age farmers in pineapple cultivation. Most of the respondents were married (83%) with an average household size of 5 and reached high school level (47.9%). The respondents had an average total farm size of 3.3 hectares and an average of 1.6 hectares allocated to pineapple growing. Almost half of the respondents (41%) owned the land; the rests were tenants or leaseholders. The majority of the farmers intercrop pineapple with coconut while growing other crops and animals, and more than half had off-farm employment (60%) as an additional source of income. For off-farm employment, the farmer respondents perform other jobs such as farm laborer to other farms, Barangay Official, construction worker, and driver, among others. Out of 96, 18 respondents solely depend on income from pineapple.

Figure 1: Existing Area Planted with Queen Pineapple and Number of Farmers per Municipality



Source: A Compendium of Queen Pineapple Industry and Technology Milestones, Campita 2021.

Only 32% of the farmer respondents were members of the cooperative. Cooperative mainly processed and supported members by buying small-size pineapples, which other buyers would otherwise reject. Also, cooperatives provide credit support, marketing linkage, and free training. Most non-members were unaware of the benefits of the cooperative hence the low percentage of membership.

A total of 32 respondents were purposively selected for the intermediaries’ survey, comprised of 16 traders, seven retailers, four agents, four members of cooperatives, and one individual processor. Female respondents included the majority (72%), aged 41-60 (75%), and an average household of 5 members. Most of the respondents were married (72%) and reached high school (41%) and college levels (34%). The majority were operating with a capital of Php 500,000.00 and below (72%), only one had a capital of 1 million, and two had more than two million. The rest preferred not to disclose information on capital.

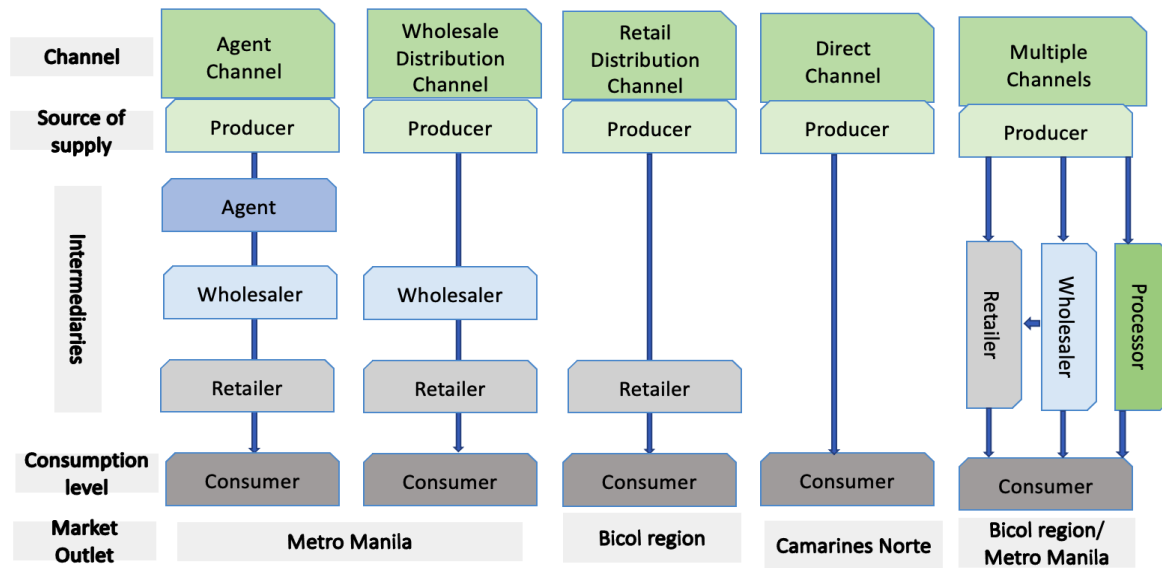
**4. RESULTS AND DISCUSSION**

**4.1. The Nature and Characteristics of the Marketing Channels**

There were five existing marketing channels used to sell pineapple, namely agent, wholesaler, retailer, multiple and direct. As shown in Figure 2, the most extended channel is the agent, and the most straightforward channel is direct. There were four intermediaries: agent, wholesaler, retailer, and processor. The product sold to processors was small-sized pineapples. Accordingly, the farmers who sell to processors also used other channels for the medium and large sizes of pineapples. This channel is called multiple channels.



Figure 2: Marketing Channels of Queen Pineapple in Camarines Norte



Source: The farmer’s survey by the author (2021)

4.1.1. Type of Channels

Farmer-Agent-Wholesaler-Retailer-Consumer

This three-level channel is the longest in Queen pineapple marketing and was chosen by 17 or 18% of the respondents (Figure 2). Farmers agreed on the price with the agent and got paid as early as two weeks before harvesting. Agents charged Php .5 to 1 per fruit or 5% of the gross sales per successful transaction.

The agents do not buy or sell pineapple by themselves. The wholesalers commission them. The wholesalers facilitate postharvest and marketing activities. Similar to the wholesaler channel, wholesalers supervise the harvesting, grading, uploading, and transporting of pineapples. Most pineapples were transported to Metro Manila by the wholesalers in this channel. Some wholesalers have their market outlet in Metro Manila and sell directly to consumers, while others sell pineapple to retailers. The retailers sell pineapples to the consumer.

There are at least 16 pineapple agents in Camarines Norte mostly based in Basud; some agents are also farmers. Although Agents have coverage areas that can span from one municipality to the entire province, 16 out of 17 farmers who chose the agent channel were residing within or nearby municipality, hence living nearby the agents. An agent has an average client of 10 farmers. The agent visits actual farm plantations and discusses marketing schemes and pricing with the farmers. If an agreement is not immediately made, the agent leaves contact numbers to farmers in case the farmers decide to sell.

The advantages of this channel from the farmers' viewpoint are a standing relationship with the agent and convenience. Filipino farmers are shy and overly grateful which prevents them from doing marketing negotiations with people they do not know and trust. Since agents were visible at the farm level, farmers develop a habit of selling harvest to them rather than exploring other marketing channels. Farmers also believed that this setup is very convenient since they need not go out of the farm to scout for buyers, the agents go to them. The disadvantage is that farmers cannot negotiate further to increase an agreed price in case the farmers see that the previously agreed price is not sufficient.

Farmer-Wholesaler-Retailer-Consumer

This two-level channel is where the wholesalers buy the pineapple harvest in large volumes. In this channel, postharvest activities such as harvesting, grading/sizing, packaging, and transportation are done by the wholesaler. Most respondents, 57 out of 96, preferred this channel due to its convenience and fast transaction. Most farmers devote time to planting up to harvesting but are less interested in marketing activities. Farmers prefer channels with less market participation and activities such as but not limited to planning the marketing scheme, identifying who and where to sell, setting the price, negotiating, and or directly selling the harvest.

Wholesalers of pineapple in Camarines Norte are locally called traders. There were seven registered wholesalers/traders based within the province, which operate with a total capital of 1.1 million. Registered wholesalers are wholesalers with legitimate business names and area coverage issued by the Department of Trade and Industry (lifetime) and with the business permit issued by the municipal mayor (renewable per year). Registered wholesalers can be provided with a foodlane pass/sticker upon request. Foodlane accreditation is given to *viajeros* to ensure smooth delivery of products, especially

during the pandemic where border restrictions were implemented (Department of Agriculture, 2020) and in normal conditions where traffic flow is heavy.

Each trader has a contact of 2-3 agents. Traders transact with agents or directly with farmers. Farmers can borrow money from traders as early as the planting season; hence an informal marketing agreement was made that the farmer would sell to its creditor. Similar to the agent channel, most of the pineapple in the wholesaler channel is transported to Metro Manila.

Compared to the agent channel, the advantage of this channel is that farmers can further negotiate the price which may otherwise be paid for the agent's fee. Hauling from the farm to the road is usually shouldered by the farmers. However, in this channel, farmers may negotiate to split the cost of the hauling fee or increase the price of the harvest. However, to directly sell to the trader, farmers must go to the trader's house and request for farm visit before negotiation.

#### Farmer-Retailer-Consumer

This one-level channel is where the farmers sell fresh pineapple to retailers. Only 3 or 3% of the respondents chose this channel due to its limited absorptive capacity. A single retailer can only accept up to 4 metric tons per transaction. Hence, farmers would have to look for several retailers or use a combination of channels to market the excess volume. The retailer group is composed of market and street vendors. The retailers operating within the Bicol Region sell at a lower price than the retailers in Metro Manila. Local retailers with market outlets sourced out supply from farmers who are relatives, neighbors, or those whom a trusted person recommended. Street vendors often sourced out supply from commercial farmers with 1-hectare plantation and above who sell rejects and portions of their good size harvest.

#### Farmer – Consumer

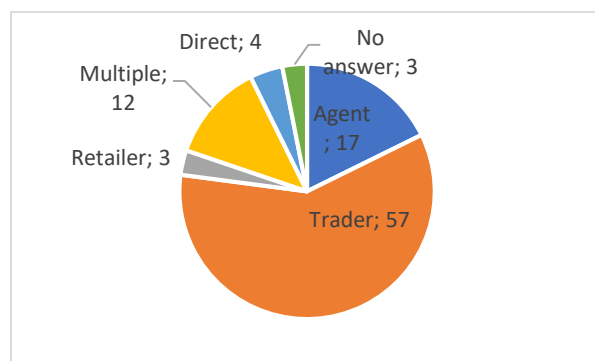
Direct marketing to consumers is the simplest channel. This was chosen by 4 or 4% of the respondents. Without intermediaries, farmers facilitate the postharvest and marketing activities and incur corresponding marketing and wastage costs. Farmers sell pineapple by using a hauler (tricycle) to go house to house within the nearby barangays and municipalities. A farmer can sell an average of 600 pcs sold at Php 15.00-20.00. Thus a farmer earns a round Php 10,000.00 and spent Php 500 on gasoline and Php 500 on food. Farmer also sells pineapple directly to the consumer by renting stalls in the market at Php 300.00 per day. Depending on the demand, pineapples sold at market stall ranges from 500 to 1000 pcs per day at Php 15.00 -20.00 per piece. However, depending on the ripeness of pineapple and the quality of the road, wastage may range from 30 to 50 pieces a day. Other than the capital, the perishability of Queen pineapple hinders the farmer from choosing this simplest channel despite higher potential income. Hence, one strategy is scheduled application of growth regulator to be able to sell pineapple by batch.

#### Multiple channels

In multi-channel, the farmer decides to sell pineapple through various channels. Some farmers divide their harvest to retailers and processors and/or directly sell it to consumers. Of the twelve respondents who chose this channel the following combination was reflected in the data: a) Sell half of the produce to the trader and half directly to consumers b) sell to the agent and sell half of the harvest directly to traders, c) Sell half to the retailers and the other half of the product directly to consumers, d) sell one third to retailers, one third to cooperative and one third directly to consumers, and e) sell to agent and retailer or sell to trader and half to the retailer. Selling to multiple channels was preferred by 12 or 13 % of the respondents.

Selling harvest for processing to cooperatives also appeals to backyard producers, with limited capital; backyard producers have a limited number of plants and budget for fertilizer and weed control, resulting in a high number of small fruits suited for processing. Further, processors cannot buy in large volumes as they limit the number of fruits to process each day; hence the absorptive capacity of the cooperative is also limited, like the retailer channel.

**Figure 3: Number of Respondents by Marketing Channel**



Source: The farmer's survey by the author (2021)

#### 4.1.2. Type of Intermediaries

Channel intermediaries are among the most critical elements of any supply chain, as the bulk of output passes through them (Sharma, et al., 2020). In the Queen pineapple marketing channel, there are up to three layers of intermediaries. The first layer is the intermediaries who purchase pineapple from farmers, the second layer is the wholesalers who transact through agents, and the third layer is the retailers who purchase from the wholesaler. These retailers who purchase products from the wholesalers are mostly based in Metro Manila. Table 1 shows the absorptive capacity of the first layer of channel intermediaries who purchase directly from farmers.

**Table 1. Characteristics and Absorptive Capacity of Intermediaries in The Marketing Channels of Queen Pineapple**

Intermediaries	Nature of Business	Purchasing Area	Qty. per Transaction (pcs)	Volume Traded per Month (MT)	Destination	Form of Commodity
Agent	Not registered	Farm Site	25,000	up to 160	Metro Manila	Fresh
Wholesaler	Registered or					
	Not Registered	Farm Site	20,000	up to 20	Bicol Region	Fresh
Retailer	Not Registered	Farm site/ Market Outlet	15,000	up to 4	Camarines Norte	Fresh
Processor	Registered	Consolidating /Processing Area	3000-25,000	1-160	MM/Bicol/CN	Processed and Fresh

Source: The buyers' survey by the author (2021)

The wholesalers have the largest absorptive capacity of up to one truckload per transaction. Wholesalers are concentrated in the municipality of Basud, where a large plantation of Queen pineapple is located. They offer cash advances to farmers during the production period from planting to fruiting, harvest the fruits through hired laborers, and haul the harvest from access road near the farm to the market.

Retailers are usually not registered, they are mostly street vendors and market vendors. Travelers in Camarines Norte during peak season were greeted by vendors along the highway selling their pineapples arranged in nipa hut or "Bahay Kubo". Retailers distribute pineapple within the Bicol region due to limited logistics and absorptive capacity.

Processors in this paper refer to registered cooperatives processing pineapple on a commercial scale within the province. The strategy of the cooperative is to process smaller fruits into juice and other by-products to help smallholder farmers. However, the cooperative also has a limited absorptive capacity and can only buy up to 5,000 for processing and up to 25,000 for fresh products using a pre-arrangement agreement or contract. As needed, the cooperative assists members in selling their produce; at some point, cooperatives also act as wholesalers or retailers.

**Table 2: Distribution of Harvest per Channel**

Intermediaries	No. of respondents	Total Harvest for one cycle (pcs)	Percentage (%)
Agent	17	317,650	20
Wholesaler	57	1,043,843	67
Retailer	3	62,120	4
Direct	4	81,050	5
Multiple	12	63,580	4

Source: The farmers' survey by the author (2021)

Intermediaries play a crucial role in Queen pineapple marketing, with 95% (Table 2) of the products passing through them before reaching consumers. Except for direct, where the farmer sells directly to consumers, all channels were indirect, where farmers sell to intermediaries. Since traders only commissioned agents, the absorptive capacity is the same as that of wholesalers.

#### 4.2. Profitability Analysis

The activities, estimated price, cost, and profit of farmers and intermediaries are shown in Table 3. In the agent channel, the average farm-gate price of pineapple is 5.52 Philippine pesos (Php) per piece. The farmer spent Php 3.73 per piece from planting to harvesting and earns Php 1.78. In this channel, farmers have no postharvest and marketing participation. The farmer negotiates with the trader, who gets at least 5% of the total gross sales per transaction. Therefore, the profit of the agent is Php 0.27 per piece. The agents' fee is added to the cost incurred by wholesalers and does not affect the farm gate price.

The wholesaler purchases Php 5.52 from farmers and sells Php 10.60 to retailers. They pay Php 0.27 to agents. The wholesalers hired laborers to harvest, haul, grade, sort, load and unload and transport the product to the market outlet, usually in Metro Manila. They spend Php 2.32 on these activities. Therefore, their profit is Php 2.49. The retailers usually rent market stalls and pay for hauling, sorting, and vending labor. They purchase at Php 10.60 from wholesalers and spend Php 2.83 on their activities. They sell at 22.10 to consumers. Therefore, the retailers' profit is Php 8.67.

Hence in the agent channel, the total cost for production and marketing is Php 8.89, and the profit is Php 13.21. The profit among farmers and intermediaries is 13.5% for farmers, 2.0% for agents, 18.8% for wholesalers, and 65.6% for retailers. The highest profit goes to retailers similar to the findings of Wijesooriya, V.R. et al.(2020), on profitability analysis of farmers in Sri Lanka and contrary to the study of Kaido (2020) that farmers in Jambi province Indonesia get the highest profit share among the actors. Farmers have no postharvest and market participation while the wholesalers perform the heavy activities in the channel. The agents merely negotiate and earn the lowest per transaction.

The wholesaler channel is almost the same as the agent channel. The agent's profit is added to the wholesalers as the agents are removed from the channel. The wholesalers directly transact with farmers and reduce the cost of the agents' fee. As a result, had an increased profit of Php 0.27 per piece compared to the agent channel. Retailers' cost, profit, and product prices in the wholesale channel are the same as that of the agent channel. This is the most profitable channel for the wholesalers. The wholesalers profit by economies of scale, purchasing and delivering huge volumes to metro manila, and backloading vegetables to the province.

In the retailer channel, the farmer incurred additional costs on postharvest and marketing activities but earned an additional income of Php 0.9 per piece compared to agent and wholesaler channels because of the higher purchase price. The retailers purchase at a higher price Php 7.64, but the selling price to the consumer is lower than the agent and wholesaler channel. In this channel, retailers are mainly based within the province of Camarines Norte and sometimes sell in the nearby provinces of Camarines Sur, Albay, and Sorsogon. The retail price in the province is lower than that in Metro Manila.

Also, retailers spend more than the agent and wholesaler because of additional activities. Therefore, the profit of retailers in the retailer channel is Php 5.15, which is lower than the profit of retailers in the agent and wholesaler channel. In this channel, the total cost for production and marketing is Php 8.08, and the profit is Php 7.83. The proportion of profit between farmers and retailers is 34.2% and 65.8%, respectively. Though the retailers get the highest profit share, this is the point where pineapples are rapidly decaying. Hence the risk of losses once the pineapples are not sold immediately was high.

In the direct channel, as there is no intermediary in this channel, the farmer performs all the activities from planting to harvesting, grading, loading, and transporting the products to the market outlet and directly selling to consumers. In this channel, the cost spent by the farmer is the highest because the farmer has to bear all the costs. The farmers' cost is doubled compared to the agent and wholesaler channel at Php 3.08 per piece and around Php 1.85 per piece increase compared to the retailer channel. The retail price is also the lowest, but farmers earn the highest profit at Php 8.61 per piece because the farmer gets all the profit.

In multiple channels, farmers may opt to use a combination of any of the four channels mentioned, and incurred cost and earned profit depend on the specific combination. To engage in this channel, farmers need sufficient market information and a network of contacts to sell pineapple using different channels.

The direct channel brings the largest profit to the farmer. However, the farmer conducts more activities than the other channel. The direct channel had the lowest cost and gained all of its profit because of the absence of intermediaries. However, it should be noted that there is a limit to the quantity that can be sold in the province. As mentioned above, a large part of the pineapple is sold in Metro Manila. Even though the local markets are more profitable for the farmer than Metro Manila, the primary market is still Metro Manila.

The most affordable retail price was at the direct channel at the consumer level. This was expected because of the reduced marketing layers, the farmers can earn more, and the consumer can buy a pineapple at fair value. The direct channel is where the farmer and the consumer benefit the most.

**Table 3: Activities, Estimated Price, Cost, and Profit of Farmer and Intermediaries per Channel**

Channel	Particulars	Farmer (Php/pc)	Agent (Php/pc)	Wholesaler (Php/pc)	Retailer (Php/pc)
AGENT CHANNEL	Price	5.52	5.79	10.60	22.10
	Cost	3.73	5.52	8.11	13.43
	Profit	1.78	0.27	2.49	8.67
	Activities	Planting to Fruiting, Hauling from farm to access road	Negotiation	Harvesting, Grading, Up/Unloading, Transporting	Sorting, Selling to Consumer
	Price	5.52		10.60	22.10

WHOLESALE CHANNEL	<b>Cost</b>	3.73	7.81	13.43
	<b>Profit</b>	1.78	2.79	8.67
	<b>Activities</b>	Planting to Fruiting, Hauling from farm to access road		Negotiation/ Harvesting, Grading, Up/Unloading, Transporting
RETAILER CHANNEL	<b>Price</b>	7.64		15.91
	<b>Cost</b>	4.96		10.76
	<b>Profit</b>	2.68		5.15
	<b>Activities</b>	Planting, Harvesting, Grading, Up/Unloading, Transporting		Sorting, Transporting to market outlets, Selling to the Consumer
DIRECT CHANNEL	<b>Price</b>	15.42		
	<b>Cost</b>	6.81		
	<b>Profit</b>	8.61		
	<b>Activities</b>	Planting, harvesting, Grading, Up/Unloading Transportation, and selling to the consumer		
MULTIPLE CHANNEL		combination of any channels above		

Note: \* Source: The farmers' and buyers' survey by the author (2021)

The result showed that income from the direct channel is 384% higher compared to the agent and wholesaler and around 221% higher compared to the retailer channel. It is evident that the highest profit for farmers comes from direct channel however, only four respondents are capable of doing direct selling. Since the capital requirement is way above most farmers' financial capacity, farmers must be empowered to participate in marketing activities through the direct channel. To do this, farmers must have sufficient capital of Php 200,000.00 to produce and self-market around 30,000 pcs of pineapples. There must be available loan windows that farmers can access not from traders but from banks or cooperatives.

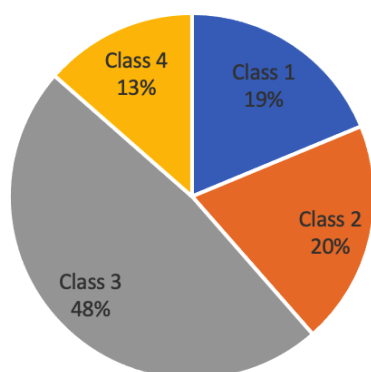
Further, the result showed that the channel varies mainly on cost requirements and the activities involved in each level. However, both cost requirements and activities involve money. Hence the bottom line of the farmer's decision relies on the capacity to finance the whole process from planting, harvesting, postharvest, and marketing. More so, sufficient marketing information is needed to empower them to perform these activities as to cost and prices per channel, network and negotiation skills, and building long-term relations with their clients.

#### 4.3. Socio-economic Characteristics of the Respondents Relative to Marketing Channels

To understand the economic situation of pineapple growers in Camarines Norte relative to the selection of marketing channels, sources of income were classified and analyzed based on the concept of the poverty threshold and purchasing power parity. Factors affecting the selection of marketing channels were also interpreted to understand why they choose specific channels.

##### 4.3.1. Income Classification of Farmer Respondents per Channel

There were four classifications of pineapple farmers' income sources: Class 1- pineapple (mono-cropping) without off-farm employment, Class 2-Pineapple with other crops and animals without off-farm employment, Class 3 - Pineapple (monocropping) and off-farm employment, and Class 4-Pineapple with other crops and animals and off-farm employment. Only 19% of the respondents relied on income from pineapple only. Some had grown other crops (20%), while some performed off-farm employment to augment income from pineapple monocropping (13%). Meanwhile, most of the respondents (48%) had a combined income from a pineapple while raising other crops and animals and performing off-farm employment.

**Figure 4: Percentage of Respondents by Income Class**

Source: The farmer's survey by the author (2021)

As shown in Table 4 below, the respondents' average actual income (combination of on and off-farm income) was Php 91,808.29 or Php 7,650.00 per month. Among the channels, the highest actual income was found in multiple channels and the lowest actual income was found in the retailer channel.

Hence, farmers in a specific class must choose the channel which reflected the highest income. It can be noted that if farmers mono-crop pineapple without off-farm employment, it is better to sell pineapple through retailers or directly sell to consumers, or a combination of both. If a farmer grows pineapple with other crops, it is best to sell pineapple directly to the consumer along with harvest from other crops to maximize income. However, if a farmer is a mono-cropping pineapple and at the same time has off-farm employment, the best channel is the wholesaler channel. This would save his time and labor which would otherwise be spent on his off-farm employment. Meanwhile, if a farmer has multiple crops and off-farm employment, he could earn more by using a combination of channels.

**Table 4: Average Annual Income vs Average Required Income of Farmer Respondents by Income Classification per Channel**

Income class	Marketing Channel					Average Actual Income (Php)	Average Required Income (Php)	Income difference (Php)
	Agent	Wholesaler	Retailer	Multiple	Direct			
Class 1		45,689.67	70,445.00	85,000.00	62,605.00	50,186.61	58,600.75	-8,412.14
Class 2	31,757.50	58,000.83	41,285.25	44,110.88	71,812.00	52,008.45	61,210.50	-9,202.05
Class 3	30,536.33	114,352.50		42,562.50	69,300.00	66,680.23	49,932.00	16,648.33
Class 4	102,594.44	135,013.48		180,978.25		131,634.72	60,854.63	70,780.09
<b>Total</b>	<b>68,828.41</b>	<b>97,534.96</b>	<b>51,005.17</b>	<b>115,822.96</b>	<b>68,882.25</b>	<b>91,808.29</b>	<b>59,023.35</b>	<b>32,784.93</b>

Source: The farmer's survey by author (2021)

To assess the economic situation of the farmer respondents per class and channel, the actual income was compared to the required income based on the International Poverty Line (IPL) currently at \$1.90 a day (Kenton, 2020). IPL is the threshold that someone is living in poverty. Compared to the Purchasing Power Parity (PPP) Threshold of 19.5 LCU per 1\$ per adult per day, a family of five requires Php 5,634.69 per month or **67,616.25** per year. Based on this data, farmer respondents under Classes 1 and 2 are living below the IPL, while farmer respondents with off-farm employment under classes 3 and 4 have better economic conditions.

To further assess the association of income and other socio-economic factors of the respondents, the chi-square statistics were employed to determine if the observed connection in cross-tabulation was statistically significant. Results showed that marketing channel has a significant association with gender, civil status, location, and source of income.

**Table 5: Association of Marketing Channels to Socio-Economic Factors of the Respondents**

Variable	Pearson Chi-Square	df	Asymptotic Significance
Gender	9.449	5	.092*
Civil Status	35.749	20	.016*
Educational Level	20.228	25	.735
Cooperative Membership	21.446	15	.123

Years in Farming	37.284	25	.054
Land Area	25.991	25	.408
Land Tenure Status	23.119	20	.283
Source of Information	15.780	30	.985
Location	69.267	35	.001*
Source of Income	28.012	15	.021*

\*Significant at 5% level

Cross-tabulation results suggest that the majority of men (n=37) and the majority of married respondents (n=50) preferred the wholesaler channel. This may be an indication that men may want faster transactions than female respondents. Married respondents who preferred the wholesale channel may be more financially pressured than single, widowed, or annulled respondents.

Further, most of the respondents from San Lorenzo Ruiz and Basud (n=34) preferred the wholesaler channel while 16 out of 17 respondents who chose the agent channel are living in Basud. This may be an indication that these respondents are living in proximity to the agent and wholesalers. Also, most of the respondents whose source of income was from pineapple multi-cropping and with off-farm employment (n=28) believed that the wholesaler channel is the most favorable.

#### 4.3.2. Factors Affecting Selection of Marketing Channel

Market channels are the series of pathways a product must go through and transform before it reaches the consumer. Choosing the right marketing channel is an important decision a farmer makes every harvest since it may reduce losses or increase income (Apani, 2017). This decision is crucial and dictates the speed of transaction, the amount of money paid for the product, and the quality of the product upon reaching the consumers.

Table 6 summarizes the factors considered by the farmer in choosing a marketing channel. The farmer-respondents chose two factors on average. The predominant issue was quick cash, chosen by 60 out of 96 respondents (62.5%), and was selected 22.9% of the time. The second leading issue was time-saving (40.6%). High income ranked third among the issues (38.5%). Borrow capital was the least selected issue for choosing a marketing channel (2.1%) and was chosen two times out of 261. The quick cash being the top consideration is highly expected considering that pineapple farmers waited a long time to produce pineapple and had accumulated financial responsibilities at the end of the production period.

**Table 6: Factors that Influence the Selection of Marketing Channels**

Income Classification	Marketing Channel					Total
	Agent	Wholesaler	Retailer	Multiple	Direct	
Quick Cash	4	45	1	7	1	58
Time Saving	4	26	1	5	1	37
Less Labor Cost	7	23	2	2	1	35
High Income	8	20	1	4	2	35
Habit	13	4	2	4	-	23
Efficiency	7	8	1	3	-	19
Security	-	12	-	4	-	16
Recommendation of Trusted Person	6	7	-	2	-	15
Stability	3	1	1	2	1	8
Other reasons	2	1	-	-	1	3
borrow capital	-	1	-	-	1	2
No answer	-	-	-	-	1	1
<b>Total</b>	<b>17</b>	<b>57</b>	<b>3</b>	<b>12</b>	<b>4</b>	<b>*93</b>

Source: The farmers' survey by the author (2021)

\*Three (3) respondents have not indicated the market channel preference

The main factor influencing the selection of the Agent Channel is Habit (75% or 13 out of 17 respondents). Farmers using this channel have developed a trusting relationship with the agents and were not interested in exploring other channels. This is similar to the findings of Galvez (2019) that pineapple farmers in Isabela chose the channel because of loyalty. Further, farmers chose the agent channel because of perceived efficiency, lower labor costs, recommendation of a trusted person, and high income. However, profitability analysis (Table 3) showed that the agent channel has the lowest profitability at the farmer level. Hence, this indicates that farmers lack market information on comparative profitability data per channel similar to the findings of Kaido (2020).

The main factor influencing the selection of the Wholesaler Channel is Quick cash (79% or 45 out of 57 respondents). Quick cash was the main reason for 45 respondents who chose the wholesaler channel. The long production cycle depletes farmers' capital due to pineapple production's high labor and materials costs. The wholesaler channel was the fastest way to get cash since wholesalers have capital and can lend cash in advance or pay cash at an agreed time. Farmers prioritized Quick cash due to financial pressure to sustain production and personal needs. This was also the findings of previous studies that farmers preferred immediate payment (Blandon et al., 2009; Gelaw et al., 2016; Ochlang, 2020; and Schipamn and Qalm as cited by Ihli et al., 2021) despite available options with higher profitability (Fisher & Qalm, 2014). In this case, there were other marketing channels where profit margin would be higher, but due to financial pressure majority of the farmers chose the wholesaler channel.

The main factor influencing the selection of the Retailer channel are saving labor and habit (67% or 2 out of 3 respondents). Farmer respondents who chose this channel believed that selling to a trusted retailer can save labor costs compared to other channels. Selling out of habit indicates that the farmer and the retailer have a long-term relationship which proves convenient to the farmers. Since retailers have limited absorptive capacity, farmers who chose this channel has also limited production which is best suited to this channel.

The main factor influencing the selection of Multiple channels is quick cash (58% or 7 out of 12 respondents). Since this was a combination of channels, the farmer enjoyed the advantage of quick cash by selling to wholesalers or agents and high income by selling to the retailer or directly to the consumer. However, in choosing this channel a farmer needs additional capital, a wider network, and preferably a delivery vehicle.

The main factor influencing the selection of the Direct Channel is High Income (50% or 2 out of 4 respondents). Farmer respondents who chose this channel must have bigger capital and available logistics compared to other respondents. Since financial pressure is not a hindrance, farmers in this channel can independently decide on the methods of selling, grading, and pricing their produce.

Expectedly the main factor influencing the overall selection of channels is quick cash (60.4% or 58 out of 96 respondents). It can be deduced that respondents who chose this factor as the main consideration have experienced an urgent need to get back the capital they used in pineapple production to pay for other financial responsibilities. Financial pressure limits the respondents in choosing the most profitable channel.

The findings of this study revealed that pineapple farmers in Camarines Norte are similar to pineapple farmers in Isabela wherein most farmers could not sell their produce (Galvez, 2019), have an urgent need for money (Kaido, 2020) and prefer channels with limited marketing participation. To encourage participation in formal marketing of farmers in India, Panda (2012) recommended the enhancement of access to market information, training and education, value addition, and improved logistics.

## **5. CONCLUSION AND RECOMMENDATION**

Around one-third of the pineapple farmers in Camarines Norte were living below the poverty threshold which means their income was not sufficient to finance the basic necessity. The long production period and high cost of pineapple cultivation result in strong financial pressure at the time of harvesting and marketing which hinders most of them from choosing an appropriate marketing channel.

Pineapple farmers have five marketing channels as options in marketing their products, however, the wholesaler channel was selected by a majority of the respondents due to quick cash, time-saving, and saving labor, despite lower profit compared to other channels. Among the intermediaries, the wholesaler has the most considerable capital and high absorptive volume capacity which enables them to capture the majority of the harvest delivered to market outlets outside the province. Retailers in Metro Manila get the highest profit share. Profitability analysis showed that farmers get the highest profit using direct channels however, the farmer gets to do more work and spend more than other channels and can only sell at a limited volume within the province.

A significant relationship relative to marketing channels was traced to the interplay of the following key factors: gender, civil status, location, and source of income. The majority of males, married status and with residence nearby an agent or wholesaler tend to choose the agent and wholesaler channels. Respondents with higher income were also located in the southern part of the province implying that economic opportunities are higher in the southern area.

Income analysis showed that to increase income, farmer respondents specifically under classes 1 and 2, may have to weigh between two options 1) expand production through enhanced multi-cropping and improving production management of pineapple to improve quality, or 2) get off-farm employment while growing pineapple and other crops. Respondents without off-farm employment have a greater challenge to increase their income by 25-30% to live above the poverty line. Profitability estimates provided evidence that choosing a direct channel can potentially bail them out of poverty.

This can be done by selling directly to the consumer by batch through synchronized harvesting. However, it entails selling at a limited volume and requires additional work and capital. To resolve this, farmers may strategize the application of growth



regulators to harvest and sell by batch to reduce marketing losses. Farmers may also adopt a multi-crop pineapple production system to maximize land utilization and increase productivity or secure off-farm employment.

Farmers may also initiate joint marketing by establishing a network of farmers who are willing to pull resources and consolidate harvest to sell within and outside the province. Further, farmers may also engage in active membership with the cooperative and seek the support of local government units (LGUs) and the Department of Agriculture to strengthen market linkage and sell a consolidated volume of pineapple in Metro Manila. Lastly, farmers may adopt the value chain concept, especially in the processing and marketing chain to add value to the product.

For further studies it is recommended to develop strategies to enhance access of pineapple farmers to market information to serve as a basis for the efficient selection of marketing channels; and assess the level of assistance provided by the LGU, DA, DTI and other concerned agencies in terms of farming sustainability; and identify sustainability mechanisms for the pineapple industry via policy imperatives.

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**AGRICULTURAL-FOOD SUPPLY CHAIN DESIGN WITH THE CPFR APPROACH: AN APPLICATION**

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**Permanent link to this document:** <http://doi.org/10.17261/Pressacademia.2022.1554>**Copyright:** Published by PressAcademia and limited licensed re-use rights only.**ABSTRACT**

**Purpose-** Agri-food supply chain is an important supply chain for our country in terms of both cost and food safety. In this context, the selection of suppliers, manufacturers and logistics companies that make up the chain and the relations between them are extremely important, and the quality of the companies that make up the chain must be high in order to create effective and efficient supply chains. In this study, the author aimed to conduct a research on the creation of an integrated supply chain with a collaborative approach. The framework of the study is limited to the producers, suppliers and logistics enterprises, which are the main actors in the agriculture-food value chain.

**Methodology-** The author proposes an integrated methodology for collaborative work in the agri-food supply chain. Within the framework of the methodology created within the framework of the CPFR method, the chains that enable the stakeholders included in the system to deliver the product to the demand points at the most affordable cost were determined by the linear programming model. In the second stage, meeting the demands created with random numbers was simulated. Finally, the suitability of the model was tested with the data of a company.

**Findings-** The findings show that the product moves less if the stakeholders in the chain are correctly matched within the framework of the collaborative approach. In addition, it has been seen that the needs of both demand points are met thanks to the correct match. In addition, a positive effect has been achieved in the use of the stakeholders' capacities.

**Conclusion-** This article is one of the first studies that looks at the agri-food supply chain in an integrated way and evaluates the processes within the framework of a collaborative approach. The study also contributes to improvement in the sector in terms of including the stakeholders involved in the collaborative process into the system according to the criteria determined.

**Keywords:** OR in agriculture, agri-food, agri-food supply chain, holistic design, CPFR**JEL Codes:** M11, Q10, S19**1. INTRODUCTION**

Agricultural products are products that have an important place in human life. They are basic foodstuffs for nutrition. Therefore, for a healthy diet, these products must be grown, collected, preserved and delivered to consumers in suitable conditions. One of the main objectives of the agricultural sector is to ensure food security. The aim of food safety is to prevent deterioration of foodstuffs and to extend their shelf life. Fresh vegetables and fruits are among the products with a short shelf life in the food industry and must be consumed within a certain period of time. Therefore, it is of great importance that the products are delivered to the consumer quickly, in sufficient quantity and with the same quality.

The agricultural sector contributes to the development of both sectors by creating demand for both its own products and industrial products. Since agricultural products are compulsory consumption products, the demand for these products will increase in parallel with the population growth in both rural and urban areas. Turkey's growing population requires more effective and

efficient management of the agricultural sector. In this context, it is of great importance to deal with the agricultural sector with a supply chain management approach. Supply chain management entails planning, executing, monitoring and controlling the stages from the first material to consumption together.

Agricultural product producers are one of the most important links of the agri-food supply chain. Manufacturers can sell their products in two ways. They either harvest the product and take it to the wholesale market with their own means and sell it there through brokers, or they sell directly to retailers such as supermarkets. On the other hand, temperature changes at any level during the period from the date of harvest to consumption of fresh vegetables and fruits cause deterioration in their physical and chemical structures. Therefore, many vegetables and fruits are wasted because they are not properly stored until they reach the final customer from the field. Considering all these factors, the long product flow in the agri-food supply chain increases losses and costs.

However, developing effective strategies to meet the consumer demand for agricultural products while responding to the ever-increasing changes in lifestyle and nutritional preferences is a highly complex and challenging issue. Although the distribution of perishable products such as food is multi-stage, an integrated supply chain structure should be established as the products must be delivered to the end user as quickly as possible. An integrated agri-food supply chain should include distribution and logistics processes, along with production planning and stock control. An integrated and well-designed production schedule and delivery routes should be established in order for suppliers to supply the freshest food and meet customers' requirements in a cost-effective way (Chen & Haihong, 2013).

Within the scope of this article, first of all, literature research on the agri-food supply chain was conducted. Afterwards, a methodology for integrated supply chain design was developed within the framework of the CPFR approach. In the rest of the article, linear programming model and simulation methods were applied within the scope of the application steps of the established methodology and the model was tested on a company data. In the last part of the article, the results of the study are discussed.

## **2. LITERATURE REVIEW**

Developing effective strategies to meet consumer demand for agricultural products, while responding to ever-increasing changes in lifestyle and dietary preferences, is a complex and challenging issue.

Aramyan et al. (2007) assessed the appropriateness of a new conceptual model formed to measure performance in agri-food supply chain in their study. The frame of an integrated performance measurement system was formed and this structure was assessed in the tomato supply chain from producer to retailer in the Netherlands and Germany.

In Ahumada and Villalobos (2009) research, literature review has been done on the studies of agri-food production and distribution. They classified the models successfully used in agri-food supply chain according to the features such as product type and plan range. They showed the literature gaps for further researchs.

Folinas et al. (2013) proposed a perspective view that uses lean thinking tools in order to support green supply chain and logistics management in agri-food supply chain. They used the Value Stream Mapping (VSM), the lean thinking technique in order to detect the activities that do not create any value in the agri-food supply chain. They showed that this model could be useful and fruitful in forming the green agri-food supply chain.

Fang and Leung (2009) proposed a Collaborative Planning Forecasting and Replenishment (CPFR) approach for a supply for agricultural products. By extending a two-tier supply chain to a multi-tier supply chain, an n-tier CPFR model was created and the concept of collaborative transportation was integrated into the model. Finally, the model was analyzed with a case study and its effectiveness was confirmed (Fang & Leung, 2009).

Lamsal et al. (2016) proposed the logistic organization model from the field to the plants or to the warehouses. The two-stage solution technique was proposed in order to minimize the changes in flow of product transportation vehicles. In the first stage, the time to start yield in the field was modelled as deterministic parameters, and in the second stage, the number of required vehicles to be ready for every load was determined.

Giggler et al. (2002) proposed an optimization approach that use linear programming model (LP) aiming at the quality of the products in agri-food supply chain. The suggested LP model was developed in MATLAB program providing optimum solutions for agri-food supply chain optimization.

Chen et al. (2013) applied a supply chain simulation model on a real case with agricultural production and cooperative-centered distribution systems. Three existing models of agricultural distribution systems were created, the models were optimized quantitatively, and finally, key performance indicators of all supply chains were evaluated by simulating (Chen et al. 2016).

Sanjaya and Perdana developed a logistics model for selling local farmer-produced tomato product in a structured market. In this model, a different simulation approach is used, which is simulated by state change (Sanjaya & Perdana, 2015).

Ferreira J.O. et al. (2016) Using the system dynamics of orange production and industrial processing in Brazil, a simulation model was applied and an integrated system was created.

Ahumada and Villalobos (2011) proposed the mixed integer model for the yield and distribution planning of perishable agri-products. The proposed mixed integer model is to help producers yield, pack and distribute products in complicated and changing conditions. This model offered a sample solution based on presumptions studying tomato and pepper.

Zhong et al. have searched the needed information to be used in forming an agricultural information center that aims to meet the need of information among suppliers in vegetable supply chain. In southwest China, the survey has been carried out with agri suppliers in person. The structural equation model that uses composite indicator variables in answering the questions has been used (Zhong et al.2015).

In the study of Behzadi et al. (2017), strategic and tactical problems in the agricultural supply chain network were discussed together. The Mixed Integer Linear Programming Model was applied in the supply chain case of the kiwi product to analyze the performance of a strong and flexible strategy for reducing the risk of harvest time and yield of agricultural products (Behzadi, et al., 2017).

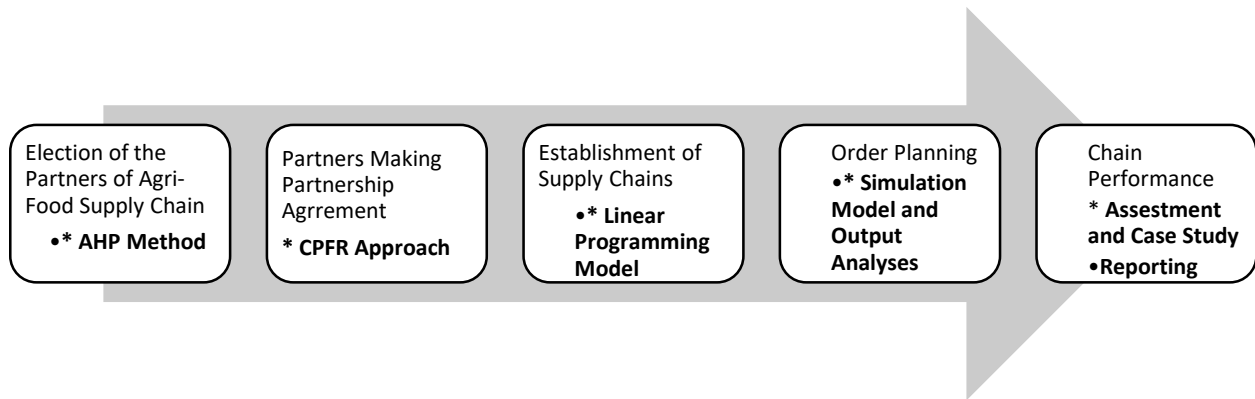
The only study that looks at the agricultural products supply chain on a holistic basis is Tsolakis et al. (Tsolakis, et al., 2014). This study is on a conceptual basis and does not include a holistic solution. Therefore, the methodology proposed in this study has been developed to address this deficiency. In particular, a study that envisages the establishment of an effective supply chain, which includes the selection of suppliers, manufacturers and logistics companies (conformity assessment) and carries out the selection of the manufacturer and logistics companies together, with a holistic perspective is aimed.

### **3. DATA AND METHODOLOGY**

The long flow of products in the agri-food supply chain increases losses and costs. The losses from farm-to-table could be very different depending on the development level of the countries. For this reason, the activities that do not create any added value in this process must be eliminated and short circuit supply chain must be established. In this study, a methodology was developed for the holistic solution of the problems encountered in agri-food supply chain management and an application was made on the tomato product.

In the developed model; the agri-food will be produced after inspection by the production firms, producer cooperatives and certified agri-food producers; logistic services will be carried out by certified logistics firms; the returns received by logistics firms will be turned into economic value; customers' complaints will be received through all the communication channels; and finally, those that are not suitable will be excluded from the system. In this system, which is based on standards and the provision of these standards and will work on pull, agricultural products will be delivered to customers in the fastest way and with the lowest cost. In the methodology we have created by taking all these factors into consideration, first of all, the selection of stakeholders in the agriculture-food supply chain was carried out in two stages. In the first stage of the chain members' entry process, the members of the chain were evaluated by the AHP method within the framework of the determined criteria, and those below a certain score were not included in the system. For the operation phase, it is foreseen that the orders coming to the system will be met by the manufacturer and the logistics company that provides the most suitable match. In this context, the product values of the proximity and AHP scores of the stakeholders were taken. The methodology for the design of the agri-food integrated supply chain is shown in Figure 1.

Figure 1: Methodology



In the first stage, the partners of the chain (suppliers, manufacturers and logistics companies) were evaluated using the AHP method. The AHP method is also used for producer-logistics firm matching in operational process so that when the producer receives an order the most suitable logistics firm will be determined. The Analytic Hierarchy Process (AHP) introduced by Thomas Saaty (1970), is an effective tool for dealing with complex decision making, and to aid the decision maker to set priorities to make the best decision (Saaty 1977).

In the second stage, making collaboration agreements between the stakeholders is ensured to as the first step of Collaborative Planning Forecasting and Replenishment (CPFR) method. In the third stage, the most suitable supply chains are determined considering supply-demand balance by linear programming method and demands are integrated to the chains according to their AHP points and distance criteria.

In the third stage of the methodology, linear programming (LP) model was applied for the agri-food supply chain consisting of 3 suppliers, 3 manufacturers and 3 logistics companies. The purpose of the LP model is to maximize total AHP scores within capacity and demand limits. Thus, the model assigns orders to one of the chains based on points. It is assumed that chains that are not assigned an order will not be used.

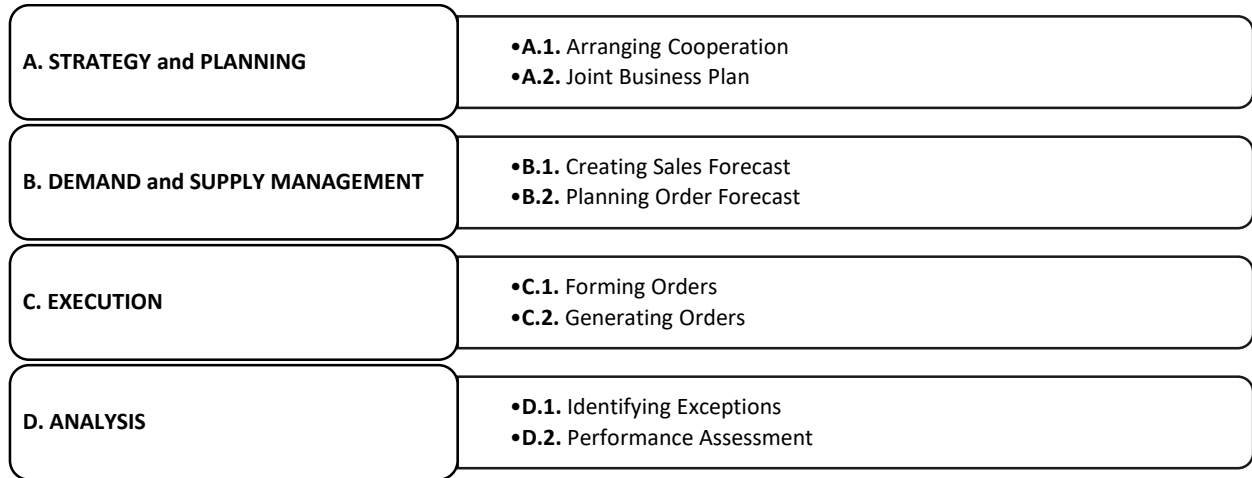
In the last stage, the simulation model was used to create and fulfill the orders. At this stage, it is envisaged to evaluate the performance of the chain and to improve the chain. For the test of the proposed model, the data obtained from ABC company, which is the sector leader in fresh fruit and vegetables for tomato product, was used by processing.

### 3.1. Collaborative Planning, Forecasting and Replenishment (CPFR)

Market demand is another important issue to be dealt with the developed production model. The CPFR is an approach that integrates supply chain elements by supporting and assisting joint practices. By way of CPFR approach, all inventories throughout the supply chain can be more visible and easier to manage. The one of the important problems in agri-food sector is that the farmers are not sure about whether their product will be bought by the consumers and how to cope with the excessive / little stock problems. The CPFR approach create the structure in order to overcome these problems and to develop agri-food product supply system. From production perspective, it is vital to know what to do with surplus capacity when you make uncontrolled production.

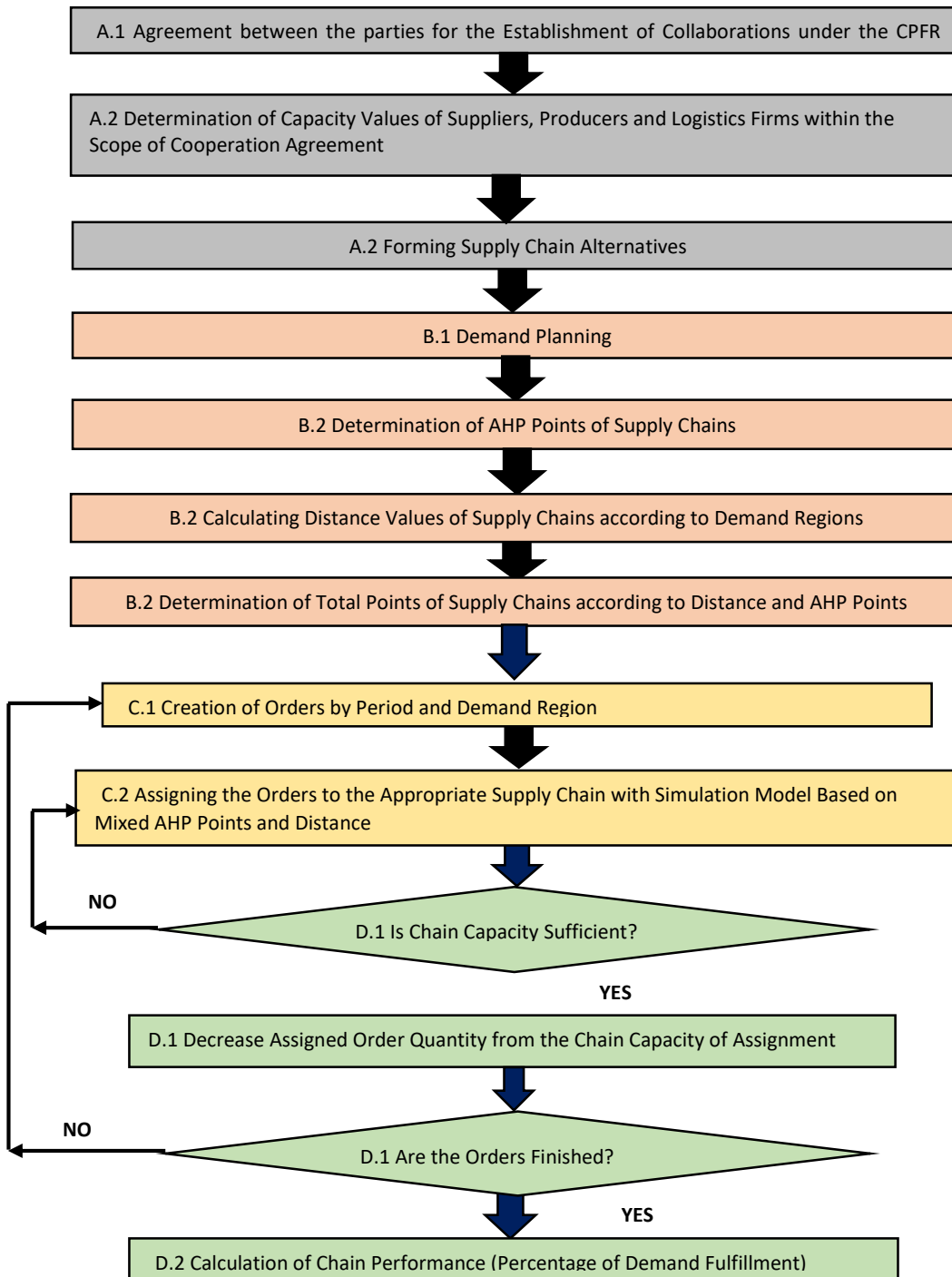
CPFR management recommends collaborative work, but considers only two phases, the seller and the buyer. Unfortunately, the agri-food value chain needs many stages or many firms with different goals. The processing steps of the CPFR method adapted for the study are shown in Figure 2.

**Figure 2: Application of CPFR Process Steps**



The CPFR Methodology of the Agri-Food Supply Chain is shown in Figure 3. Process steps A and B represent the planning and estimation function of the CPFR determined by the linear modeling program that evaluates the distance of each chain and the AHP points. Stages C and D make up the CPFR feed function. In this context, with the simulation model, which customer order will be fulfilled by which supply chain has been determined.

Figure 3: CPFR Methodology of Agri-Food Supply Chain





### 3.2. Linear Programming Model of Agri-Food Supply Chain

In the linear programming model to be used for phases A and B of the methodology. It is assumed that there will be 3 suppliers, 3 producers, 3 logistics companies, 3 different demand regions and 4 planning periods within the CPFMR approach for the agri-food supply chain.

The linear programming model is as shown below:

#### Index

Planning Period  $t= 1,2,3,4$

Demand Zone  $d= 1,2,3$

Supplier  $s= 1,2,3$

Producer  $p= 1,2,3$

Logistics Firm  $n= 1,2,3$

#### Decision Variable

$X_{s,p,n,t,d}$ : The amount sent to the (d) zone by the chain formed by (s) supplier (p) producer and (n) logistics firm during the (t) period.

#### Parameters

$P_{s,p,n,t,d}$ : The point which is gained after the supplier send the producer via logistics firm chain during the period.

$SC_{s,t}$  : production capacity of s supplier in the t period

$PC_{p,t}$  : production capacity of p producer in t period

$NC_{n,t}$  : transport capacity of n logistics firm in t period

$D_{d,t}$  : demand amount of d zone in t period

**Objective Function** is the maximization of Total Supply Chain score (point).

$$\max z = \sum_{s=1}^S \sum_{p=1}^P \sum_{n=1}^N \sum_{t=1}^T \sum_{d=1}^D X_{s,p,n,t,d} P_{s,p,n,t,d}$$

#### Constraints

##### Supplier Constraints:

$$\sum_{n=1}^N \sum_{p=1}^P \sum_{d=1}^D X_{s,p,n,t,d} \leq SC_{s,t} \quad , \forall t \in T, \quad s \in S$$

##### Producer Constraints:

$$\sum_{s=1}^S \sum_{n=1}^N \sum_{d=1}^D X_{s,p,n,t,d} \leq PC_{p,t} \quad , \forall t \in T, \quad p \in P$$

##### Logistics Firm Constraints:

$$\sum_{s=1}^S \sum_{p=1}^P \sum_{d=1}^D X_{s,p,n,t,d} \leq NC_{n,t} \quad , \forall n \in N, \quad t \in T$$

**Demand Constraints:**

$$\sum_{s=1}^S \sum_{p=1}^P \sum_{n=1}^N X_{s,p,n,t,d} \geq D_{d,t} \quad , \forall \quad d \in D, \quad t \in T$$

**Non-negative Constraints:** Every decision variable must not be negative.

$$X_{s,p,n,t,d} \geq 0$$

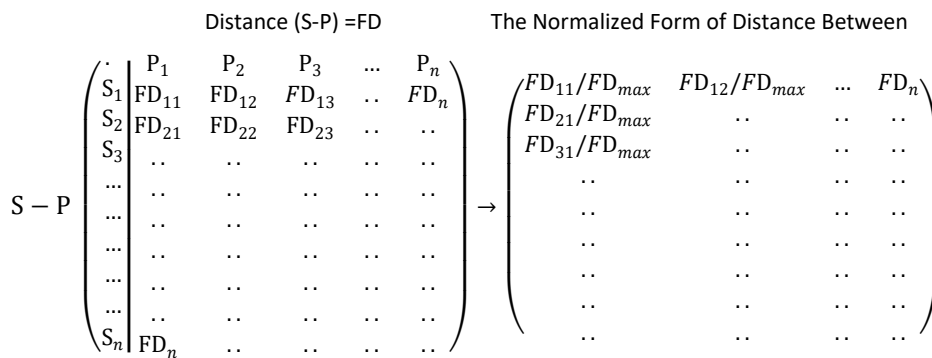
First criteria to consider in the calculation of the chain value is the customer-producer distance and the producer-demand zone distance. These values are normalized to determine the total distance. Then this value will be multiplied with the AHP points of each chain consisting of the producer, logistics firm to determine the total point.

$P_{(s,p,n,t,d)}$ = The point got by the AHP and distance points when the product is sent to the zone via the chain including the supplier, producer and logistics firm.

$$s, p, n, t, d \quad \quad \quad s \in S, p \in P, n \in N, t \in T, d \in D$$

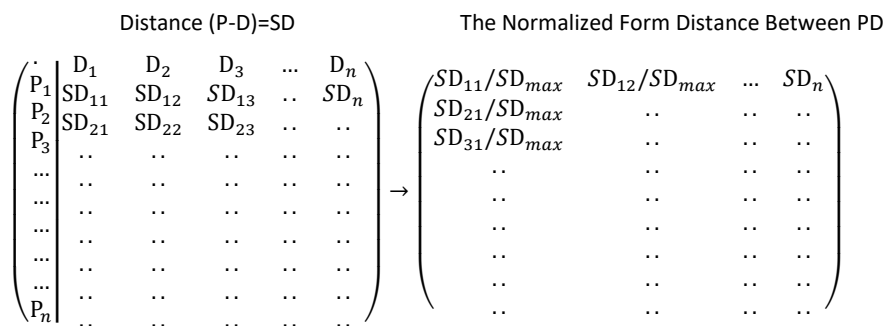
In this sense the distance of the supplier to the producer is called FD and the matrix is shown in Figure 4.

**Figure 4: The (S) Supplier-(P) Producer Distance Matrix**



The second step in calculating the chain value is to determine producer-demand zone distance. This distance is named as SD and matrix has been shown in Figure 5.

**Figure 5: The (P) Producer- (D) Demand Zone Matrix**



Finally, the total distance is calculated by the multiplication of the normalized distances. The total distance is named as TDV Figure 6.

Figure 6: Total Distance Matrix

$$\begin{pmatrix} FD_{11} \cdot SD_{11} & FD_{12} \cdot SD_{12} & \dots & TDV_n \\ FD_{21} \cdot SD_{21} & \dots & \dots & \dots \\ FD_{31} \cdot SD_{31} & \dots & \dots & \dots \\ \dots & \dots & \dots & \dots \\ \dots & \dots & \dots & \dots \\ \dots & \dots & \dots & \dots \\ \dots & \dots & \dots & \dots \\ \dots & \dots & \dots & \dots \\ \dots & \dots & \dots & \dots \end{pmatrix}$$

As an example, when we have 3 demand zones, 3 suppliers and 3 producers there will be 27 chains. Since distance is a positive factor in evaluating chains, the total distance value will be extracted from '1' value. In order to calculate the value of every chain; 0,5 of the AHP points multiplication of the supplier, producer and logistics firm and 0,5 of the 1-total distance values are summed (Figure 7). In this sense AHP points and TDV have equal weights. Yet, if needed, these weights can be changed.

Figure 7: Calculation Matrix of Total Gained Point

$$\begin{pmatrix} Z_{111} & \text{AHP POINT} & \text{TOTAL DISTANCE} \\ Z_{112} & W_{111} & TDV_{111} \\ Z_{113} & W_{112} & TDV_{112} \\ Z_{211} & \dots & \dots \\ \dots & \dots & \dots \\ \dots & \dots & \dots \\ \dots & \dots & \dots \\ \dots & \dots & \dots \\ Z_{nnn} & \dots & \dots \\ \dots & \dots & \dots \end{pmatrix} \rightarrow \begin{pmatrix} \text{CHAIN POINT} \\ 0,5 \cdot W_{111} + 0,5(1 - TDV_{111}) \\ 0,5 \cdot W_{112} + 0,5(1 - TDV_{112}) \\ \dots \\ \dots \\ \dots \\ \dots \\ \dots \\ \dots \end{pmatrix}$$

#### 4. FINDINGS AND DISCUSSIONS

##### 4.1. Application of Linear Programming Model

The LP model created above is built for three suppliers, three manufacturers, and three demand regions. Within the scope of calculating each chain value to be determined for the first two steps of the CPFR method, firstly, the distances of the suppliers to the manufacturers were determined and normalized. AHP scores of suppliers, manufacturers and logistics companies were calculated separately and the scores of the stakeholders in the chain were multiplied to form 27 supply chains. In the next step, the total score values of the supply chains on the basis of AHP and proximity (distance) were calculated separately for the three demand regions, and the chains Z111 for the 1st period, Z112 for the 2nd period and Z113 for the 3rd period have the highest scores (Appendix- 1).

The data used in the model for the demands of three different regions for four different periods, which will be used in the linear programming model for the next process, and the capacities of the suppliers, manufacturers and logistics enterprises that make up the chain were evaluated as seasonally quarterly periods (Appendix-2).

At the last stage, in the mathematical model we created for the agri-food supply chain, the data in Appendix 2 was transferred to the AIMS program and the most appropriate solution found is given in Table 1. It is assigned to the most suitable chains for each period from three different regions. For example, the first period demand of the first region is 1,084 units, and this demand was met by the chains Z311, Z221 and Z133. Likewise, in the fourth period, it is seen that the demand of the second region is 833 units and the Z231 chain alone meets the demand. In this way, we can say that all demands are met, considering capacity constraints.

**Table 1: Linear Programming Solution**

Supply Chains	Demand Zone -1				Demand Zone -2				Deand Zone -3				4.2.
	Periods				Periods				Periods				
	1	2	3	4	1	2	3	4	1	2	3	4	
Z <sub>111</sub>	0	0	0	0	0	0	0	0	0	0	232	0	0
Z <sub>112</sub>	0	490	0	0	0	0	659	0	527,5	0	0	0	0
Z <sub>113</sub>	0	0	0	0	0	0	0	0	0	0	0	0	616
Z <sub>213</sub>	0	39	0	0	0	0	0	0	0	0	0	0	0
Z <sub>311</sub>	129,5	0	0	15	0	0	0	0	0	0	0	0	0
Z <sub>313</sub>	0	0	0	0	0	0	0	0	0	0	446	0	0
Z <sub>123</sub>	0	0	0	0	0	192	0	0	0	0	0	0	0
Z <sub>221</sub>	526	0	0	348	0	106	0	0	0	0	506	0	0
Z <sub>222</sub>	0	0	0	0	528,5	0	0	0	0	0	0	0	0
Z <sub>321</sub>	0	0	0	0	0	506	0	0	0	0	0	0	0
Z <sub>323</sub>	0	0	0	0	0	0	340	0	313,5	0	0	0	0
Z <sub>132</sub>	0	0	0	416	0	0	0	0	0	0	0	0	0
Z <sub>133</sub>	428,5	0	0	0	0	0	0	0	0	0	0	0	0
Z <sub>231</sub>	0	0	0	0	226,5	0	0	833	0	0	0	0	0
Z <sub>232</sub>	0	541	230	0	0	0	0	0	0	0	0	0	0
Z <sub>233</sub>	0	0	0	0	90	0	0	0	0	558	0	0	0
Z <sub>331</sub>	0	0	478	0	0	0	0	0	0	0	0	0	0
Total	1.084	1.070	708	779	845	804	999	833	841	790	952	616	

### Simulation Application

The second phase of the CPFR model in the agri-food supply chain consists of steps C and D in Figure 2. This stage determines which chain can meet the order demand by comparing their capacities. The distance of the demand region and the AHP point of the chain are important in allocating the demands to the appropriate chains. Unlike the linear programming model, the AHP point of the manufacturer-logistics company partner selection and the AHP point of the chain, supplier, manufacturer and logistics company are considered. The distances and weights of the AHP points are equal. The values of chains consisting of 50% distance and 50% mixed AHP points are calculated (Appendix-3)

Chain capacity is the capacity of the firm at the bottleneck stage of the chain. For example; In the first demand period in Z111, the chain supplier capacity is 956, the producer capacity is 1,213 and the logistics company capacity is 1,054 tons. In this context, the capacity of the Z111 chain was taken as 956 tons. Chain capacity according to demand periods is shown in Appendix-4. When orders are allocated to chains, they are subtracted from chain capacity. The model runs until all demands are met.

The simulation model allocates orders to chains on a weekly basis according to their capacity. There are two different data types for orders; one for the number of orders per week and the other for the amount of each order. Uniform distribution is used to keep random numbers at least 5:15, maximum 16:55 based on 16 weeks (4 months x 4 weeks) for the number of orders in 4 periods from 3 different demand regions. In this context, randomly generated numbers are processed into the SQL database. Finally, the C# program is used to decide which chain will meet which demand. The results of the simulation program run with the data from the SQL database are shown in Table 2.

Demand met/backlog demand ratio is 6,44% in Demand Zone 1; 24,50% in Demand Zone 2; and 26,53% in Demand Zone 3. The average ratio is 19,61%. In the last stage. In order to test the validity of simulation model, 52 different tests were done to check the validity. In each test, different order numbers and amounts were used to determine the demand met and the backlog demand for each zone in each period. Following 52 tests, the relationship between the number of demand and the amount of demand was analyzed and 0,76 R2 value was obtained on periodical basis. This shows that simulation model yields similar results in similar values.

**Table 2: Simulation Results**

		Demand Zone – 1															
Supply Chains	Weeks																
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	
Z <sub>112</sub>					43		118										
Z <sub>311</sub>	28	21	28	17													
Z <sub>221</sub>	120	119	126	129									84	86	73	80	
Z <sub>132</sub>													51	75	95	84	
Z <sub>133</sub>	27	61	79	100													
Z <sub>232</sub>					124	73	128	83	27		45						
Z <sub>331</sub>									119	113	108	19					
<b>BD</b>				<b>56</b>			<b>23</b>				<b>81</b>						
		Demand Zone – 2															
Supply Chains	Weeks																
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	
Z <sub>112</sub>									164	154	116	163					
Z <sub>123</sub>					40	27	47	42									
Z <sub>221</sub>					25	24	14	20									
Z <sub>222</sub>	129	119	126	131													
Z <sub>321</sub>					17	122	103	113									
Z <sub>323</sub>									79	19		44					
Z <sub>231</sub>	38		54	49									125	179	191	188	
Z <sub>233</sub>	16		21	14													
<b>BD</b>	<b>24</b>		<b>54</b>	<b>159</b>		<b>49</b>		<b>119</b>	<b>248</b>						<b>45</b>		
		Demand Zone – 3															
Supply Chains	Weeks																
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	
Z <sub>111</sub>					44	55	13	54									
Z <sub>112</sub>	128	87	121	83													
Z <sub>113</sub>													103	143	138	149	
Z <sub>313</sub>									107	108	108	40					
Z <sub>221</sub>									43	121	125						
Z <sub>323</sub>	75	78	64	75													
Z <sub>233</sub>					120	135	128	133									
<b>BD</b>	<b>97</b>		<b>121</b>		<b>25</b>	<b>56</b>		<b>121</b>		<b>14</b>	<b>173</b>				<b>17</b>	<b>96</b>	

**4.3. Tomato Application**

ABC firm data was used for tomato supply chain. The ABC firm owns 5 agriculture farms in 5 different regions of Turkey and produces 12 kinds of vegetables, and 35 kinds of fruit in agricultural farms. It also makes production with contracted farmers. The products grown in agricultural farms are packaged in the factories with 110.000 square meters- closed space in 5 different regions with sophisticated technology machine park according to first-in first-out (FIFO) and cold chain rule. The firm using ERP software has established 5 factories for the alternative customers at different points of the country so that they could minimize the risks that may result from negative conditions and ensure that the fruit and vegetables are delivered fresh at minimum time. The firm ensures that fruit and vegetables could reach the customers as soon as possible by 180 refrigerating trucks. Tomato is packaged in 3 factories owned by the firm. Although different products are packed in the factory, the tomato packaging capacities of the factories were used for this study.

Linear programming model was used to create the most suitable chains by determining the AHP scores of the relevant parties with the data received from the company. Since the main aim of the model is to maximize the total AHP and distance points, the capacity is determined more than the demand. The most suitable solution created with AIMS is shown in Table 3.

**Table 3: L Tomato app linear programming solution**

Supply Chain	Demand Zone - 1				Demand Zone - 2				Demand Zone - 3			
	Period 1	Period 2	Period 3	Period 4	Period 1	Period 2	Period 3	Period 4	Period 1	Period 2	Period 3	Period 4
Z <sub>112</sub>	0	0	0	0	20	50	0	20	230	150	170	200
Z <sub>131</sub>	500	560	540	500	0	40	60	0	0	0	0	0
Z <sub>132</sub>	0	0	0	0	150	50	50	150	0	0	0	0
Z <sub>223</sub>	50	0	0	0	0	0	0	0	0	0	0	0
Z <sub>312</sub>	0	0	0	0	50	100	130	80	0	0	0	0
Z <sub>322</sub>	0	0	0	0	50	0	0	50	0	100	50	0
Z <sub>323</sub>	50	0	0	140	0	0	0	0	200	250	300	160
Total	600	560	540	640	270	240	240	300	430	500	520	360

As a result, it is seen that linear programming model enables to allocate the demands of 3 different zones for every period to the most suitable chains. In the data asked from ABC firm, the quality order of supplier, factory and logistics firm and in AHP done for supplier, factory and the logistics firm, the same quality was obtained. In AHP done for the choice of factory and logistics firm jointly, Istanbul factory and self-owned vehicles proved to be the best match. For example; in Table 7, the demand of the first zone for the first period is 600 units and this demand is met from Z<sub>131</sub>, Z<sub>223</sub>, and Z<sub>323</sub> chains. Similarly, the demand of the second zone for the 3rd period is 240 units and this demand is met by Z<sub>131</sub>, Z<sub>132</sub> and Z<sub>312</sub> chains. In this way taking the capacity constraints into consideration it could be said that all the demands are met and suitable solutions are obtained. It is also obvious that the demand of the third zone is met in all the periods with surplus capacity. The reason for this is that the objective of linear programming is to maximize the total point.

## 5. CONCLUSION

Agricultural product producers are one of the most important parties in agri-food supply chain. Producers sell their products in two ways. They either yield the product by themselves and take it to wholesale markets and sell them via middleman, or directly sell to the retailers such as markets or supermarkets. On the other hand, any level of heat change from harvest period till consumption of fresh fruit and vegetables causes chemical and physical deterioration in their structure. So, because fruit and vegetables are not preserved suitably until they reach the consumer, there is too much loss. In this sense, agri-food supply chain should be shortened by eliminating the activities that do not create added-value. In this sense, activities that do not create added value should be eliminated and the agri-food supply chain should be shortened. In this article, it is aimed to create a short-term supply chain and to provide communication between the producer and the consumer.

As a result, if the methodology described above is applied on a national basis in the existing agri-food supply chain, a pull-based system will be adopted, artificial price fluctuations will be prevented by providing sufficient supply, it will be possible to deliver the products to the consumers in the fastest way with the least loss through cold chain transportation, and in accordance with the standards. Agricultural production in our country will be planned more healthily with the database to be created and distribution will be ensured together with the production of high-quality products.

In future studies, mapping the production and shooting locations of Turkey's agricultural products by taking into account seasonal characteristics, establishing product, packaging and logistics standards, determining the features of the website, determining the location, size and characteristics of the transfer centers, determining the transportation system according to the product, season and packaging criteria, Entry of suppliers with a certain level into the system by creating models for the supplier selection of manufacturers, considering the use of suppliers in the system as a new criterion in the evaluation of producers, determining the methods of removing enterprises from the system, expanding the scope of the supply chain, and the implementation of the digitalization action plan (blockchain, big data) in agriculture. , internet of things etc.) can be suggested.

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## Appendix 1: Total Points of Supply Chains

SUPPLY CHAIN	DEMAND ZONE - 1	DEMAND ZONE- 2	DEMAND ZONE- 3
Z <sub>111</sub>	<b>0,4762</b>	0,1191	0,3191
Z <sub>112</sub>	0,3517	<b>0,5232</b>	0,4160
Z <sub>113</sub>	0,3181	0,5110	<b>0,5324</b>
Z <sub>211</sub>	0,4430	0,0858	0,2858
Z <sub>212</sub>	0,3057	0,4771	0,3700
Z <sub>213</sub>	0,2706	0,4635	0,4849
Z <sub>311</sub>	0,4368	0,0797	0,2797
Z <sub>312</sub>	0,2972	0,4686	0,3615
Z <sub>313</sub>	0,2618	0,4547	0,4761
Z <sub>121</sub>	0,4536	0,0965	0,2965
Z <sub>122</sub>	0,3204	0,4919	0,3847
Z <sub>123</sub>	0,2858	0,4787	0,5001
Z <sub>221</sub>	0,4362	0,0790	0,2790
Z <sub>222</sub>	0,2962	0,4677	0,3605
Z <sub>223</sub>	0,2608	0,4537	0,4751
Z <sub>321</sub>	0,4329	0,0758	0,2758
Z <sub>322</sub>	0,2917	0,4632	0,3560
Z <sub>323</sub>	0,2562	0,4491	0,4705
Z <sub>131</sub>	0,4451	0,0879	0,2879
Z <sub>132</sub>	0,3086	0,4800	0,3729
Z <sub>133</sub>	0,2736	0,4664	0,4879
Z <sub>231</sub>	0,4336	0,0764	0,2764
Z <sub>232</sub>	0,2926	0,4641	0,3569
Z <sub>233</sub>	0,2571	0,4500	0,4714
Z <sub>331</sub>	0,4314	0,0743	0,2743
Z <sub>332</sub>	0,2897	0,4611	0,3540
Z <sub>333</sub>	0,2541	0,4470	0,4684

## Appendix 2: Linear Programming Model Data

	Period -1	Period -2	Period -3	Period -4
Demand Zone-1	1.084	1.070	708	779
Demand Zone-2	845	804	999	833
Demand Zone-3	841	790	952	616
	<b>2.770</b>	<b>2.664</b>	<b>2.659</b>	<b>2.228</b>
	Period -1	Period -2	Period -3	Period -4
Producer- 1	1.213	1.047	1.253	1.455
Producer- 2	1.368	863	846	1.336
Producer- 3	899	1.099	1.004	1.493
	<b>3.480</b>	<b>3.009</b>	<b>3.103</b>	<b>4.284</b>
	Period -1	Period -2	Period -3	Period -4
Logistics Firm-1	1.054	844	984	1.232
Logistics Firm-2	1.056	1.031	889	1.018
Logistics Firm-3	832	1.045	847	1.319
	<b>2.942</b>	<b>2.920</b>	<b>2.720</b>	<b>3.569</b>
	Period -1	Period -2	Period -3	Period -4
Supplier-1	956	914	900	1.032
Supplier-2	1.371	1.244	1.088	1.181
Supplier-3	1.264	1.325	1.281	941
	<b>3.591</b>	<b>3.483</b>	<b>3.269</b>	<b>3.154</b>



**Appendix 3: Values of Chains Calculated with Distance and Mixed AHP Points According to Zones**

Supply Chains	Demand Zone -1	Demand Zone -2	Demand Zone -3
Z <sub>111</sub>	0,4340	0,0760	0,2760
Z <sub>112</sub>	0,2950	0,4670	0,3590
Z <sub>113</sub>	0,2550	0,4480	0,4690
Z <sub>211</sub>	0,4380	0,0800	0,2800
Z <sub>212</sub>	0,3030	0,4740	0,3670
Z <sub>213</sub>	0,2580	0,4510	0,4730
Z <sub>311</sub>	0,4340	0,0760	0,2760
Z <sub>312</sub>	0,2950	0,4670	0,3590
Z <sub>313</sub>	0,2550	0,4480	0,4690
Z <sub>121</sub>	0,4410	0,0830	0,2830
Z <sub>122</sub>	0,2900	0,4620	0,3550
Z <sub>123</sub>	0,2550	0,4480	0,4690
Z <sub>221</sub>	0,4500	0,0930	0,2930
Z <sub>222</sub>	0,2940	0,4650	0,3580
Z <sub>223</sub>	0,2590	0,4520	0,4730
Z <sub>321</sub>	0,4410	0,0830	0,2830
Z <sub>322</sub>	0,2900	0,4620	0,3550
Z <sub>323</sub>	0,2550	0,4480	0,4690
Z <sub>131</sub>	0,4360	0,0780	0,2780
Z <sub>132</sub>	0,2880	0,4590	0,3520
Z <sub>133</sub>	0,2560	0,4490	0,4700
Z <sub>231</sub>	0,4410	0,0840	0,2840
Z <sub>232</sub>	0,2890	0,4610	0,3540
Z <sub>233</sub>	0,2610	0,4540	0,4750
Z <sub>331</sub>	0,4360	0,0780	0,2780
Z <sub>332</sub>	0,2880	0,4590	0,3520
Z <sub>333</sub>	0,2560	0,4490	0,4700

**Appendix 4: Capacity of the Chains According to Demand Periods**

Supply Chains	Demand Period-1	Demand Period -2	Demand Period -3	Demand Period-4
Z <sub>111</sub>	956	844	900	1032
Z <sub>112</sub>	956	914	900	1032
Z <sub>113</sub>	832	914	847	1032
Z <sub>211</sub>	1054	844	984	1181
Z <sub>212</sub>	1056	1031	889	1181
Z <sub>213</sub>	832	1045	847	1181
Z <sub>311</sub>	1054	844	984	941
Z <sub>312</sub>	1056	1031	889	941
Z <sub>313</sub>	832	1045	984	941
Z <sub>121</sub>	956	863	846	1032
Z <sub>122</sub>	956	863	846	1018
Z <sub>123</sub>	832	863	846	1018
Z <sub>221</sub>	1054	844	846	1181
Z <sub>222</sub>	1056	863	846	1018
Z <sub>223</sub>	832	863	846	1018
Z <sub>321</sub>	1054	844	846	941
Z <sub>322</sub>	1056	863	846	941
Z <sub>323</sub>	832	863	846	941
Z <sub>131</sub>	899	844	900	1032

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Z <sub>132</sub>	899	914	889	1018
Z <sub>133</sub>	832	914	847	1032
Z <sub>231</sub>	899	844	984	1181
Z <sub>232</sub>	899	1031	889	1081
Z <sub>233</sub>	832	1045	847	1181
Z <sub>331</sub>	899	844	984	941
Z <sub>332</sub>	899	1031	889	941
Z <sub>333</sub>	832	1045	847	941

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## RELATIONSHIP BETWEEN DOMESTIC LOGISTICS OPPORTUNITY EFFICIENCY AND INTERNATIONAL LOGISTICS OPPORTUNITY EFFICIENCY BASED ON MARKET POTENTIAL: EMPIRICAL RESEARCH ON DEVELOPING COUNTRIES

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### ABSTRACT

**Purpose-** This research has two main purposes. The first purpose is to determine the domestic and international logistics opportunity efficiency levels based on the market potentials of developing countries. The second purpose is to determine whether the domestic logistics opportunity (DLO) efficiency of developing countries has a significant effect on the international logistics opportunity (ILO) efficiency.

**Methodology -** Two basic analysis techniques have been applied in this study. In the first analysis, two output-oriented data envelopment analysis (DEA) models have been developed to determine the DLO and ILO efficiency of developing countries. The data of the input variables are taken from the Market Potential Index (MPI) 2021 report. Data for output variables are taken from the Agility Emerging Markets Logistics Index (AEMLI) 2022 report. In the second analysis, simple regression analysis has been applied to determine the relationship between DLO efficiency and ILO efficiency. The sampling consists of 45 developing countries.

**Findings-** According to the DEA Model-1, the DLO efficiency of 26 developing countries has been determined at the full efficiency level. 19 countries are not at the full efficiency level. According to the DEA Model-2, the ILO efficiency of 31 developing countries has been determined at the full efficiency level. 14 countries are not at the full efficiency level. According to the simple regression analysis findings, DLO efficiency has a positive and significant effect on ILO efficiency.

**Conclusion-** It has been determined which country should focus on which input variable for the developing countries that are not at the full efficiency level to reach the full efficiency level. It has been determined that the DLO and ILO efficiency of five countries are different. Empirical evidence has been obtained that the steps to be taken to increase the DLO efficiency will also increase the ILO effectiveness.

**Keywords:** Domestic logistics opportunity, international logistics opportunity, emerging market potential, DEA, linear regression analysis.

**JEL Codes:** C67, M31, O57

### 1. INTRODUCTION

The common purpose of the marketing components is to maximize customer satisfaction. Logistics services are among the marketing components that directly affect customer satisfaction (Bienstock et al., 1997). To ensure customer satisfaction and loyalty, the quality of logistics service should be increased (Daugherty et al., 1998). Firms should keep the relationship between logistics activities and marketing activities strong to gain competitive advantage in market conditions (Mentzer and Williams, 2001). Mentzer et al. (2004) draws attention to the necessity of global market segmentation based on logistics service expectations, claiming that cross-border legal regulations in international trade may cause disruption of global logistics activities. Hannah (2008), on the other hand, explained that the domestic market practices of countries differ, and multinational companies face different obstacles in logistics activities. This situation supports the inevitable relationship between the national market and international logistics activities.

Foreign trade stakeholders need information about the logistics capabilities and performances of countries in both export and import processes. To meet this need, various institutions and organizations are developing efforts to determine the logistics

performance of countries. For example, Logistics performance index (LPI) reports are published by Worldbank. In addition, Agility Emerging Markets Logistics Index (AEMLI) reports to identify logistics performance opportunities based on the current capabilities of countries are published by Agility. AEMLI has been reporting the logistics scores of developing countries every year since 2011. In its 2022 report, AEMLI has published the scores of the "Domestic logistics opportunities", "International logistics opportunities", "Business fundamentals" and "Digital readiness" sub-variables, as well as the "overall index scores" of developing countries (AEMLI, 2022). Domestic logistics opportunities measure the potential of domestic logistics services in emerging markets to meet domestic market demands. International logistics opportunities, on the other hand, measures the potential of international logistics services to meet international market demands. Business fundamentals measures the open, sound, fair and robust nature of emerging markets. Digital readiness measures the level of digitalization, sustainability, and innovation orientation of the emerging market.

Among the main concerns of multinational companies in international trade is the decision of which country to enter and which not to enter the market. In addition, information about which country's market potential is higher than others is important for market researchers. "Market Potential Index (MPI)" has been developed by The Michigan State University to determine the market potential of countries. MPI has been published regularly since 1996. In the 2021 report of MPI, 8 dimensions were used to determine the market potentials of the countries. These dimensions and their weighting percentages are "Market Size (25%)", "Market Intensity (15%)", "Market Growth Rate (12.5%)", "Market Consumption Capacity (12.5%)", "Commercial Infrastructure (10%)", "Market Receptivity" (10%)", "Economic Freedom (7.5%)" and "Country Risk (7.5%)" (MPI, 2021).

This research has two main purposes. The first purpose is to determine the domestic and international logistics opportunity efficiency levels based on the market potentials of developing countries. The second purpose is to determine whether the domestic logistics opportunity (DLO) efficiency of developing countries has a significant effect on the international logistics opportunity (ILO) efficiency. To achieve the first objective, DLO and ILO efficiency levels based on market potential should be determined. Data envelopment analysis (DEA) application is aimed to determine the DLO and ILO efficiency levels. Afterwards, it has been planned to conclude the research by determining the relationship between DLO and ILO efficiency levels with simple regression analysis. To realize this plan, three basic research questions have been formed. The research questions are:

- *Research Question 1:* Can DLO efficiency levels based on the market potential of developing countries be obtained by DEA?
- *Research Question 2:* Can ILO efficiency levels based on the market potential of developing countries be obtained by DEA?
- *Research Question 3:* Is there a significant relationship between the DLO efficiency levels and the ILO efficiency levels of developing countries?

To answer the research questions mentioned above, literature review is presented in the second part of the article, research methodology in the third part, the findings in the fourth part, the conclusions in the fifth part, and the implications and suggestions in the sixth part.

## **2. LITERATURE REVIEW**

In the literature review, no study has been found that deals with the relationship between the "market potentials" and "domestic and international logistics opportunities" of developing countries. Since the economic and logistics indicators of the countries are used especially in the determination of the MPI, studies that deal with the logistics performances of the countries and other economic indicators are included in the literature review.

In a study conducted on 10 countries with the best logistics performance according to LPI, it was determined by Fikru (2021) that the country's trade depends on economic size, infrastructure, timelines and landlocked. In addition, the importance of logistics in global trade competition was emphasized. Martí et al. (2017) utilized DEA analysis to determine logistics performance efficiency. In the research, logistics performance sub-criteria were accepted as input and output variables in the DEA models. Logistics performance efficiency of countries have been determined with DEA models applied in different scenarios. In the study, which deals with the relationship between logistics performance and international trade of Balkan countries, Bugarčić et al. (2020) concluded that logistics performance and logistics service quality positively affect international trade.

Göçer et al. (2022) determined 16 logistics actions of countries with content analysis. The effects of the determined logistics actions on LPI variables (Customs, Infrastructure, Ease of arranging shipments, Quality of logistics services, Timeliness, Tracking and tracing) were examined. According to the research findings, cooperation action and environmentalist mindset action have a

significant effect on customs, ease of arranging shipments, quality of logistics services, timeliness, tracking and tracing variables. Efficiency studies action and use different modes of transportation action have significant effects on the infrastructure variable. Use different modes of port action has significant effect on customs variable. Marketing action, on the other hand, has a significant effect on the ease of arranging shipments variable. Using LPI and Emerging market logistics index data, Maiboroda et al. (2020) examined the domestic distribution network setup. As a result of the research, it has been determined that the establishment of local and regional cooperation is important in the planning of distribution networks. Using data from 41 countries between 2013 and 2019, Demir et al. (2021) examined the effects of imports, gross fixed capital formation, exports, and unemployment rate on AEMLI using Tobit analysis. According to the analysis findings, it has been determined that imports of countries have a negative effect on logistics performance, while other variables have a positive effect.

In the literature, there are studies dealing with the relationship between the logistics performance of countries and their competitiveness levels. Using the ANOVA technique, Sergi et al. (2021) discussed the relationship between logistics performance and global competitiveness. In the research, it has been determined that infrastructure and institutes factors play an important role in the logistics performance of countries. With the regression analysis, Ekici et al. (2019) point out that some factors that make up the competitiveness of countries have critical importance in increasing logistics performance. Kabak et al (2020) proved the significance of the relationship between the competitiveness levels of countries and logistics performance by using the Bayesian net and partial least square method. Erkan (2014), on the other hand, emphasizes that countries should develop the quality of railroad and port infrastructure to increase their logistics performance.

In studies dealing with the relationship between logistics performance and trade, it is seen that there is a significant relationship between logistics activities and commercial activities of countries. Wang and Choi (2018) obtained empirical findings supporting that export and import volumes increase as the logistics performance of countries increases. Puertas et al. (2014) presented evidence that logistics activities are important for both exporting and importing countries, but the success of logistics activities in importing countries affects import activities at a higher level. Korinek and Sourdin (2011) determined that low logistics activities create obstacles in the commercial activities of countries.

In general, studies dealing with the relationships between the logistics performance of countries and various variables are also encountered in the literature. Polat et al. (2022) found that there is a significant relationship between the logistics performance of countries and their CO2 emissions. Uca et al. (2016) examined the relationship between corruption perception and logistics performance of countries. Lu et al. (2019) discussed the relationship between green transportation and logistics performance. Liu et al. (2018) examined the relationship between logistics performance and environmental performance of Asian countries. Civelek et al. (2015), on the other hand, determined that there is a significant relationship between logistics performance and gross domestic product. This empirical research aims to bring to the literature by explaining the relationship between the logistics performances of countries and their market potentials.

### **3. DATA AND METHODOLOGY**

#### **3.1. Variables and Sampling**

In this empirical research, it is aimed to apply DEA to determine both DLO efficiency and ILO efficiency. Two DEA models have been created in the study. The first DEA model has been used to determine the DLO efficiency, and the second DEA model has been used to determine the ILO efficiency. In both models, the input variables are taken from the Market Potential Index (MPI) report of 2021. Output variables are taken from the Agility Emerging Markets Logistics Index (AEMLI) report of 2022. The reason for taking the input variables from the 2021 reports and the output variables from the 2022 reports is to evaluate the logistics opportunity efficiency of 2022 based on the 2021 market potential of the developing countries.

MPI indicators (Market Size, Market Growth Rate, Market Intensity, Market Consumption Capacity, Commercial Infrastructure, Market Receptivity, Economic Freedom, Country Risk) have been used as input variables in both DEA models. As output variables, the AEMLI sub-indicator "Domestic Logistics Opportunities (DLO)" has been used in the first model, and "International Logistics Opportunities (ILO)" has been used in the second model. Data from 45 developing countries have been used to create the data set of the study. To determine the effect of DLO efficiency level on ILO efficiency level, "DLO Efficient" has been determined as independent variable and "ILO Efficient" has been determined as dependent variable. Information about the variables used in the empirical research and the sample area are presented in Table 1.

**Table 1: Variables and Sampling**

Models		Variables	Period	Sampling	
DEA Model-1		<i>Inputs</i>	Market Size (I1), Market Growth Rate (I2), Market Intensity (I3), Market Consumption Capacity (I4), Commercial Infrastructure (I5), Market Receptivity (I6), Economic Freedom (I7), Country Risk (I8)	2021	45 countries
		<i>Outputs</i>	Domestic Logistics Opportunities (O1)	2022	
DEA Model-2		<i>Inputs</i>	Market Size (I1), Market Growth Rate (I2), Market Intensity (I3), Market Consumption Capacity (I4), Commercial Infrastructure (I5), Market Receptivity (I6), Economic Freedom (I7), Country Risk (I8)	2021	45 countries
		<i>Outputs</i>	International Logistics Opportunities (O1)	2022	
Linear Model	Regression	<i>Dependent</i>	ILO Efficient	2022	45 countries
		<i>Independent</i>	DLO Efficient		

### 3.1. Data Envelopment Analysis (CCR-Output)

While calculating the efficiency values of DLO and ILO with DEA Model-1 and DEA Model-2, adopting an output-oriented approach has been taken as a basis. The reason for choosing this approach is to maximize the DLO and ILO values, that is, the output values. In The Charnes Cooper and Rhodes (CCR) applications, outputs are weighted, and inputs are weighted. Then the weighted outputs are divided by the weighted inputs to obtain the ratio. With the output oriented CCR models, this ratio is maximized by maximizing the output variables (Charnes et al., 1989).

The objective function and constraints of the CCR-O model are shown in Eq.1 and Eq.2, respectively.

$$\min e_k = \sum_{i=1}^m v_i x_{ik} \quad (1)$$

$$\sum_{i=1}^m v_i x_{ij} - \sum_{r=1}^s u_r y_{rj} \geq 0 \quad j = 1, \dots, n$$

$$\sum_{r=1}^s u_r y_{rk} = 0$$

$$u_r, v_i \geq 0; \quad r = 1, \dots, s; \quad i = 1, \dots, m \quad (2)$$

The dual models of the objective function and constraints of the CCR-O model are shown in Eq.3 and Eq.4, respectively.

$$\text{Max } Z_k \quad (3)$$

$$\sum_{j=1}^n \varphi_{jk} x_{ij} - x_{ik} \leq 0$$

$$z_k y_{rk} - \sum_{r=1}^s \varphi_{jk} y_{rj} - x_{ik} \leq 0$$

$$\varphi_{jk} \geq 0; \quad r = 1, \dots, s; \quad i = 1, \dots, m; \quad j = 1, \dots, n \quad (4)$$

To determine the DLO and ILO efficiency levels, 8 input variables and 1 output variable have been used for both DEA Model-1 and DEA Model-2. There are also 45 DMUs (Developing Countries) in total. The indices and parameters of the study are as follows:

Indices:

$$i \quad \text{MPI input} \quad i = 1, \dots, m \quad (m=8)$$

$$r \quad \text{AEMLI output} \quad r = 1, \dots, s \quad (s=1)$$

$$j \quad \text{Developing Countries} \quad j = 1, 2, \dots, n \quad (n=45)$$

Parameters:

$v_i$  : "i" weight given to MPI input.

$u_r$  : "r" weight given to financial AEMLI output.

$x_{ik}$  : "k" score of the "i" MPI input of the decision unit.

$y_{rk}$  : "k" score of the "r" AEMLI output of the decision unit.

$v_j x_{ij}$  : "j" Developing countries weighted input score.

$u_r y_{rj}$  : "j" Developing countries weighted output score.

#### 4. FINDINGS AND DISCUSSIONS

##### 4.1. Data Envelopment Analysis Findings

OSDEA package program was used to test the DEA models. Output-oriented CCR method was applied in both DEA models. Detailed information about DEA models is presented in Table 2. According to the DEA Model-1 findings, while the DLO activity level of 26 countries is at full efficiency level, the DLO activity level of 19 countries is not at the full efficiency level. DLO efficiency levels of countries are presented in Appendix 1. When Appendix 1 is examined, it is understood that the efficiency levels of 26 countries are "1 (100%)", that is, they are at the full efficiency level. The efficiency levels of the countries that are not at the full efficiency level are as follows: Bangladesh (%85), Chile (%75), Colombia (%76), Ghana (%90), Jordan (%82), Kazakhstan (%92), Kenya (%98), Kuwait (%92), Malaysia (%68), Mexico (%77), Morocco (%85), Paraguay (%95), Peru (%78), Philippines (%64), South Africa (%93), Thailand (%83), Turkey (%82), Uganda (%93), and Vietnam (%83).

According to the DEA Model-2 findings, while 31 countries' ILO efficiency level is at full efficiency level, 14 countries' DLO efficiency level is not at full efficiency level. In Appendix 2, countries' ILO efficiency levels are presented. When Appendix 2 is examined, it is understood that the efficiency levels of 31 countries are "1 (100%)", that is, they are at the full efficiency level. The efficiency levels of the countries that are not at the full efficiency level are as follows: Bangladesh (%81), Chile (%84), Colombia (%86), Ghana (%91), Jordan (%84), Kuwait (%91), Malaysia (%81), Mexico (%87), Morocco (%95), Paraguay (%99), Peru (%92), Philippines (%72), Turkey (%98) and Uganda (%96).

When the findings of both DEA models are compared, 5 countries are not at the full efficiency level in the DLO activity, but at the full efficiency level in the ILO activity. These countries are Kazakhstan, Kenya, South Africa, Thailand, and Vietnam. All other remaining countries are at full efficiency in both the DLO and the ILO.

**Table 2: Model Features**

	DEA Model 1	DEA Model 1
<b>Model Name</b>	DLU efficiency analysis of developing countries	ILO efficiency analysis of developing countries
<b>Model Type</b>		CCR-O
<b>Model Orientation</b>		Output-Oriented
<b>Model Efficiency Type</b>		Tech
<b>Model RTS</b>		Constant
<b>Model Description</b>	The Charnes Cooper and Rhodes Model called CCR.	

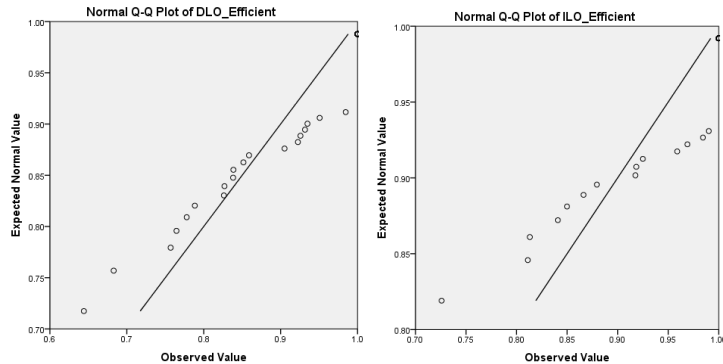
##### 4.2. Linear Regression Analysis Findings

The simple regression model has been preferred to determine the relationship between DLO efficiency and ILO efficiency in developing countries. Basically, DLO efficiency is expected to have a significant impact on ILO efficiency. The reason for this can be shown as the fact that internal logistics opportunities play an active role in creating external logistics opportunities. As a finding of DEA models, both DLO efficiency and ILO efficiency levels of 45 developing countries have been determined. The obtained findings constitute the data set of simple regression analysis. DLO and ILO efficiency levels are found in Appendix 1 and Appendix 2. Descriptive statistics of the data set are shown in Table 3. Q-Q plots have been created to observe the normal distribution of the data set (Figure 1). When Figure 1 is examined, it is observed that the data set is far from the normal distribution. However, when we look at the kurtosis and skewness values of the variables, the Skewness and Kurtosis values for DLO\_Efficient are "-1.37365" and "0.943142", respectively. For ILO\_Efficient, skewness and Kurtosis values are "-2.02743" and "3.487943" respectively. Kline (2011:63) suggested that for the data set to have a normal distribution in social sciences, the kurtosis value should be lower than "3" and the skewness value lower than "10". At this point, it is assumed that the data set has a normal distribution. In addition, when the curve estimation models is calculated, it is determined that the R<sup>2</sup> values of the models are almost the same (approximately 3%). Curve estimation model summaries and parameter estimates are presented in Appendix 3, and graphical representations are presented in Appendix 4. When Appendix 3 is examined, it is seen that all models are significant (p<0.01), the model structure with the highest R<sup>2</sup> value is Cubic and Quadratic models (R<sup>2</sup>=0.761), and the R<sup>2</sup> value of the linear model is 0.725. When Appendix 4 is examined, it is seen that the curve lines of the models are very close to each other.

**Table 3: Descriptive Statistics**

	N	Mean	Std. Dev.	Var.	Skewness		Kurtosis	
	Stat.	Stat.	Stat.	Stat.	Stat.	Std. Err.	Stat.	Std. Err.
DLO_Efficient	45	0.933559	0.098123	0.009628	-1.37365	0.353732	0.943142	0.694544
ILO_Efficient	45	0.965552	0.066525	0.004426	-2.02743	0.353732	3.487943	0.694544

**Figure 1: Q-Q Plot Charts**



The findings of the Pearson correlation relationship between the variables are presented in Table 4. Newbold (2000) points out that if the correlation between variables is higher than 0.80, there is a very high correlation between the variables. A very high level of correlation has been found between DLO\_Efficient and ILO\_Efficient variables ( $r(45)=0.851, p<0.01$ ).

**Table 4: Correlation Analysis Findings**

Variables	Mean	S.D.	DLO_Efficient	ILO_Efficient
DLO_Efficient	0.933559	0.098123	1	
ILO_Efficient	0.965552	0.066525	0.851*	1

Notes: \*  $p < 0.01$  (2 tailed)

The high correlation relationship indicates that the effect of DLO\_Efficient on ILO\_Efficient has a significant effect. Simple regression analysis has been done with SPSS program. Simple regression analysis findings to examine how much DLO\_Efficient affects ILO\_Efficient in developing countries are as seen in Table 5. Simple regression analysis findings are statistically significant ( $F_{(1,43)}= 113.150077, p<0.001$ ). According to the analysis findings, the simple regression analysis model equation is “ILO\_Efficient = 0.426766 + 0.577131 (DLO\_Efficient)”. The adjusted  $R^2$  value of the model is 0.718. According to this value, the 71.8% variance in the international logistics opportunity depends on the domestic logistics opportunity.

**Table 5: Coefficients**

Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	B	Std. Error	Beta		
(Constant)	0.426766	0.050924		8.380463	0.000
DLO_Efficient	0.577131	0.054256	0.851248	10.637203	0.000

Note: Dependent Variable is ILO\_Efficient

**5. CONCLUSION**

In this empirical research, domestic and international logistics opportunity efficiency of developing countries has been determined by DEA analysis. In addition, the linear relationship between DLO\_efficient and ILO\_efficient has been investigated by simple regression analysis. Two important conclusions have been obtained based on the DEA analysis findings. The first conclusion is that the DLO\_efficient of 19 developing countries is not at the full efficiency level. The input variables and reference countries that 19 developing countries should focus on to reach the full DLO\_Efficient level of efficiency are presented in Appendix 5. According to Appendix 5, for example, for Turkey to increase its domestic logistics opportunity efficiency to full efficiency, it is necessary to



focus only on the commercial infrastructure input variable. In addition, Turkey's reference countries are Algeria, Angola, Argentina, China, Ethiopia, Lebanon, and Pakistan.

The second conclusion is that 14 developing countries do not have full ILO\_efficiency. The input variables and reference countries that 14 developing countries should focus on to reach the full ILO\_efficient level are presented in Appendix 6. According to Appendix 6, for example, Chile needs to focus only on the market consumption capacity, commercial infrastructure, economic freedom, and country risk input variable to maximize its international logistics opportunity efficiency. In addition, Chile's reference countries are Angola, Oman, Qatar, and Uruguay.

When the differences between Appendix 5 and Appendix 6 are examined:

- It is seen that Kazakhstan, Kenya, South Africa, Thailand, and Vietnam should focus on DLO\_Efficient, on the other hand, ILO\_efficient is successful.
- *Bangladesh*: The market consumption capacity input variable should be focused on enabling the DLO, but not in the ILO.
- *Colombia*: The commercial infrastructure input variable should be focused on enabling the ILO, but not in the DLO.
- *Jordan*: The economic freedom input variable should be focused on enabling the ILO, but not in the DLO.
- *Uganda*: The country risk input variable should be focused on enabling the ILO, but not in the DLO.

In the second phase of the research, the effect of the DLO\_Efficient level on the ILO\_Efficient level has been examined. DLO\_Efficient has a statistically positive and significant effect on ILO\_Efficient. At this point, it has been concluded that international logistics opportunity efficiency can be increased by increasing the domestic logistics opportunity efficiency of the developing countries. In the DEA analysis findings, the input variables that developing countries should focus on are highly similar in both the DLO and the ILO. At this point, it is concluded that the policies that developing countries will create to develop their market potential will both increase domestic logistics opportunities and increase international logistics opportunities.

## **5. IMPLICATIONS AND SUGGESTIONS**

The implications and suggestions for increasing the DLO and ILO activities of developing countries are as follows:

- Vietnam should increase "Market Intensity" by lowering GNI per capita estimates and private consumption as a percentage of GDP to improve logistics opportunities.
- Kenya should increase the "Market Growth Rate" by increasing the compound annual growth rate of primary energy use and compound annual growth rate of GDP and decreasing it in Philippines, Uganda, and Vietnam to improve logistics opportunities.
- Bangladesh, Chile, Colombia, Mexico, Paraguay, Philippines, South Africa, Uganda, and Vietnam should increase "Market Consumption Capacity" by reducing consumer expenditure, income share of middle-class, median disposable income per household to develop logistics opportunities.
- Ghana, Kuwait, Malaysia, Mexico, Thailand, and Vietnam should increase "Market Receptivity" by reducing per capita imports from US and trade as a percentage of GDP to improve logistics opportunities.
- Chile, Ghana, Kenya, Malaysia, Paraguay, Peru, South Africa, and Thailand should increase "Economic Freedom" by reducing Economic Freedom and Political Freedom to improve logistics opportunities.
- Bangladesh, Chile, Colombia, Ghana, Jordan, Kuwait, Malaysia, Mexico, Morocco, Paraguay, Peru, Philippines, South Africa, Thailand, and Vietnam should increase "Economic Freedom" by reducing Economic Freedom and Political Freedom to improve logistics opportunities.

It is generally recommended that the countries that are at the full efficiency level in domestic and international logistics opportunity activity should continue their current market and logistics policies.

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## APPENDICIES

### Appendix 1: Domestic Logistics Opportunities Efficiency Scores

Country	Efficiency	Country	Efficiency	Country	Efficiency
Algeria	1	India	1	Philippines	0.644138442
Angola	1	Indonesia	1	Qatar	1
Argentina	1	Jordan	0.826943885	Russia	1
Bahrain	1	Kazakhstan	0.925769319	Saudi Arabia	1
Bangladesh	0.858884121	Kenya	0.984534374	South Africa	0.931647135
Bolivia	1	Kuwait	0.922452385	Sri Lanka	1
Brazil	1	Lebanon	1	Tanzania	1
Cambodia	1	Malaysia	0.682907586	Thailand	0.83857977
Chile	0.756990386	Mexico	0.777844133	Tunisia	1
China	1	Morocco	0.851601065	Turkey	0.826160466
Colombia	0.76452627	Nigeria	1	UAE	1
Ecuador	1	Oman	1	Uganda	0.934827933
Egypt	1	Pakistan	1	Ukraine	1
Ethiopia	1	Paraguay	0.950692705	Uruguay	1
Ghana	0.905055198	Peru	0.788403898	Vietnam	0.838192906

### Appendix 2: International Logistics Opportunities Efficiency Scores

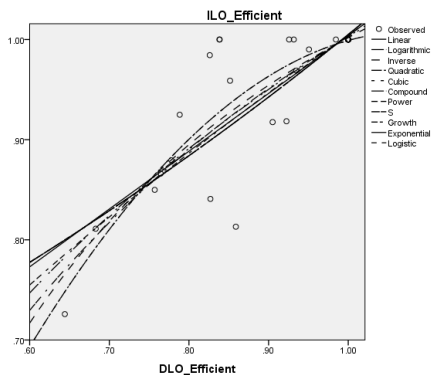
Country	Efficiency	Country	Efficiency	Country	Efficiency
Algeria	1	India	1	Philippines	0.725841466
Angola	1	Indonesia	1	Qatar	1
Argentina	1	Jordan	0.840873538	Russia	1
Bahrain	1	Kazakhstan	1	Saudi Arabia	1
Bangladesh	0.813116191	Kenya	1	South Africa	1
Bolivia	1	Kuwait	0.918423173	Sri Lanka	1
Brazil	1	Lebanon	1	Tanzania	1
Cambodia	1	Malaysia	0.811113729	Thailand	1
Chile	0.849899553	Mexico	0.879433786	Tunisia	1
China	1	Morocco	0.958912993	Turkey	0.984383163
Colombia	0.866232382	Nigeria	1	UAE	1
Ecuador	1	Oman	1	Uganda	0.969013968
Egypt	1	Pakistan	1	Ukraine	1
Ethiopia	1	Paraguay	0.990121957	Uruguay	1
Ghana	0.917555375	Peru	0.924906523	Vietnam	1

**Appendix 3: Model Summary and Parameter Estimates**

Equation	Model Summary					Parameter Estimates			
	R Square	F	df1	df2	Sig.	Constant	b1	b2	b3
Linear	0.725	113.150	1	43	.000	.427	.577		
Logarithmic	0.742	123.575	1	43	.000	1.003	.501		
Inverse	0.755	132.700	1	43	.000	1.429	-.427		
Quadratic	0.761	66.685	2	42	.000	-.581	2.939	-1.359	
Cubic	0.761	66.685	2	42	.000	-.581	2.939	-1.359	.000
Compound	0.717	109.138	1	43	.000	.529	1.899		
Power	0.738	120.928	1	43	.000	1.004	.558		
S	0.755	132.267	1	43	.000	.480	-.477		
Growth	0.717	109.138	1	43	.000	-.637	.642		
Exponential	0.717	109.138	1	43	.000	.529	.642		
Logistic	0.717	109.138	1	43	.000	1.890	.526		

Note: The independent variable is DLO\_Efficient. Dependent variable is ILO\_Efficient.

**Appendix 4: Model Summary and Parameter Estimates Charts**



**Appendix 5: Input Variables and Reference Countries to Achieve Full Efficiency (DLO\_Efficient)**

Country	I1	I2	I3	I4	I5	I6	I7	I8	Peer Group
Bangladesh				+	+			+	Algeria, Ethiopia, India, Nigeria, Pakistan
Chile				+	+		+	+	Angola, Oman, Qatar, Uruguay
Colombia				+					Algeria, Angola, Argentina, Bolivia, Tanzania, Uruguay
Ghana						+	+	+	Algeria, Ethiopia, Lebanon, Oman, Tanzania
Jordan								+	Algeria, Angola, Bolivia, Ethiopia, Lebanon, Oman, Tanzania.
Kazakhstan					+				Algeria, Angola, Bolivia, Lebanon, Oman, Qatar, Uruguay.
Kenya			+		+		+		Argentina, Bolivia, Ethiopia, Tanzania, Uruguay.
Kuwait					+	+		+	Algeria, Angola, Lebanon, Qatar, Ukraine.
Malaysia						+	+	+	Algeria, Angola, Lebanon, Qatar, Tanzania.
Mexico				+		+		+	Angola, China, Lebanon, Saudi Arabia, Ukraine.
Morocco					+			+	Algeria, Angola, Bolivia, Oman, Qatar, Uruguay.
Paraguay				+			+	+	Bolivia, Oman, Qatar, Tanzania, Uruguay.
Peru							+	+	Algeria, Angola, Argentina, Lebanon, Tanzania, Uruguay.
Philippines			+	+				+	Algeria, Angola, Bolivia, Ethiopia, Tanzania.
South Africa				+	+		+	+	Algeria, Angola, Argentina, Brazil.

<i>Thailand</i>					+	+	+	+	Algeria, Angola, China, Ukraine.
<i>Turkey</i>					+				Algeria, Angola, Argentina, China, Ethiopia, Lebanon, Pakistan.
<i>Uganda</i>			+	+	+				Algeria, Argentina, Bolivia, Ethiopia, Tanzania.
<i>Vietnam</i>	+	+	+	+	+			+	Algeria, China.

Notes: Market Size (I1), Market Growth Rate (I2), Market Intensity (I3), Market Consumption Capacity (I4), Commercial Infrastructure (I5), Market Receptivity (I6), Economic Freedom (I7), Country Risk (I8)

#### Appendix 6: Input Variables and Reference Countries to Achieve Full Efficiency (ILO\_Efficient)

Country	I1	I2	I3	I4	I5	I6	I7	I8	Peer Group
<i>Bangladesh</i>					+			+	Algeria, Argentina, China, Ethiopia, Nigeria, Pakistan.
<i>Chile</i>				+	+		+	+	Angola, Oman, Qatar, Uruguay.
<i>Colombia</i>				+	+			+	Algeria, Argentina, Bolivia, Ecuador, Tanzania.
<i>Ghana</i>						+	+	+	Algeria, Angola, Ethiopia, Lebanon, Oman.
<i>Jordan</i>							+	+	Algeria, Angola, Bolivia, Ethiopia, Lebanon, Oman.
<i>Kuwait</i>					+	+		+	Angola, Lebanon, Oman, Qatar, Ukraine.
<i>Malaysia</i>						+	+	+	Algeria, Angola, Lebanon, Oman, Ukraine.
<i>Mexico</i>				+		+		+	Angola, China, Russia, Saudi Arabia, Ukraine.
<i>Morocco</i>					+			+	Algeria, Angola, Bolivia, Ecuador, Oman, Ukraine.
<i>Paraguay</i>				+			+	+	Angola, Bolivia, Lebanon, Oman, Uruguay.
<i>Peru</i>							+	+	Algeria, Angola, Argentina, Bolivia, Ethiopia, Ukraine.
<i>Philippines</i>			+	+				+	Algeria, Angola, Argentina, Bolivia, Ethiopia.
<i>Turkey</i>					+				Algeria, Angola, Argentina, China, Ethiopia, Lebanon, Pakistan.
<i>Uganda</i>			+	+				+	Argentina, Bolivia, Ethiopia, Sri Lanka, Tanzania.

Notes: Market Size (I1), Market Growth Rate (I2), Market Intensity (I3), Market Consumption Capacity (I4), Commercial Infrastructure (I5), Market Receptivity (I6), Economic Freedom (I7), Country Risk (I8)



## EFFICIENCY OF SOCIAL RESPONSIBILITY PROJECTS PROMOTED IN SOCIAL MEDIA

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### ABSTRACT

**Purpose-** People's commitment to social media and their tendency to SRP are driving marketers and companies to SRP in social media. It is aimed to investigate which type of SRP is promoted in social media and which social media channels are more likely to share SRP-related posts. In the research, it is examined whether the attention and actions of the society are mobilized according to the age and income status of the society. One wonders whether social media has an impact on getting people to participate in the SRP and whether people's interest in social media has an impact on their participation in the SRP.

**Methodology-** A positivist research approach is adopted as the research design. The quantitative analysis method is used in the research. Data in the research is collected using an online questionnaire. In the published survey, 501 people who have completed the survey and are available are reached in total. Arithmetic mean, correlation, ANOVA and T-test are used to analyze the survey data.

**Findings-** SRPSM attracts the attention of the community and mobilizes the community to participate in these projects. In the fields of health, environment, and education; SRP is more widely promoted on Instagram and Twitter channels. Young people and people with a high-income level do not participate much in the SRP promoted on the social media channel. Social media is an effective tool to get people to participate in the SRP. People's interest in SRP on social media drives them to participate in SRP.

**Conclusion-** While the 1st and 2nd hypotheses are rejected, the 3rd and 4th hypotheses are accepted. It is assumed that the analysis results obtained from the research will contribute to researchers and practitioners. After the conclusion part, limitations and suggestions are presented to researchers who will conduct research and study on this subject in the future.

**Keywords:** social responsibility (SR), social media (SM), digital marketing, social responsibility projects (SRP), responsibility.

**JEL Codes:** M11, M14, M31

## 1. INTRODUCTION

As a result of technological advances in recent years, the increase in the use of information and communication technologies brings many innovations. The increase in the use of social media channels, especially depending on the internet, disrupts the routines in marketing and directs marketers to innovate.

According to TUIK (2022) and We Are Social Turkey (2022) data, 82% of Turkey's population (a total of 85 million 680 thousand 273) has been using the internet since the beginning of 2022 (We Are Social Turkey, 2022). According to We Are Social Turkey 2022 data, the ratio of social media users to the population in Turkey is 80%. An average of 8.1% of every internet user in Turkey has one or more accounts on social media channels. Accordingly, at the beginning of 2022, Facebook had 34.40 million users, Instagram with 52.15 million, YouTube had 57.40 million, LinkedIn had 12 million, and Twitter had 16.10 million users (We Are Social Turkey, 2022).

Looking at these figures, it is understood that social media (SM) has a very important place in Turkey. This makes it worthwhile to conduct academic studies on SM in Turkey and makes it worth researching. The heavy use of SM by the younger generation is intriguing to work on. It is thought that the fact that SM use is so preferred will make it possible to use social responsibility projects (SRP) through social media channels (SMC) as attention-grabbing and stimulating. In the context of social

responsibility projects (SRPSM) in this social media, it is important to investigate community behavior as a study subject. At the same time, it is thought that the obtained results will guide the researchers who are interested in this study. Because SM is one of the channels that are effective in the announcement and promotion of SRP (Puwirat and Tripopsakul, 2019). In addition, it is thought that it is important to examine the subject closely and contribute to this subject in the literature since today's society attaches importance to SRP and supports the products and services of the companies that carry out projects in this direction.

Especially during the pandemic, the time spent in SM increases as people have to spend most of the day at home. SRPSM sharing has a share in this increase (Flag, 2020; Roundy and Bonnal, 2020). Marketers perceive these negative situations (crises) as opportunities and work to connect their products and services to an SRP. Thus, it becomes easier to attract the attention of society and enable society to take action (Epareborda, 2020). The diversity of SMC, the increase in the frequency of people's use of these channels, and the increase in circulation time create an opportunity for companies to draw the attention of both themselves and consumers to their products and services (Kaplan and Haenlein, 2010). Facebook, Twitter, WhatsApp, Instagram, and LinkedIn are thought to attract attention and mobilize.

It is important to understand the status of SRPSM and whether drawing people's attention to SRPSM behaviors can lead to action, and to gain deeper insight by better understanding the underlying causes of SRPSM and evaluating the work with the results obtained. It is expected that the effectiveness of SRPSM will be seen in the analyzes made.

In the last five years, it is seen that the studies in the field of social responsibility have moved into a vicious circle such as corporate reputation-image-performance, WOM, retail, brand loyalty, purchase intention, and corporate social responsibility (Al-Ghamdi & Badawi, 2019; Benitez et al., 2020; Chu et al., et al., 2020; Chu and Chen, 2019; Dalla-Pria and Rodríguez-de-Dios, 2022; Dal Mas et al., 2022; Fauzan, 2022; Gupta et al., 2021; Hejase, 2020; Huang et al., 2020; Ibrahim, 2022; Liu et al., 2020; Ma et al., 2021; Oh and Ki, 2019; Popkova et al., 2021; Puwirat and Tripopsakul, 2019; Zhang et al., 2021). The subject examined in this study is important in that it is different from the studies conducted in the last five years and contributes to filling the gap in the field of SR.

In the literature review section of the study, the subject is compared using various sources, and information about the SR field is given. Under the title of Social Media, which is the main subject of the study, the history/birth of SM, its features, some SRPs in SM, and the connection of SM with companies and consumers (society) are mentioned. In the methodology part of the study, the research design of the study, the methods followed in the research, data collection, scales, and measurement tools are mentioned. In the fourth chapter, the findings of the analysis are given. In the conclusion part, the limitations of the research, suggestions for companies, and suggestions for researchers who want to work in the field of social responsibility are presented.

## **2. LITERATURE REVIEW**

Social responsibility projects (SRP) are important for companies because society's expectations of companies are changing in the ever-evolving and changing world order. Companies need to sign projects in areas that can attract the attention of the society and enable them to take action in the changing and developing world order, to attract the society to the companies. SRP is one of the projects that companies should sign, which has been frequently encountered recently, which attracts the attention of the society and puts them into action.

Since the SRP issue of the companies started to be discussed, it has attracted a lot of attention so far, and this has led to the emergence of many SRPs in the social media in the last thirty years (Huang et al., 2020). A large number of emerging SRPs enable companies to gain a competitive advantage against each other (Aguinis et al., 2020; Oldenburg and Miethlich, 2020; Shaukat et al., 2016). The company that has the advantage will start to make a name for itself. The company, which has made a name for itself and has a competitive advantage, is reflected as a result of the successful implementation of social responsibility projects that can be an integral part of the employee, society, and the environment and have significant potential and significant impact in the long run (Haski-Leventhal, 2018; He and Harris, 2020; Ji et al., 2020; Vethirajan et al., 2020; Wesley et al., 2012). For companies to act strategically, maintain their competitive advantages, perform well and be one step ahead of other companies, they need to think well in which areas they should create SRP and care about the projects they create.

There is a social responsibility (SR) pyramid introduced by Carroll in 1979, which companies prefer and pay attention to while carrying out their social responsibility projects (SRP). This model, which companies have expressed as the SR pyramid, consists of top-down economic, legal, ethical, and voluntary responsibility (Carroll, 1991; Carroll and Shabana, 2010; Fontoura and Coelho, 2020). By acting according to these four formations, the companies that carry out SRP look after both their interests and the benefit of society. It is thought that one or more companies that observe ethics/morality and carry out an SRP without acting against the law will not prefer to engage in a project that may harm society and their own company. This pyramid,

which companies prefer and pay attention to while carrying out SRP, is also an element that increases the reputation, image, and value of companies in the eyes of consumers (Pirsich et al., 2007; Zhang et al., 2021). Due to the benefits of SRP and its ability to be appropriated to society, companies that implement the right projects can step forward and be more preferred.

As the SRP implemented by the companies increases the awareness and expectations of the society, the idea of designing the SRP of the companies gains more importance globally. For this reason, companies adopt a strategic approach by being aware of their awareness and expectations (Wildowicz-Giegiel, 2014) and SRP carries out it in a way that can attract the attention of the society and enable it to take action.

Firms can also apply SRP within their own company in terms of both being an example and being heard by giving projects such as improving the benefits provided to their employees, energy-saving, nature protection, donations, and voluntary projects (such as tree planting) (Popkova et al., 2021; Qiu et al., 2021). Thus, the company can gain the appreciation of society by making itself known and attracting the attention of society. Similarly, it is necessary to announce social responsibility projects (SRPSM) on social media for companies to announce the SRP, attract the attention of the society and enable the society to take action. In this way, it becomes possible to reach the majority of society in a short time. Therefore, social media is one of the best digital marketing tools that are increasingly used and given importance by companies to attract the attention of companies in a certain period time and enable them to take action (Kesavan et al., 2013; Mills, 2012).

Firms generally prepare SRPSM content in a way that tries to protect both the social media platform and the interests of society (Coffman, 2002; Kotler and Lee, 2008; Yang et al., 2020). For this reason, companies' use of social media by taking into account the interests of the society to show that they have SR awareness while delivering the SRP to large masses makes it easier for the SRP they have prepared to attract attention.

In a way, SRP is the work prepared by non-governmental organizations, the state, or the private sector to meet a deep need for philanthropy, both institutionally and personally, to overcome the problems that concern society (Davis and Blomstrom, 1971; Pringle and Thampson 2000). SRP is a systematic and planned study carried out by the relevant institutions, organizations, companies, or individuals on issues that pose problems in society and need to be resolved around a common goal. SRP is carried out without expecting any personal financial return to carry out works on behalf of the past and the future. The projects that emerge as a result of a systematic and planned study support the development of individuals, companies, institutions, and organizations. For this reason, it is important to ensure cooperation between individuals, institutions, companies, and organizations. In addition to the interests of individuals, companies, institutions, and organizations, it is thought that it aims to reach large masses and take action and attract the attention of the society depending on the characteristics of the problems.

Given the nature of the issues that SRP generally addresses, there are four types of social responsibility areas. These are economic, legal, ethical, and philanthropic responsibilities. While these four different areas of responsibility take place at certain levels of the companies' SRP, the ethical and philanthropic dimension is becoming more important day by day (Bone Louis and Kurtiz David, 1999; Carroll, 1991). As a result of philanthropy, SRP may focus on donations from time to time. Donation projects initiated by companies on many issues such as poverty, education, and health are some of these donation-oriented projects.

**Economic Responsibilities:** These are social responsibilities realized to obtain a monetary efficiency from resources by considering profit and entrepreneurship motives in products or services.

**Legal Responsibilities:** It is the fulfillment of the responsibilities of individuals, companies, institutions, and organizations in a way that is not against the law while performing the SRP.

**Ethical Responsibilities:** It is the implementation of SRPSM by taking into account the projects expected by the society, prohibited by the society, and not accepted by the society. Ethical responsibilities are often not well defined.

**Charitable Responsibilities:** These are the corporate actions of companies that meet the good corporate expectation of society. It includes actively participating in actions or projects that promote the well-being or maintenance of the community. The distinguishing feature between philanthropy and ethical responsibilities is that philanthropy requires voluntary participation (Carroll, 1991). Ethical responsibility, on the other hand, requires that the SRPSM be carried out in a way that does not disrupt the moral structure of the society, rather than voluntarily.

The importance of SRP is increasing day by day (Del Bosco, 2017; Go and Bortree, 2017; Lee, 2016). This situation reflects positively on SRP to a large extent. As a result of the increasing importance given to SR, the behavior of the society while choosing products and services may change (Bigné et al., 2010). Parallel to the behavior and habits of the changing society, it is beginning to be seen that the existing criteria of the society are also important. Products included in the SRPSM are now ranked as an important benchmark by society among other similar products. This situation is thought to constitute the



elements that make SRPSM important and valuable. Giving importance to SRP is a situation that develops in connection with its resonance in society. Its wide repercussions are still reflected on social media today (Saxton et al., 2019). It is thought that the widespread reflections of SR studies carried out on social media, will be successful in attracting the attention of the society and taking action. SRP is expected to grow like an avalanche in the coming days by adding a new ones to these projects as the society demands, the demand is met by the companies and responds to SRP. In addition, SRP is important in terms of creating a factor for society to take action and attract attention because human beings as social beings have responsibilities towards society. In this direction, the SRP that has been made or is being done is essential.

According to the conditions of the time, marketers primarily seek various ways to attract the attention of society (Dutot et al., 2016). In a firm, the marketer(s) must first attract the attention of the society and then enable the society to turn their attention to the product or service into action. In the long run, attention can make society take action against the prepared SRPs (Belch and Belch, 2004). It is expected that the products or services of the companies in the SRP will affect society faster and the projects made for the society will be supported by the SRP. The success of the SRP depends on the participation of the communities. The participation of the society refers to the amount of time, energy, thoughts, and different resources (cash, credit card, social media applications) used by the companies in the process of purchasing the product or service offered within the scope of SR. It is important to consider each stage of the model one by one, to make the subject understandable and to better understand what happens at each stage. Accordingly (Hassan et al., 2015; Pashootanzadeh and Khalilian, 2018; Rehman et al., 2014):

A firm announces what it will or will offer to the public and provides information about its firm to attract the attention of society. For example, a company tries to attract the attention of society by making it known which products and services are produced, how they are produced, and what features they have in a product or service covered by an SRP. In summary, the first stage is the stage where they try to fully inform society and ultimately try to attract their attention.

Selling is accomplished by doing what needs to be done to turn to purchase attention into action. For example, after a company in the SRP promotes its product or service, draws attention through social media, and makes the society want the product or service. It is ensured that the society can apply for a download or phone call, limited-time offer, or special discount registration to purchase the product or service.

### **3. Social Media**

With the arrival of the 2.0 revolution, the diversification of mental and programming options brings innovations in internet technology. Social media (SM), another dynamic that reached large masses with the birth of the internet, that is, the developments in the dynamics that are the cornerstone of technology, create an area where people can communicate freely with its rich content creation and various sharing features (Abitbol and Lee, 2017). Thus, thanks to SM, people can share whenever and wherever they want as long as there is the internet, and many people can see these shares in a shorter time. In addition, since SM is capable of creating rich content, it also enables the creation of various services and various applications offered with the functions of being constantly renewable, developable, and updatable. Thus, people have the opportunity to be both the creator and commentator of the content and the creator of the application.

The fact that there is more loyalty to SM day by day and more people spend time in these applications brings SM to an important position. Recently, it is thought that one of the factors that make it necessary to be connected to SM is the global health crisis we are in. Due to the global health crisis, people are forced to spend most of the day at home. This causes people to spend many hours of the day in SM to make use of their time, which makes SM even more important.

SM is an online information and publicity resource that is created and used by individuals to inform individuals about products, services, companies, and SRP by companies, which renews itself every day (Blackshaw and Nazzaro, 2006; Burucuoglu and Erdogan, 2019). SM is an ocean that has become a very functional channel for both users who use social media channels in society and companies that support promotional projects created or to be created to attract people's attention and direct people to the created company and product service.

Those who use this ocean the most are the young generation, which has the most populous part of the world's population and has the most information in the digital world. The younger generation is becoming more and more sensitive and interested in SM advertising. Some of the reasons for this are that the younger generation is influenced by people with experience, such as friends, relatives, peers, family, and celebrities, before purchasing a product. These people take an active role in creating and influencing a positive or negative perception about the product and service on other people with their suggestions, comments, and ideas (Ryan and Xenos, 2011). Therefore, while SM has such an important place in appealing to the younger population and making them stay in SM longer, it is not expected to be on a fixed and static schedule.

SM can be constantly renewed to attract people's attention, thanks to the advantages it offers to people, such as instant updating, and unlimited access to real-time comments. Themes, colors, and even boring short videos can be updated

according to the interest of each generation (Ramaswamy and Ozcan, 2016). Thanks to update ability, popularity status, and public perception can be easily measured. Thanks to SM, all content, innovations, comments, and ratings can be archived, so they can be accessed again, making it possible to compare and evaluate the innovations created and more. In this case, it is thought that all social media channels can be blended. Because it is thought that an innovation that is not kept in one may become popular for another social media channel. As a result, this popularity is better observed through individual publishers. Comments, number of likes, preferences, shopping status, etc. observations guide in examining the popularity status (Chu et al., 2020). Updates and innovations made as a result of the information obtained support or do not support participation. People are completely free in this regard.

It is claimed that SM channels have five basic features (Lietsala and Sirkkunen, 2008). The first of these is the availability of space for content sharing. Because SM consists of various channels. Thanks to these various channels, it is possible to share wherever the nature of sharing is thought to be effective and will attract the attention and interest of more audiences. Second, social media channels are based on social interaction. SM is a very wide channel and millions of users either know each other or not. The majority of users can interact with all other users by sharing and interpreting their experiences with each other. Thus, as a result of interactions, it ensures that other people in society are attracted to the product or service. Third, in SM participants can create, share and discuss all content. SM is a space where people interact with others by creating, sharing, and discussing content based on their social interaction experience. By making additions to the shared content – the add-on may vary depending on the good or bad evaluation of this product and service – users can share it on all social media channels and present it to the evaluation, attention, and interest of other users. Depending on whether other users like it or not, the product or service may succeed or fail. That is, the sale may or may not occur. Fourth, all content can be given as links to other external networks. This item appears as a reflection of the second and third items. Some of the reasons for connecting to other social media channels are to reach more audiences and want to be heard more. The fifth is that members who actively participate in the site also have accounts. This highlights the customizability of the SM.

People using SM are waiting for a real promotional project. It is thought that this promotion can be made in the form of attention and then an encouragement to action by presenting an unusual design or remarkable facts, or it can be in the form of the first action and then attention. Today, many digital, social, and mobile social media channels available to provide this format can be made with eye-catching designs, colors, sounds, and music. At this point, companies need to look at social media channels, bringing together channels suitable for products and services, associate those that are compatible with each other, and act in an integrated manner (Venger and Pomirleanu, 2018). Because SM is now becoming an indispensable tool of the marketing communication structure for individuals and companies in society.

How does SM integrates with newer media channels applications, which channel applications are appropriate, what impact the use of such application channels will have on people in the community, and the number of other competitors in SM, their projects, and the type of project themes are important? Likes in SM are used to establish and maintain relationships with users (Okazaki et al., 2015). Because in this way, if there are new suggestions or complaints and the most liked aspect, it is important to identify them. Because it is necessary to develop a new roadmap and strategy for feedback. This provides a framework for understanding whether application channels such as Twitter, WhatsApp, Instagram, Facebook, and LinkedIn are suitable for reaching attention and action mechanisms.

To use SM well, certain competencies are required in addition to certain interaction and participation rules. In terms of marketing, SM provides access and communication to many people in application channels at the least cost (Bialkova and Te Paske, 2021). Examining the effectiveness of SM may provide some advantages to marketers and SRP developers. Because social media is thought to have a latent power in attracting the attention of the society to SRP and enabling them to participate in these projects.

On this basis, social media is the best tool to ensure that the innovative SRP, which will benefit society/humanity, has wide repercussions. "Because SM tools now exist throughout society at the individual and firm-level and as part of the marketing communications structure" (Copley et al., 2013). Thanks to social media channels, SRP can be announced to many audiences in many societies and it is easier to attract the attention of many audiences. Remarkable and implemented SRP examples are seen in SMC in Turkey, e.g. SRP initiated by Tema Foundation to protect all-natural assets, TOÇEV's "Hey young take action" hashtag "I'm pedaling for my blood friend" Kızılay's project, " Sunlight". It is possible to see projects such as the project implemented by Türk Telekom in cooperation with the Disabled Life Association (EyDer) and TOTAL Turkey to improve the eyesight of children with low vision, and the recycling of plastic bottles (hurriyet.com; digitalajanslar.com).

When we look at the many SRPs listed above in SM, which are not yet counted, it is seen that they are popular and successful in attracting attention. One of the biggest factors showing success is the awards given to the projects. Then, factors such as people's following the projects from their SM accounts, liking, commenting, sharing, and taking action show that the interest in SRP is successful.

So much so that every SRP that is well thought out, prepared, and studied by measuring the pulse of the society can find the opportunity to find wide resonance among people. In line with the desire to find wide repercussions in the basic structure of SRP, activating these people, who are intertwined with the problems seen in the environment, the world, and the world in which they live increases the SRP. To draw attention to SRP; people are interacted with by using creative visuals and voiceovers, making short videos, and hashtag campaigns, involving people in content creation, and short videos, and using celebrity messages to support projects.

SRP performers; Instead of managing people, they should deal with the value structures and responsibilities of the society and interact with people in a way that people value (Baird and Parasnis, 2011; Komodromos, 2017). As a reflection of this, participation in an ongoing or ongoing SRP is expected to be high and continuous. To ensure participation in the SRP and increase the number of participants, it is important to choose a social media channel that will allow the highest level of interaction possible. Thanks to the selected social media channel, younger people who follow SM frequently, retweet SRP on Twitter, like the stories about the project on Instagram, and share them with groups of friends via social media channels such as Facebook-LinkedIn-mail. In addition, people in friend groups also increase participation in SRP in the form of snowballs by forwarding them to other friend groups. A project with low participation means wasted effort and time, both financially and morally. As a result, SRP's awareness, attention, and action are provided in a faster and more practical way, thanks to the influence of social media channels on people in society.

In terms of marketing, this situation contributes to companies. This contribution varies according to the realization of the SRP and people's reactions to the SRP. SRP ensures that companies are constantly on the agenda. "SRP offers companies opportunities/s for their economic projects. Companies increase service popularity by sharing information about their products and services through SRP" (Lea et al., 2006; Mahmes, 2018). For this reason, companies should not only focus on meeting the needs, wishes, and expectations of the society, but also address the common and special needs, wishes, and expectations of the society. "SRP offers companies the opportunity to strengthen their relationships with communities and increase the degree of sincerity thanks to SM. All these affect the existing and potential customers of the companies and fix their attention to both the company and the SRP" (Borges et al., 2019; Dabas et al., 2018; Davis Mersey et al., 2010). In other words, when the company attracts the attention of the society with the SRP, this attention is continuous and the eyes of the society are on every project that the company will do.

#### **4. DATA AND METHODOLOGY**

A positivist research approach was adopted as the research design in determining the research strategy and creating its structure. The reason is that it is deductive as a logic of science, providing generally accepted information that can be attributed to a society based on theory and hypotheses, enabling sufficient quantitative and qualitative data collection, establishing a causal relationship between variables, and testing hypotheses (Coşkun et al., 2019). Scientific articles, books, conference papers, and other resources were accessed through Google and Google scholar search engines to create the conceptual framework for the research. In addition, new sources were obtained by the snowball method by reaching other sources from the bibliographies and bibliographies in the accessed sources. In this part of the research, the qualitative-descriptive method was used. The data for the quantitative dimension of the study were collected through a questionnaire. Ethical approval was given for the questionnaire used in the research by Yalova University Human Research Ethics Committee with protocol number 2021/85 on 27.06.2021.

In the study, the online survey was conducted due to the increase in the number of people with an internet connection, the increase in the rate of SM usage, the simultaneous access to people with representative features for the study sample, the high probability of getting quick results and the low cost. use is preferred. As the scale type, categorical scales from the single scales class were used, and the Likert scale was used to determine the extent to which the participants from the multiple scales class agreed or disagreed with the given statements. Among the participants aged 18 and older who use social media channels in Turkey, people who come across SRPSM and think that social media channels are an ideal environment to announce SRP were considered as the population of the study (sample mass). In the sampling method, which is one of the non-probability-based techniques, the participation of everyone who can be reached and who accepts to answer the questionnaire is taken into account. After communicating with the participants who were contacted to fill out the questionnaire, the participants were also reached by contacting the groups of that participant from time to time and these groups with the groups of other participants. Snowball sampling was used because it was tried to be found.

The distribution of questionnaire was distributed via e-mail, social media channels (Facebook, Twitter, WhatsApp, Instagram, LinkedIn), and groups on social media channels. Considering the places distributed, a total of 501 participants were accessed. The number of usable participants who completed the survey among the people accessed was determined as 501.

Before starting the questions in the questionnaire, an informative text was given. In the information text, there is information about the scope of the study, the information to be shared will only be used for the thesis, the information will not be shared

with third parties, answering the questionnaire is voluntarily and personal information will not be given. In addition, they were informed that the survey would not be used outside the study, that the participants could leave the survey at any time, and that it would take approximately how long it would take to answer the survey. Brief information about the research, what the survey was for, and what measures were given.

The questions asked in the questionnaire were prepared by the researcher and consisted of a total of 4 parts and a total of 23 questions. The 8 questions in the first part consist of categorical questions that were put to assess the participants' attention, action, whether they came across the SRPSM and whether they saw social media channels as an ideal place to announce the SRP. Among these categorical questions, in the first part, there are scale statements about attention and action variables. Scale statements related to these attention and action variables were prepared by the researcher. At the same time, the questions in this section were asked by creating a 5-point Likert (strongly agree, agree, neither agree nor disagree, disagree, strongly disagree).

In the second and third sections, the participants were asked to indicate their frequency status. Accordingly, in the second part, they were asked to indicate the appropriate frequency level (often, sometimes, rarely, never) among the options that suit them in the areas they frequently encounter in social media (education, environment, health, food, support for development, disadvantaged groups, culture).

In the third part, the participants were asked which social media channels (Twitter, Tiktok, Facebook, Instagram, LinkedIn, and Youtube) they encountered SRP more frequently (often, sometimes, rarely, never).

The 3 questions in the fourth part of the questionnaire consist of categorical questions that were put to evaluate the demographic information of the participants. Among these questions, the questions directed to the participants were age (18-22, 23-29, 30-36, 37-43, 44-49, 50 and over) and income status (less than 1000 TL, 1000-2000, 2001-5000, 5001-8000, 8001-12000, more than 12000) information.

The part of the questionnaire regarding the attention variable consists of 4 statements. The part of the questionnaire related to the action variable consists of 4 statements. Since the cronbach alpha values of the variables were in the range of 0.88-0.93 in the results, it was assumed that the expressions were reliable and did not pose a problem in terms of being readable and understandable. Table 1 below shows the variables in question, the expressions of the variables, and the sources of these expressions.

The research questions and research hypotheses created for this research are listed below, respectively.

The research questions are stated as what types of social responsibility projects (SRP) are most promoted in social media channels? And in which social media channel are social responsibility projects (SRP) more common?

The research hypotheses;

H1: Young people participate more in social responsibility projects (SRP) promoted on the social media channel.

H2: People with high incomes participate more in social responsibility projects (SRP) on the social media channel.

H3: Social media is an effective tool to get people to participate in social responsibility projects (SRP).

H4: People's attention to social responsibility projects in social media enables them to participate in social responsibility projects.

**Table 1: Variables Used in the Research Model, and Expressions of the Variables**

Variables	Variable Number	Expressions
ATTENTION	Attention1	I come across social responsibility projects on social media.
	Attention2	Social responsibility projects that I come across on social media attract my attention.
	Attention3	I find the social responsibility projects that I come across on social media remarkable.
	Attention4	I pay attention to social responsibility projects that I come across on social media.
ACTION	Action1	I support social responsibility projects that I come across on social media and ask for my contribution.
	Action2	I contribute to social responsibility projects that I come across on social media that ask for my contribution.
	Action 3	Meeting social responsibility projects on social media enables me to take action to support them.

	<b>Action4</b>	I participate in social responsibility projects that I come across on social media that ask for my contribution.
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SPSS v16 statistical program was used for the survey data. With the questionnaire data, arithmetic mean, correlation, ANOVA, and T-test analyzes were performed in the SPSS statistical program.

The reliability of the scales (attention and action), descriptive statistics (age, income, subject of social responsibility projects, social media channels), correlation, arithmetic averages, and frequency analyzes were used in the survey analysis.

In the reliability analysis for the attention variable, reliability was achieved for four statements (Attention1, Attention2, Attention3, Attention4). This reliability value was found to be 0.88 for the Attention variable. This result means that there is no problem that the participants acted consistently in their answers and responded consciously. The results are generally good because they are valid and reliable. This shows that SRPSM has attracted the attention and interest of society.

In the analyzes made for the reliability of the action variable, reliability was provided for four statements (Action1, Action2, Action3, Action4). This reliability value was found to be 0.93 for the Action variable. The results are valid and reliable. This rate shows that consumers are not indifferent to SRPSM, they support SRP, and society takes action to support SRP.

**Table 2: Descriptive Statistics**

Age			Income		
Ages	Frequency	Percent	Income level	Frequency	Percent
18-22	115	23	Less than 1000	144	28,7
23-29	205	40,9	1000-2000	51	10,2
30-36	91	18,2	2001-5000	133	26,5
37-43	52	10,4	5001-8000	97	19,4
43-49	18	3,6	8001-12000	52	10,4
Over 49	20	4	Over 12000	24	4,8
Total	501	100		501	100

In Table 2 above, descriptive information about the age and income of the research participants is given. According to this descriptive information, it is seen that the people participating in the study are mostly between the ages of 23-29 (205 people) and 18-22 (115 people). This shows that 320 people between the ages of 23-29 and 18-22 participated in the survey, in which a total of 501 people participated. When these results are expressed as percentiles, they correspond to a 40.9% percentile between the ages of 23-29 and a percentile of 23% between the ages of 18-22. The sum of these corresponding percentages is 63.9%.

Considering the income situation in the same table, it is seen that the income status of 144 people is below 1000 TL, and the income status of 133 people is 2001-5000 TL in the survey, in which a total of 501 people participated. In this case, it shows that the participation of 277 people whose income is below 1000 TL and between 2001-5000 TL is intense. According to the most common income ranges, it corresponds to a percentile of 28.7% for 1000 TL and below, and a 26.5% percentile for the 2001-5000 TL range. These corresponding percentages represent a total of 55.2%.

## 5. FINDINGS AND DISCUSSIONS

In the study, the research hypotheses of the study are tested by using the IBM SPSS Statistics v16 program. In the study, arithmetic mean, correlation, ANOVA and T-test are used in the tests performed to test the research hypotheses. In the study, a total of 501 people who completed the questionnaire and were available from the online questionnaire were reached. The statistical values of the analysis results made with 501 people reached are presented in tables. Table 3 below shows the Descriptive Statistics of Social Responsibility Project Areas. In this table, average and standard deviation values are given in seven social responsibility areas: health, environment, education, food, culture, disadvantaged groups, and support for development.

**Table 3: Statistics Describing Social Responsibility Project Areas**

Project Areas	Mean	Std. Dev.
Health	3,90	1,11
Environment	3,78	1,06
Education	3,42	1,15

Food	3,20	1,20
Cultural	2,91	1,20
Disadvantaged groups	2,82	1,31
Support for development	2,65	1,22

Table 3 shows the mean and standard deviation values for health, environment, education, food, culture, disadvantaged groups, and development support. When these given areas are evaluated, the standard deviations reflected as a result of the analysis show in which subject areas (which themes) SRPSM is seen more.

According to the table, the values of 1.11-1.06 and 1.15 in the standard deviation column draw attention. The three values given mean that the most common social responsibility area on social media is Health. While health is in the first place, it has been determined that SRPSM is most common in the area of Environment in the second place and Education in the third place. When we look at the column in which the mean values for the significance levels are included, it is seen that the level of significance in the field of Health is 3.90, the level of significance in the field of Environment is 3.78, and the level of significance in the field of Education is 3.42. In this case, the first question of the research is "Which type of social responsibility projects (SRP) are promoted the most in social media channels?" The answer to the question is that SRP is mostly promoted in the fields of health, environment, and education on social media channels. This means that society pays the most attention to the SRP in the field of health, environment, and education and takes action.

**Table 4: Descriptive Statistics of Social Media Channels**

Platform	Mean	Std. Deviation
Instagram	3,91	1,23
Twitter	3,14	1,50
Youtube	2,78	1,40
Facebook	2,73	1,39
LinkedIn	2,06	1,31
TikTok	1,61	1,09

Table 4 above shows the values of Social Media Channels Descriptive Statistics. The table includes Instagram, Twitter, Youtube, Facebook, LinkedIn, and TikTok platforms. The ratios of the channels according to their standard deviations and importance levels are shown in the table. Accordingly, it is seen that Instagram comes first and Twitter comes second at the level of significance of 3.91 and 3.14, respectively. The corresponding values of these two channels in the standard deviation column are 1.23 for Instagram and 1.50 for Twitter. With these results, the second question of the research is answered. The second question of the research is "Which social media channel is more common in social responsibility projects (SRP)?" was on it. The answer to the question is that first Instagram and then Twitter is more common in the SRP.

**Table 5: Correlations**

	Mean	Std. Dev.	1	2	3
1. Attention	3,78	0,95			
2. Action	3,39	1,05	0,75**		
3. Age	2,43	1,27	0,03	0,04	
4. Income	2,87	1,51	-0,02	0,02	0,56**

\*\*Correlation is significant at the 0.01 level (2-tailed).

Table 5 above shows the correlations. It is seen in the table that the correlation analysis has been analyzed in four components, taking into account the relationships of attention, action, age, and income. Depending on the relationships, in this table, the direction (negative-positive) and significance status of the relationships established in the hypotheses of the study can be determined.

The values expressed with \*\* at the intersection of the two variables indicate that the related variables act together. The  $p$  in the table represents the level of significance. Here, the values expressed with  $p$  are the values outside the mean and standard deviation column. If the  $p$  value is less than 0.05 in the 95% confidence interval, the model is said to be significant as a whole (Cevahir, 2020).

Looking at the action variable row, the  $p$  value of its relationship with attention was found to be 0.75. This value shows that there is a positive relationship between action and attention. The star value indicates that both variables act together in the relationship between action and attention. This result means that the public's attention to the SRPSM is taking action. Similarly, it means that the society's activities, which is SRPSM, have caught their attention. According to these findings obtained as a result of the analysis, hypothesis H4 (People's attention to social responsibility projects in social media enables them to participate in social responsibility projects.) is accepted. According to these findings, hypothesis H3 (Social media is an effective tool to get people to participate in social responsibility projects.) is also accepted.

Looking at the age variable line, the  $p$  value of the relationship with attention was determined as 0.03. According to this result, the relationship between age and attention is significant since the  $p$  value is less than 0.05 at the 95% confidence interval ( $p < 0.05$ ). Since the  $p$  value does not decrease to negative, there is a positive and significant relationship between age and attention. It is seen that the  $p$  value at the junction point with the action in the age line is 0.04. In this case, the relationship between age and action is significant as the  $p$  value is less than 0.05 at the 95% confidence interval. Since the  $p$  value does not decrease to negative, there is a positive and significant relationship between age and action. According to these findings obtained as a result of the analysis, the H1 (Young people participate more in social responsibility projects "SRP" promoted in the social media channel.) hypothesis is rejected.

Looking at the income variable row, the  $p$  value of the relationship with attention was determined as -0.02. It is seen that the value has decreased to minus. In this case, the relationship between income and attention is significant as the  $p$  value is less than 0.05 at the 95% confidence interval. Since the  $p$  value drops to negative, there is a negative and meaningless relationship between income and attention. Considering the relationship between income and action, it is seen that the value of  $p$  is 0.02. The direction of the effect is positive since the value of  $p$  does not fall into negative. At the same time, this value is significant since the  $p$  value is less than 0.05 in the 95% confidence interval. In other words, there is a positive and significant relationship between income and action. The  $p$  value about to with concerning income and age is 0.56. The direction of the effect is positive since the value of  $p$  does not fall into negative. The fact that the value is a star indicates that both variables act together in the relationship between income and age. According to these findings obtained as a result of the analysis, the H2 (People with high-income levels participate in social responsibility projects "SRPSM" more in the social media channel.) hypothesis is rejected.

## **6. CONCLUSION AND IMPLICATIONS**

This study aimed to investigate whether the introduction of SRPSM is effective, attracts attention, and moves consumers to action. It has been concluded that SRP attracts the attention of society through social media channels and mobilizes society. The results show that SRP is mostly seen in the fields of health, environment, and education on Instagram and Twitter social media channels. Among the reasons for this situation, the widespread use of Instagram and Twitter, the active participation of young people on these platforms, and the more exposure of participants to SRP in the fields of health, environment, and education on Instagram and Twitter channels can be cited.

As a result of the analysis of the research, the 1st and 2nd hypotheses were rejected, and the 3rd and 4th hypotheses were accepted.

For H1 (Young people participate more in social responsibility projects "SRP" promoted on social media channels.); The income of people aged 18-22 and 23-29 is below 1000 TL or 1000-2000 TL. Accordingly, it is considered that low-income levels do not mobilize young people against SRP, as it prevents them from participating in SRPSM. The fact that those with higher incomes are the minority may also have given this result. If the number of participants with high income was high, the result might be different and the hypothesis could be accepted. Another reason may be that the attention of young people between the ages of 18-22 and 23-29 to the SRP promoted on social media channels does not turn into action. The reason for this may be that these age ranges constitute the people who are in the lowest range according to their income level. In addition, the fact that young people have no working conditions, their income is provided by scholarships/loans from the family or received, and the low salary because they work part-time may also be effective in not turning their attention to action. While this shows that the young people are very active in attracting the attention of the SRPSM activity, it means that there is little or no SRPSM activity when it comes to action. SRPSM, created by companies, may not have attracted the attention of young people enough. Young people may not be able to take action because their attention has not been sufficiently drawn.

For H2 (people with higher incomes participate more in SRPSM); The reason for rejecting the hypothesis is that the number of high-income respondents aged 37-43, 43-49, and over 50 is small. Therefore, the number of participants with an income of 5001-8000 TL, 8001-12000 TL, and 12000 TL are also low. The small number of participants in this age range and the low number of participants with these incomes are considered to be insufficient for participation in SRPSM. SRPSM may be attracting the attention of the society within these ranges and maybe encouraging them to take action, but a generalizable valid result may not emerge because their numbers are the minority. In terms of the total number of participants, 90 people

out of 501 participants, that is, only 18% of a 100% area and only 34.6% of a 100% income, are this group. These rates are too low to generalize about the high participation rate. High-income people may be drawing attention to SRPSM. High-income people may be turning their attention to SRPSM into action. However, these actions may not constitute the majority because they are at a very low level. High-income people may not be paying attention to action.

For H3 (Social media is an effective tool to enable people to participate in social responsibility projects "SRP".); When the analysis results are evaluated in general, it is concluded that social media channels are the right place to publish the SRP. This situation may increase the effectiveness of SRP today and tomorrow.

The research was conducted and concluded within the framework of various constraints in the last quarter of 2021. In the research, it was assumed that the people who participated in the survey gave sincere, conscious, and correct answers. In addition, since this research does not have a counterpart, it was not possible to compare the findings with other studies. The questions of the questionnaire used in the research were created by taking into account everyone who can be reached over the age of 18. Therefore, the survey questions used in the article and the sample of the survey's participant population are limited to Turkey. The results may give different results with a different scale, a theory, a different method, or a different audience.

In this case, the first limitation of the study is the region (it was applied only within the borders of Turkey), the second limitation is to analyze and generalize over 501 people in total. The third constraint is the limited time to reach respondents for the survey, and the responses were not as expected (limited number of high-income, low-income youth). The fourth limitation is that the research is limited to the data obtained from the measurement tool developed and applied by the researcher.

Researchers can make a comparative improvement in the results of the analysis by applying the sample size both in Turkey and in other countries. Those who will work on this subject can keep the sample size larger, and continue this study by giving more places to the participants with high-income levels and increasing the number of participants with high-income levels. They can make a new study by associating it with a theory. The attention and action variables in this study can be reconsidered by including the other expressions in the AIDA model, interest and desire. The DAGMAR model can be used. Different results can be obtained by making different analyzes and associations. In addition to this study, by adding interview (interview) application or group interviews, more clear, clear, and direct results can be obtained about the opinions, thoughts, and suggestions of consumers. Apart from the variables used in this study, one/more than one different relationship can be established between them by using different variables, or one/more than one different relationship can be established between them by adding other variables to these variables. The firm/s that make one or two specific SRPs can be identified and the study can be repeated. Other work can be done. New variables can be used, supported by theory.

It is thought that increasing the number of participants participating in the research, adding new and different variables, new and different theories to the research, creating new questions, and investigating why the participants chose the relevant one may change the results of the study. Therefore, it is considered that a more comprehensive approach to the study will provide new results and change the course of the research.

In this case, to attract young people to SRP in social media channels, companies need to give more importance to projects that may attract young people and redesign their current projects in a way that attracts the attention of young people. Social media channels should take initiatives to attract the attention of people who do not participate in the SRP social media channels despite their high-income level and to turn their attention into action. Companies should make these initiatives first on Instagram and then on Twitter as a supporting factor.

According to the results of the analysis, young people give more importance and pay attention to SRP, especially on Instagram. Companies included in the SRP should heavily use Instagram and Twitter channels, which are among the platforms most frequently used by young people in terms of the effectiveness of their projects while announcing the SRP. Companies should prepare the visual (coloring and size) of the SRP they make very well to attract the attention of society of all ages. At the same time, the SRP of the companies can draw attention when these changes are applied with short video ads. Firms can offer reasonable prices for products and services to mobilize society. It can initiate campaigns and promotions. Thus, since the income of the young people in the society will not be very difficult, it will be ensured that they take action by making a small contribution. SRP can be prepared with informative, educational, and remarkable visuals and effects on SMA, AIDS, Lösev, blood donation, vaccines, and various types of cancer, especially in the field of health that attracts the most attention, so that the society can take action. In the field of environment, which is another area that attracts the most attention, companies are faced with famine, waste, environmental pollution, climate changes, drought, recycling, etc. By using social responsibility themes, they can use their products and services in SM as a project that attracts attention and takes action. It is recommended that companies act by using social responsibility themes such as combating the ways of thinking that separate girls and boys



in the field of education, various scholarship opportunities, educational donations, courses, and homeschooling for sick children who cannot go to school. Thus, it is thought that the SRPSM they created will be more remarkable and actionable.

This shows that the SRP that companies will do in these three areas has a definite equivalent in societies. Companies should continue to carry out SRP, especially in the fields of health, environment, and education, increase the number of their studies, and companies that do not carry out SRP in these three areas should start giving projects in these areas.

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