

# Organic Food in Supply Chain: Literature Review

Ismi Zahria and Iwan Vanany

Department of Industrial and Systems Engineering, Institut Teknologi Sepuluh Nopember,  
Surabaya, Indonesia, Kampus ITS,  
Sukolilo, 60111, Indonesia  
[ismizahria@gmail.com](mailto:ismizahria@gmail.com), [vanany@ie.its.ac.id](mailto:vanany@ie.its.ac.id)

## Abstract

This paper reviews previous studies on organic food in the supply chain to understand the art from the previous research manuscripts and recommend future research. The authors conducted description and content analysis to understand the state of organic food in supply chain research and outline future research opportunities. The systematic literature review was used to search for paper collected, review, and analyze based on the Scopus database from 1990-2021. The findings indicate that literature review is the most research method, oil is the most organic food type, and logistics is the most of supply chain scope. Systematic classification with description and content analysis is a slight contribution of this paper. Academicians can use it to understand research in organic food in the supply chain and future research.

## Keywords

Organic Food, Supply Chain, Literature Review, Systematic Literature Review, Cluster Analysis

## 1. Introduction

Organic food products have become an option for consumers to consume because attention to food safety is increasing, and they are more concerned about their health. It can be seen from the high increase in demand for organic food products (Pınar & Çelebi, 2019). In addition, the issue of ecological sustainability, economic, into environmental also raises the issue of organic food (Santos, G. C.; Monteiro, 2004). The majority of research results show pesticide residues in food (healthy factors) to be a significant factor in purchasing organic food products rather than overall environmental concern. However, this factor is more critical in some countries (Bourn & Prescott, 2002).

Organic food products require certainty throughout the entire process of the supply chain, from farming to customers. Managing the supply chain for organic food products is needed by practitioners to ensure that all food processes in the supply chain meet the requirements of organic food. On the other hand, the complexity of organic food in the supply chain is high because it must involve many parties, various aspects, and a long process (Vieira et al., 2013). Related parties and processes start from fruit and vegetable farming, distributors, retailers, buyers, or end customers. If supply chain management for organic food goes well, organic supply chains can help increase end customer trust in organic products (Hamzaoui-Essoussi & Zahaf, 2012).

Some previous papers have carried out a literature review for organic food. Hemmerling et al. (2015) reviewed the consumption behavior for organic food. Kushwah et al. (2019) reviewed previous papers on organic food to understand the motivation and barriers of organic food consumption. Li et al. (2019) conducted a bibliometric review on customer's willingness to pay for organic food in China. However, a few papers have reviewed organic food on the supply chain. This paper aims to understand research methods applied, types of organic food, and the scope of the supply chain.

Eight literature review papers obtained in this study, the topics covered were related to the food supply chain, cold supply chain and perishable food. For example Fredriksson & Liljestränd (2015) reviewed food logistics, which proposes the following definition of food logistics: Food logistics examines logistical activities within a food supply chain setting by evaluating the constellation of food supply chain actors and problematizing food product attributes. Vrat et al. (2018) discussed cold-chain for perishable food products using Scopus database from 1985–2017, The research examines the current literature on this critical issue and using a structured approach known as literature

review analytics, which includes bibliometric and network analytics, to draw valuable insights. There is no literature review paper that specifically discusses organic food in the supply chain. Thus this paper brings the novelty of research gap in literature review paper.

This paper is structured as follows. First, section two present the research methodology used in this study. Section three described the review results that explored the description and content analysis and followed by discussions. Finally, the conclusions present the research's contributions to academicians and its limitations of this research.

## 2. Research Methodology

This study has been carried out using the systematic literature review (SLR) approach. We used a four-stage of SLR such as (1) defining the rule of search stages, (2) initial search, (3) second search, and (4) third search. The initial stage is a critical stage in the SLR approach to developing a protocol to conduct a comprehensive review (Khannan et al., 2021). In this study, the initial search, second search, and third search stages conducted on retrieved research publication on Scopus database on April 2021. The defining rules of search are organic food and the supply chain. Two rules and topics used with several keywords used are shown in Table 1. Rule 1 for organic food and rule 2 for supply chain were used in the second stage to search papers related to the Scopus database from 1990 until April 2021.

Table 1. Rule, Topic, and Keywords

Rule	Topic	Keywords	Numbers of Papers
Rule 1	Organic Food	"organic farm*" OR "organic product*" OR "organic food*" OR "organic" OR perishable*"	1,548,653
Rule 2	Supply Chain	"Supply chain*" OR "logistic*" OR "distribut*"	1,856,250
<b>Rule 1 + Rule 2</b>			<b>22,058</b>

In the third search, we found 1,355 papers with a limited search of two subject areas: Business, Management, and Accounting and Decision Sciences. In the final stage, 1,314 papers were founded after screening for deleting the paper that did not has the author's name in the paper. Table 2 shows the result of the number of papers with several keywords in rule 1 and rule 2. each stage from stage 1 until stage 4.

Table 2. Third and Fourth Stages Results

Step	Combination	Refine	Numbers of Papers
<b>1st</b>	Rule 1 and Rule 2	Year: 1965 – Present Doc. Type: All Source Type: All Language: All	138,253
<b>2nd</b>	Rule 1 and Rule 2	Year: 1990 - 2021 Doc. Type: All Source Type: Article Language: All	119,231
<b>3rd</b>	Rule 1 and Rule 2	Subject area: Business, Management and Accounting; Decision Sciences	1,355
<b>4<sup>th</sup> (Final)</b>	Rule 1 and Rule 2	<i>No author name available</i>	1,314

## 3. Review Results

### 3.1 Description Analysis

#### 3.1.1. Trend publications

The number of literature used in this study to explore description and content amounted to 1,314 papers. Based on the number of papers used, the trend publication can be identified with the annual publication distribution (see Figure 1). In Figure 1, the first paper was founded in 1990, and the number of papers is increased significantly from 1990 to early 2021. There was the highest increase in 2020 from 139 papers in 2019. The trend of increasing research on organic food was also shown by (Gružauskas et al., 2019) which writes that the contribution of small and medium farmers will increase in the future due to the increasing demand for organic food products based on the research of (Alleweldt et al., 2013).

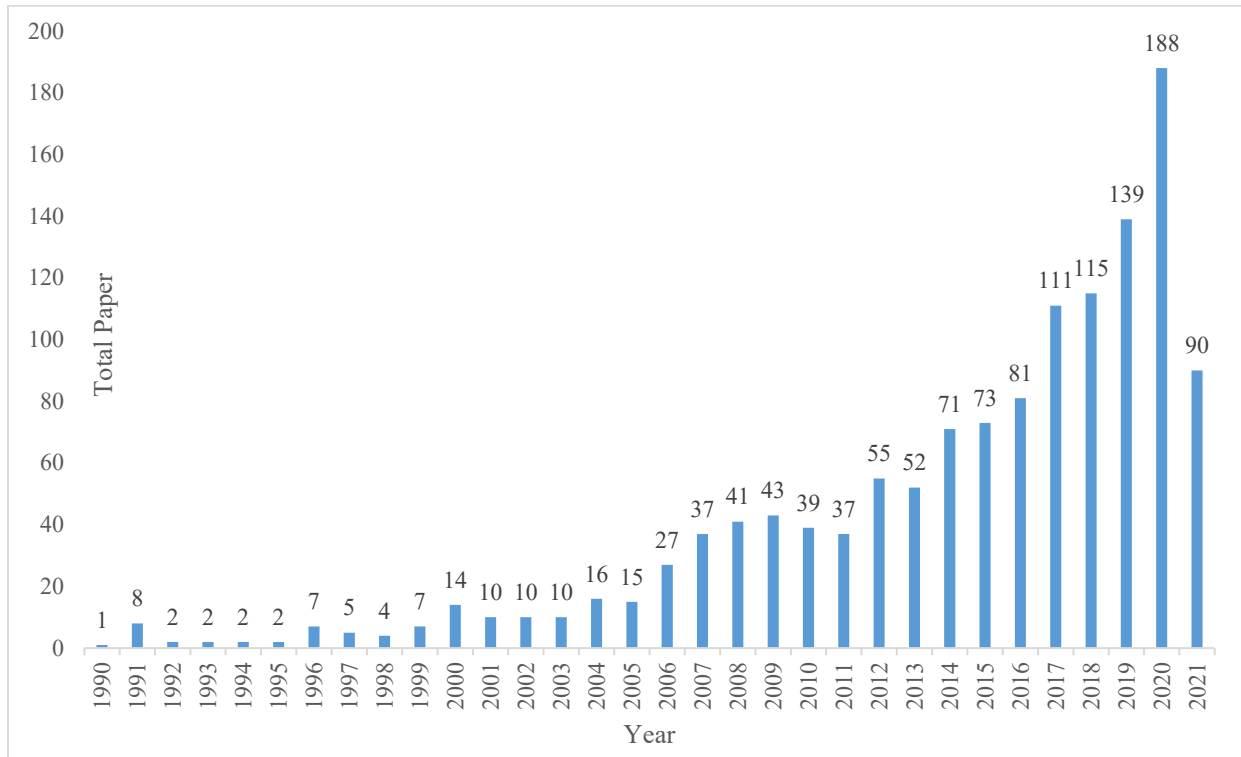


Figure 1. Trend publication on organic food in the supply chain

#### 3.1.2. Top 20 journals

The top 20 journals that published papers on organic food in the supply chain from 1990 until 2021 are shown in Table 3. The top five significant journals are Journal of Cleaner Production (186 papers), Ecological Indicators (132 papers), International Journal of Production Economics (55 papers), British Food Journal (49 papers), and European Journal of Operational Research (38 papers). 35% of the number of papers on organic food in the supply chain were published in the top five journals.

Table 3. Total Paper each Year on Top Journal

No	Journal Name	1990-2000	2001-2005	2006-2010	2011-2015	2016-2021	TP
1	Journal of Cleaner Production	1	0	1	25	159	186
2	Ecological Indicators	0	1	6	25	100	132
3	International Journal of Production Economics	2	1	9	18	25	55
4	British Food Journal	1	6	9	12	21	49
5	European Journal of Operational Research	6	2	5	4	21	38
6	International Journal of Production Research	0	1	2	5	23	31
7	Queueing Systems	4	2	14	9	1	30
8	Annals of Operations Research	0	0	1	6	16	23
9	Operations Research	5	1	6	3	2	17
10	Computers and Operations Research	1	2	1	1	10	15
11	International Journal of Supply Chain Management	0	0	0	2	13	15
12	Journal of Food Products Marketing	0	0	3	6	5	14
13	International Journal of Consumer Studies	0	2	2	5	3	12
14	Journal of the Operational Research Society	3	1	2	1	4	11
15	Modeling Earth Systems and Environment	0	0	0	0	10	10
16	Operations Research Letters	3	0	2	2	3	10
17	Industrial Management and Data Systems	0	0	0	0	10	10
18	International Journal of Logistics Systems and Management	0	0	1	2	7	10
19	Production and Operations Management	0	0	3	2	4	9
20	International Food and Agribusiness Management Review	1	0	2	4	2	9

### 3.1.3. Top 10 Paper Citations

The following are the papers most cited by researchers. We need to look at the cited top paper because it shows that the top paper is beneficial and is used by many parties to refer to something and become a reference. The top paper shows the same total citation value, which is 405 starting from different years from 1997 to 2017. The top 10 papers as a whole show that, in general, the dominant ones are related to supply chains, such as inventory, demand, and supply, retail, pricing, distribution. The trend of supply chain research on perishable food can be seen from 40% of the top papers discussing this matter since the 2000s. Interestingly, the supply chain research on organic food published in 2017 (the most recent paper compared to other papers) has the same total citation as the previous paper, with the highest total citation per year reaching 100, namely 101.25. This shows that organic research is at the peak of the trend.

Table 4. Top 10 Paper Citations Index

Rank	Authors	Title	TC	Year	TC/Y
1	Bakker M., Riezebos J.	Review of inventory systems with a deterioration since 2001	405	2012	45
2	Elberse A.	Demand and Supply Dynamics for Sequentially Released Products in International Markets: The Case of Motion Pictures	405	2003	22,5
3	Padmanabhan V.	Manufacturer's returns policies and retail competition	405	1997	16,875
4	Govindan K., Jafarian A., Khodaverdi R.	Two-echelon multiple-vehicle location-routing problem with time windows for optimization of sustainable supply chain network of perishable food	405	2014	57,857
5	Zhao W.	Optimal dynamic pricing for perishable assets with nonhomogeneous demand	405	2000	19,286
6	Lippman S.A.	The competitive newsboy	405	1997	16,875
7	Nijs V.R., et al.	The category-demand effects of price promotions	405	2001	20,25
8	Blackburn J.	Supply chain strategies for perishable products: The case of fresh produce	405	2009	33,75
9	Sarker B.R., Jamal A.M.M.	Supply chain models for perishable products under inflation and permissible delay in payment	405	2000	19,286
10	Rana J.	Consumer behavior and purchase intention for organic food: A review and research agenda	405	2017	101,25

### 3.2 Content Analysis

This part researcher assigns content analysis from papers, including research method, food type, and scope of the supply chain.

#### 3.2.1. Research methods applied

In this review paper, the classification of research methods uses five types of research methods by (Kothari, 2004) such as modeling, case study research, conceptual framework, empirical studies, and literature review. Modeling research is one of the research methods that proposed model is assumed to represent the actual system and need the required information (e.g., input, parameters (Sulistyo, 2013). Case study research is qualitative research that researchers often carry out involving a survey or observation of an organization, social unit, institution, and others. Generally, the scope of the study is quite broad, and the period is quite long (Kothari, 2004). According to (Kothari 2004). Conceptual research is new ideas or concepts from existing ideas or theories. In contrast, empirical studies are based on experience or experiments from a study where researchers can control the research variables. A conceptual model is a collection of concepts, with or without propositions that represent (but not explain) an event, object, or process. Any premises found in a conceptual model are only logical statements, not epistemological connections (Meredith, 1993). The empirical study was driven by observations of a phenomenon that frequently begins with inquiries about what happened, and the phenomenon involves, and its frequency. Instead, empirical research examining observed phenomena must include a well-thought-out rationale for the study, such as why it is exciting or possibly significant (Helfat, 2007). A literature review summarizes state of the art in each topic by distilling the available literature in that discipline. It is feasible to identify areas where additional research may be advantageous based on this review of previous and recent work (Slack, 2004).

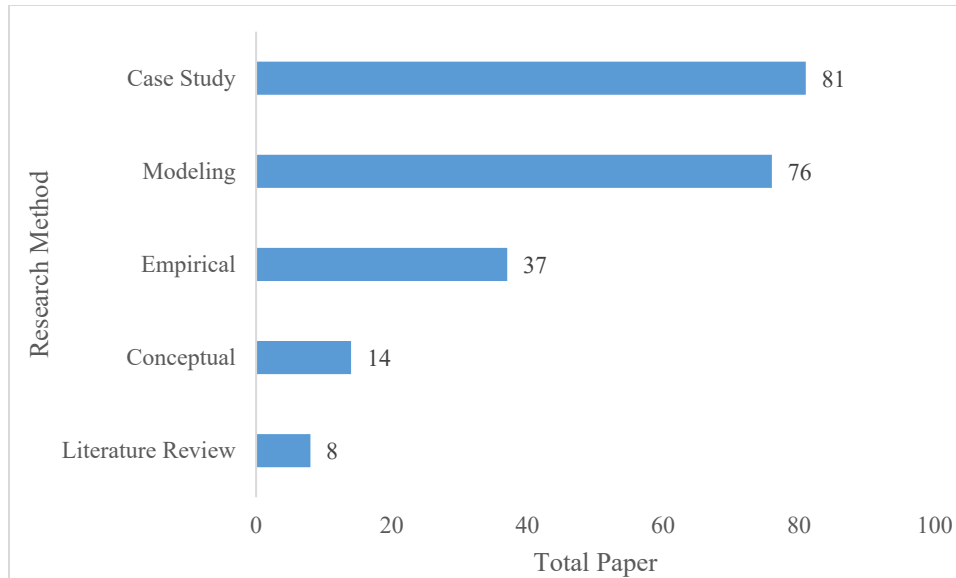


Figure 2. Research Methods Applied on Organic Food in Supply Chain

### 3.2.2. Types of Organic Food

Table 5: The Number of Research Papers in each Type of Organic Food

No	Food Type	Amount of paper	Authors (Example)
1	Apple	3	Keyes et al., 2015; Longo et al., 2017; Ozbay & Yargic, 2015
2	Berry	2	Ramos et al., 2018; Rijpkema et al., 2014
3	Cereal	5	Kulak et al., 2015; Larson, 2018; Leinonen et al., 2019; Oliveira et al., 2019; Romanucci et al., 2018
4	Coffee	5	Arulrajah et al., 2014; Bilfield et al., 2020; Claro & De Oliveira Claro, 2004; Ramos, et al., 2019; Ramos, et al., 2019
5	Dairy	1	Jia et al., 2018
6	Egg	3	Costantini et al., 2020; Kim, 2018; Pelletier, 2017
7	Fish	20	Asche et al., 2021; Bouchet et al., 2020; Coronado Mondragon et al., 2020; Chen, 2013
8	Honey	6	Jensen & Mørkbak, 2013; Silva et al., 2021; Virgil & Simona, 2020
9	Meat	9	Schmidt Rivera et al., 2014; Schiavo et al., 2018; Muñio et al., 2017
10	Milk	23	Yin et al., 2016; Svensson & Wagner, 2012; Ercin et al., 2012
11	Oil	165	Chousou et al., 2018; Kalogeras et al., 2009; Mili & Arfa, 2020; Formigoni et al., 2014; Furumo et al., 2020
12	Potato	5	Darroch & Mushayanyama, 2006; Liu et al., 2018; Smit et al., 2008; Yakovleva & Flynn, 2009
13	Rice	1	Stanger et al., 2013
14	Tomato	6	Del Borghi et al., 2014; Gaukler et al., 2017; Ghezavati et al., 2017; Okdinawati et al., 2020
15	Wine	6	Lanfranchi et al., 2020; Pappalardo et al., 2020; Sguanci et al., 2019
<b>Total</b>		<b>260</b>	

Most people prefer organic food products only in fruits and vegetable products. However, organic products have various types of products ranging from animal and vegetable, such as meat, eggs, fish, fruit, vegetables, and even jelly. Wier & Calverley (2002) wrote that there are at least four organic products, namely bread and cereals; dairy products; meat products, and other products such as fruit and vegetables. Meanwhile, in the study Krystallis & Chryssohoidis (2005), at least divided into three major groups, namely essential foods with a high frequency of purchase such as fruit (apple, orange), vegetables (tomato, lettuce), milk, pasta, bread, cheese, chicken and peas); the second group of essential foods with average frequency such as meat, eggs, fish, cheese and olive oil; while the third group is the primary non-food group such as preserved meat (ham, sausage), biscuits and canned food (tuna, tomato juice). Nevertheless, the most critical aspects for organic food to be successful in the market are sensory quality, freshness, regionalism, careful processing, and minimal additives (Kahl et al., 2012). Kahl et al. (2012) also wrote that organic food is produced utilizing a regulated and certified production process. The following table is an organic product in several studies.

### 3.2.3. Scopes of Supply Chain

The food supply chain consists of many links and operates globally, with many stakeholders involved, from agriculture to forks (Verhoosel et al., 2018). Various actors involved in the United Kingdom in the fresh food supply chain (fruit and vegetables) recognized the importance of process integration and have taken initiatives to improve their vertical coordination (Wilson, 1996). This indicates that supply chain management for organic food needs to be considered. Table 6 shows the number of research papers in each scope of the supply chain. Logistics and farming areas are the most frequently studied scope of the supply chain. This shows that not only processes and activities in the farming area need to be managed, but also processes and activities in the logistics area need to be managed.

Table 6: The Number of Research Papers each Scope of Supply Chain

No	Scopes of Supply Chain	Number of Papers	Authors (example)
1	Farming	235	Asian et al., 2019; Baez et al., 2020; Annunziata et al., 2010
2	Food Processing	9	Casey, 2008; Bettels et al., 2020; Zhang et al., 2020
3	Logistics	772	Aguirre Gonzalez, 2012; Azoury & Miyaoka, 2013
4	Retail	209	Margunani et al., 2018; Onyango et al., 2007; Padel & Midmore, 2005
5	End customer	1	Yan & Ke, 2018
<b>Total</b>		<b>1,226</b>	

## 4. Discussions

The contribution of this paper is to elaborate on the existing research publication on organic food in the supply chain. The future research agenda on organic food in the supply chain has also been attempted in this paper. For instance, Kushwah et al. (2019) set future research for customer motivation and barriers in organic food consumption, customer purchase decisions using a quantitative approach, and consumption value of organic food products. Hansmann et al. (2020) recommended the research agenda to apply the integrative model to predict purchases of organic food products, including self-reported behavior objectively. The application of risk assessment to reduce the frequency and impact of risk events in a long organic food supply chain is practitioners' intention. Many practitioners pointed out that it is urgent to apply risk assessment on the supply chain, including the food supply chain (Vanany and Zailani, 2010).

The limitation of this paper is a more elaborate description and content analysis. Meanwhile, efforts to elaborate research clusters and co-citation analysis by bibliometric approach have not been carried out. The implications of this research are based on the content analysis carried out. First, in the research method applied, it is surprising to see the literature review as a research method that academics have used to conduct research on organic food in the supply chain. Secondly, organic oil products were the most selected for research, and organic fish products as the second choice were selected as types of organic food. Kalogeras et al. (2009) identified Dutch consumers' willingness to pay (WTP) for organic olive oil and found that consumers' experience, perception, and awareness are significant factors of customer purchasing. The significant factors of consumers' willingness to pay for organic olive oil products are the same or different with different types of organic food products are interesting to research in the future. Finally, a few

previous research has the scope of research that elaborates the downstream, upstream supply chain, and the total supply chain. Previous research is still dominated by the scope of research into logistics and farming.

## 5. Conclusions

We gave a detailed study of organic food throughout the supply chain across time, based on bibliometric and content analysis. We discussed the contributions of scientific publications to organic food research and the contributions of researchers to the developing discipline of supply chain management. To our knowledge, this is the first study to attempt to identify research trends, top journals, and most-read papers, using content analysis as a research approach, organic food types, and supply chain scopes. Despite its limitations, we believe that our study provides knowledge and inspiration to researchers who wish to pursue organic food research in the future.

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## Biography

**Ismi Zahria** is a first-year Ph.D. student in the Department of Industrial and Systems Engineering at the Institut Teknologi Sepuluh Nopember (ITS), Surabaya, Indonesia. Her doctoral is focused on organic food in the supply chain. Ismi Zahria finished her bachelor and master degree also at Institut Teknologi Sepuluh Nopember, Surabaya, Indonesia. Her research interests include organic food, assessment on organic food, logistic and supply chain management and food supply chain. She can be contacted at [ismizahria@gmail.com](mailto:ismizahria@gmail.com).

**Iwan Vanany** is a Professor in the Department of Industrial and Systems Engineering at Institut Teknologi Sepuluh Nopember (ITS), Surabaya, Indonesia. His research interests are food supply chain management, business process management, and halal operations dan supply chain. He has published in *International Journal of Information System*

*and Supply Chain Management, Meiji Business Journal, Supply Chain Forum: An International Journal, International Journal Logistics Systems and Management, Journal of Islamic Marketing, International Journal of Lean Six Sigma, British Food Journal, and Food Control.* He teaches business process reengineering, supply chain management, enterprise resources planning (ERP), logistics system, production and planning control, transportation, warehouse management, and purchasing management. He can be contacted at [vanany@ie.its.ac.id](mailto:vanany@ie.its.ac.id).