



Investigating the Organic Agricultural Products Supply Chain in Iran

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Abstract

The present study aimed to investigate the organic agricultural products supply chain in Iran and provide a processes maturity framework for this chain based on the Iranian Standard of the organic products. Accordingly, the model proposed in this research, has provided an improvement tool that addresses the integration of company's internal processes at low levels, and the integration of the processes with external partners at higher levels of maturity given the maturity levels definition. This model is designed based on the main components of maturity models, i.e. maturity levels with a five-level structure and the relevant questionnaire (confirmed by CVI index). Based on the results of the implementation of the proposed maturity model in two case studies, it was found that the two processes of customer service management and customer relationship management need the most attention and improvement, which is consistent with theoretical findings. In Company A, lack of direct communication or online communication platform to communicate with customers are among the weaknesses and good quality of products is among the strengths, and in Company B, lack of procedure for collecting and documenting information is among the weaknesses and close relationships with key partners is among the strengths, identified based on the evaluation by the proposed maturity model. Finally, improvement strategies were presented for each of these processes using the ANP method, which can be used as a roadmap by managers and practitioners in this field.

Keywords:

Maturity framework; organic agricultural products; supply chain management; supply chain processes

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INTRODUCTION

Today, organizations are facing increasing global competition, increasing customers' and employees' demand, reduced product life cycle and reduced acceptable response time. Competition in many industries has expanded from the level of a single company to the level of supply chains. Hence, organizations need to manage not only their in-house relationships, but also their relationships with other supply chain partners (Croxtton et al., 2001). As supply chain is considered as an essential element in company success, its performance evaluation is especially important according to Reyes and Giachetti (2010). How to deal with the increasing complexity of supply chains has become a competitive factor today. Nevertheless, few companies have access to the tools needed to manage complexity. Most companies have not yet identified a complex management approach/management system or are unaware of the efficiency and suitability of these methods and tools (Kluth et al., 2014).

Supply chain management, as a management philosophy, is a system approach to see the entire chain as a single entity (Klemencic, 2006). According to this philosophy, success of the supply chain is not inherent, but it is realized through the efforts of all members of chain including manufacturers, suppliers and service providers.

On the other hand, the organic products supply chain is no exception to this growing global complexity. With the growth of organic agricultural products markets, companies should seek to develop effective ways to transfer these products to customers by maintaining quality and integrity throughout the supply chain. It is necessary to produce, process and distribute these products in accordance with the processes, methods, and standards that prevent any contamination, while able to deliver the right products, at the right time and to the right place in order to succeed.

Due to the growing importance of the food health and safety problems and environmen-

tal considerations, and the attention paid to healthy and organic products in this regard, numerous studies have been conducted so far on the supply chain of these products.

Global research on the supply chain of organic products is mainly focused on optimizing the production, distribution, and marketing of these products. Palomino et al. (2017) have reviewed the organic coffee supply chain in San Martin, Peru, and provided a SCOR-based framework for evaluating organizations and improving their activities. Kerdrisam and Suwanmaneepong (2015) have reviewed organic agriculture strategies in Thailand using SWOT and TOWS strategic matrices to develop organic agriculture strategies in the sustainable supply chain. Mischev and Stoyanova (2009) have studied organic supply chain in Bulgaria and focused on the issues such as the effects of supply chain on food security and the product quality. Dovleac (2016) has explored the supply chain for organic products in Europe and evaluated the challenges faced by the European organic market in providing solutions for sustainable development. Part of researches is also focused on the product market, as reported by institutions, organizations and individuals from around the world, which is less relevant to our current concern. Edwardson and Santacoloma (2013) in their study entitled: "*Organic supply chains for small farmer income generation in developing countries*", examined the factors influencing success or failure of this chain by studying cases from India, Thailand, Brazil, Hungary and Africa. In all case studies, a range of factors that influenced success were identified. Key among these were: secure access to stable markets through value chain integration, active participation by private sector partners able to take responsibility for financial and managerial resources and provide support to farmers, support services from Non-governmental Organizations (NGOs) and government agencies, and adequate investment and access to finance.

As can be seen, previous studies are more focused on the requirements of a particular

country or region and, while the research on agricultural products, especially organic products are less able to be generalized to other countries or regions due to its specific and important requirements, the climate and conditions of different regions, the economic, political, legal and environmental conditions governing the geographical areas and different countries.

On the other hand, the supply chain inadequacy has been proven in agricultural sector of developing countries like Iran, and this annually imposes significant costs on the country. Management weaknesses in the distribution system of agricultural products and the lack of an extensive and integrated information system resulted in failure to achieve the desired position despite investments in this area. Also, according to [Molainasab et al. \(2011\)](#), the existence of heterogeneous elements in this chain has led to its lack of integrity in Iran. This necessitates the study of the applicability of modern management methods in the agricultural sector especially about organic products because of their distinctive features which is further discussed below.

As in many developing countries, the domestic market is still relatively small for organic products in Iran. However, local demand for organic products has been growing in line with rising incomes and consumer awareness as well as concerns related to a number of food safety issues. It is typical for developing countries that the domestic organic market starts in the capital city with smaller outlets/health shops. These shops are usually located in residential areas that are inhabited by upper-middle class citizens ([Kledal et al., 2012](#)). The same goes for Iran, where a number of organic products such as rice, honey, and olive oil are now occasionally available in a few outlets in some high-end residential areas in the northern part of Tehran. The market is not stable, however, and lacks a consistent supply of products. Also, quality and packaging need to be improved in order to lower both distribution

costs and secure a growing consumer interest ([Kledal et al., 2012](#)).

Also, the price of these products is still high in Iran due to the small scale of their supply. So, the demand for these products is always more than their supply. In addition, a large part of the organic products cost is due to the inefficient distribution network. Despite the dramatic growth of this industry and its related technologies, the way of distributing organic food products has not been much improved. This has led to a lot of complexity and confusion in the supply chain of these products. In fact, distributors do not know when the stores need products, and the store does not have up-to-date information about existing stocks or distributors' price levels. Totally, it can be said that the Iranian organic products supply chain is inefficient due to the lack of market knowledge, lack of proper transmission of demand information, lack of understanding retailers, the large number of actors and decision makers in Iran's macro-economic sector, and the deep impact of intermediaries' information on the producer. This inefficiency is more likely to result in the lack of coordination between the various links of the chain and requires an approach to build coordination and integration between the various chain components. The mentioned evidences are part of the reality of organic products supply chain and the issues ahead of this section.

As many studies show, (e.g. [Molainasab et al., 2011](#)), Iran can be a great place for organic agriculture development due to its specific potentials and climatic conditions, and this is achievable through identifying the shortages of the supply chain of these products and develop and implement appropriate solutions to improve its status.

Given the specific characteristics of the organic agricultural products supply chain mentioned above, the requirements and differences in different countries and regions, and the weaknesses and vulnerabilities resulted from different sources of information, it is essential to design a maturity model,

compatible with our national standards, in order to performance evaluation, as well as determining the strengths and weaknesses of this chain in our country. The model proposed in this study can be used as a road map for improving supply chain processes. This roadmap identifies both strengths and opportunities for improvement in the supply chain of organic agricultural products, and thus provides tools for improving the supply chain of these products. On the other hand, to the best of our knowledge, there is no research in Iran that specifically explores the structure of the supply chain for organic agricultural products. Accordingly, it is necessary to provide such tool that makes it possible to better understand the status quo of the organic products supply chain, and provide a roadmap for the continuous improvement.

The rest of the research is organized as follows: The next section is dedicated to providing a framework for evaluating maturity. In the third section, the proposed model is implemented on two sub-chains of organic agricultural supply chain. Section four discusses the results of the research. Finally, the conclusions, recommendations for managers and suggestions for the future research were provided in section 5.

PROPOSED FRAMEWORK

Maturity models typically include a sequence of levels (or stages) that form an anticipated, desired, or logical path from an initial state to maturity. An organization's current maturity level represents its capabilities as regards a specific class of objects and application domain. Maturity models are used to assess as-is situations, to guide improvement initiatives, and to control progress (Röglinger et al., 2012). The maturity levels defined in the present research are based on the general definition of maturity levels in accordance with the *Capability Maturity Model Integration (CMMI) (2002)*, which is the basis for all maturity models, as well as the maturity requirements of the supply chain processes that are to meet the in-

tegrity and coordination criteria, and the organic product standards. The general definition of maturity levels in the proposed model is as follow:

Level 1, Initial: The supply chain and its practices are unstructured and ill-defined. Process measures are not in place. Process performance is unpredictable. Targets, if defined, are often missed. Customer satisfaction is low. Functional cooperation is also low (Lockamy & McCormack, 2004). Practices may originate from the initial experience or knowledge of a team member (Wysocki, 2004).

Level 2, Defined: Basic SCM processes are defined and documented. Process performance is more predictable. Targets are defined but still missed more often than not. Overcoming the functional silos takes considerable effort owing to boundary concerns and competing goals. Customer satisfaction has improved, but is still low.

Level 3, Standard: This represents the breakthrough level. Managers employ SCM with strategic intent and results. Cooperation between intra-company functions, vendors and customers takes the form of teams that share common SCM measures and goals that reach horizontally across the supply chain. Process performance becomes more predictable and targets are often achieved. Customers are included in process improvement efforts and customer satisfaction begins to show marked improvement. Organic product standards are accepted for relevant processes and are used to improve the process to meet organic requirements.

Level 4, Integrated: There is complete coordination between the various departments of the company as well as some upstream and downstream supply chain levels. Process performance becomes very predictable and targets are reliably achieved. Lessons learned and best practices are gathered and made available to other parts of the company (Wysocki, 2004). Organic standards are fully implemented about the relevant processes.

Level 5, Continuous improvement: Collabo-

ration between legal entities is routine to the point where advanced SCM practices that allow transfer of responsibility without legal ownership are in place. Multi-firm SCM teams with common processes, goals and broad authority take shape. Trust, mutual dependency and esprit de corps are the glue holding the extended supply chain together. Process performance and reliability of the extended sys-

tem are measured and joint investments in improving the system are shared, as are the returns (Lockamy & McCormack, 2004).

Accordingly, maturity levels are defined for each of the eight supply chain management processes, defined in GSCF supply chain architecture framework (Lambert et al., 2004), as shown in Figures 1 to 8:

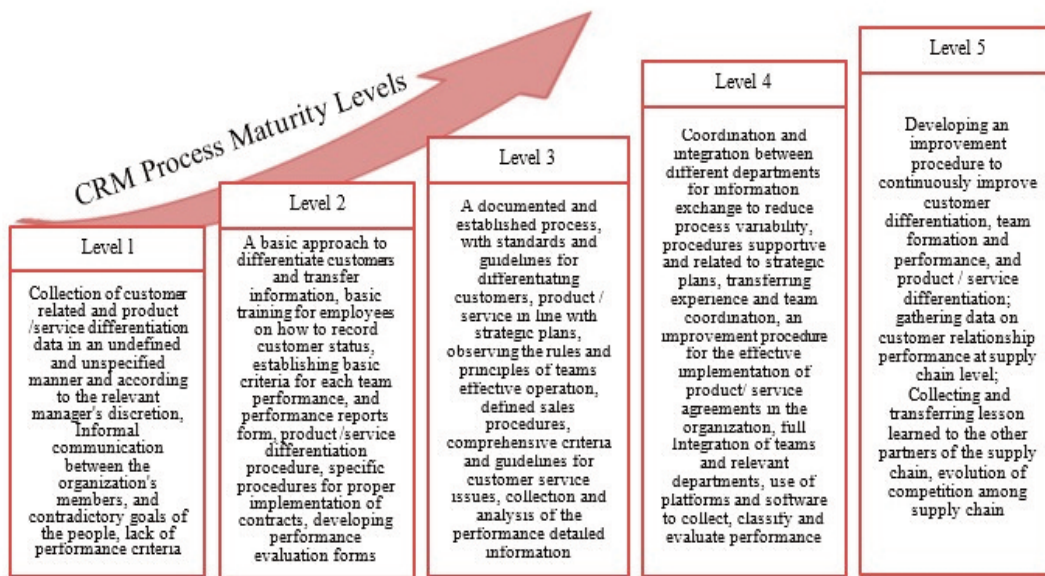


Figure 1. Customer relationship management process maturity levels (Source: Simon et al., 2015 and the GSCF framework)

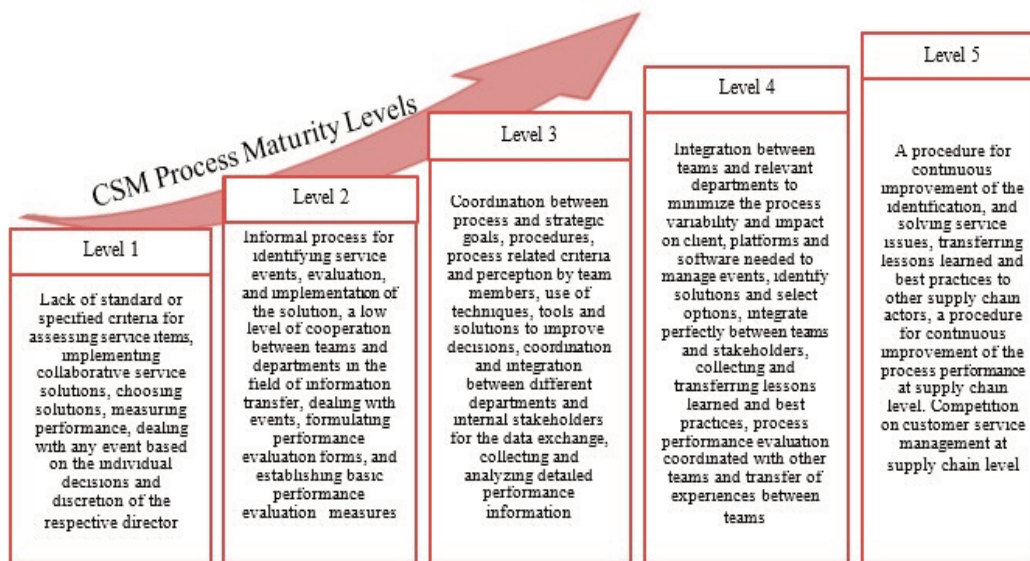


Figure 2. Customer service management process maturity levels (Source: Simon et al., 2015 and the GSCF framework)

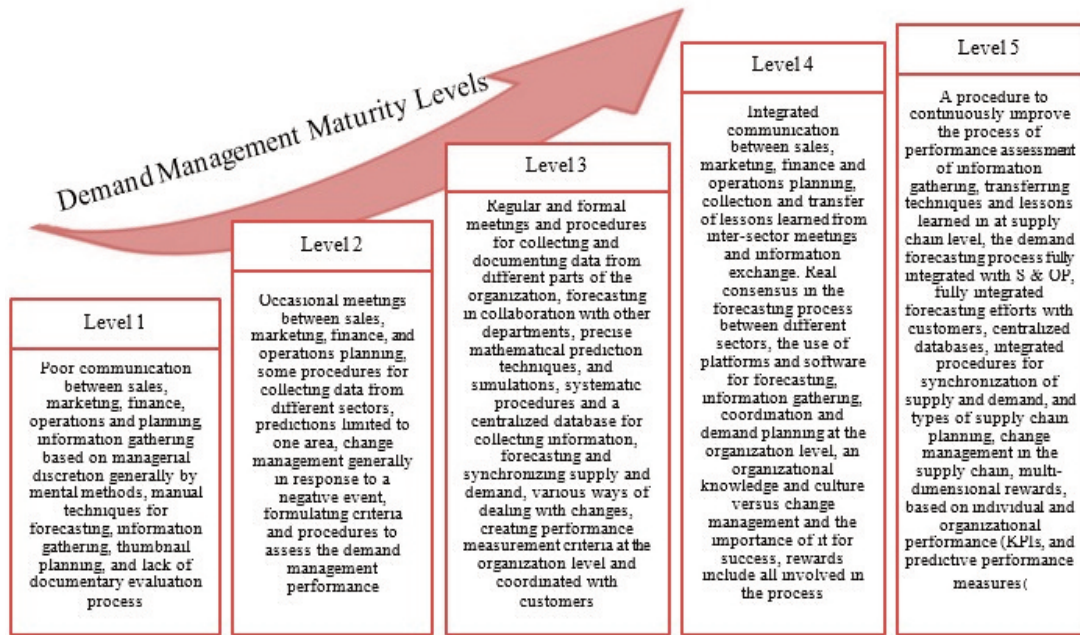


Figure 3. Demand management process maturity levels (Source: Simon et al., 2015 and the GSCF framework)

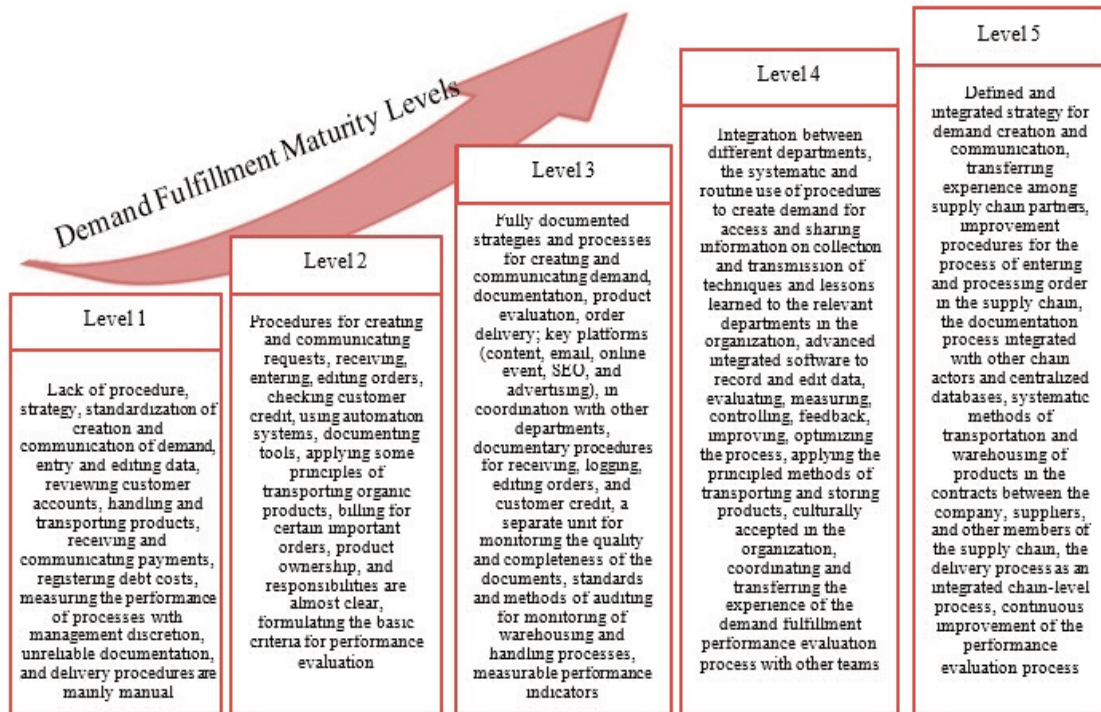


Figure 4. Demand fulfillment process maturity levels (Source: Simon et al., 2015 and the GSCF framework)

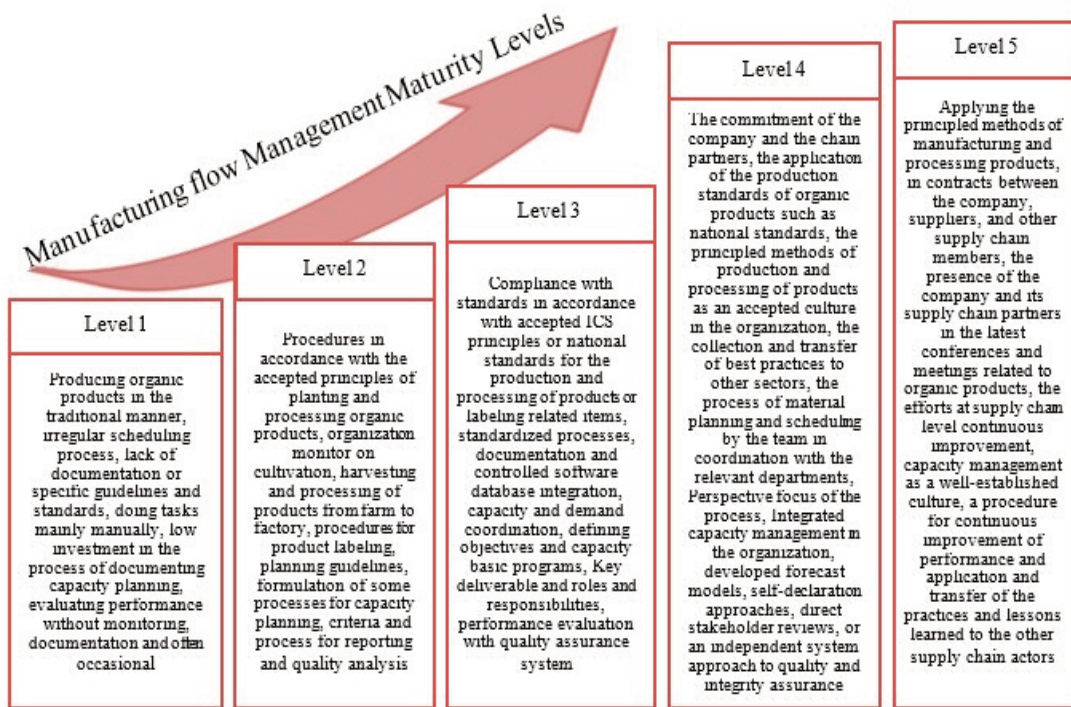


Figure 5. Manufacturing flow Management process maturity levels (Source: INSO11000, ICS, Simon et al., 2015 and the GSCF framework)

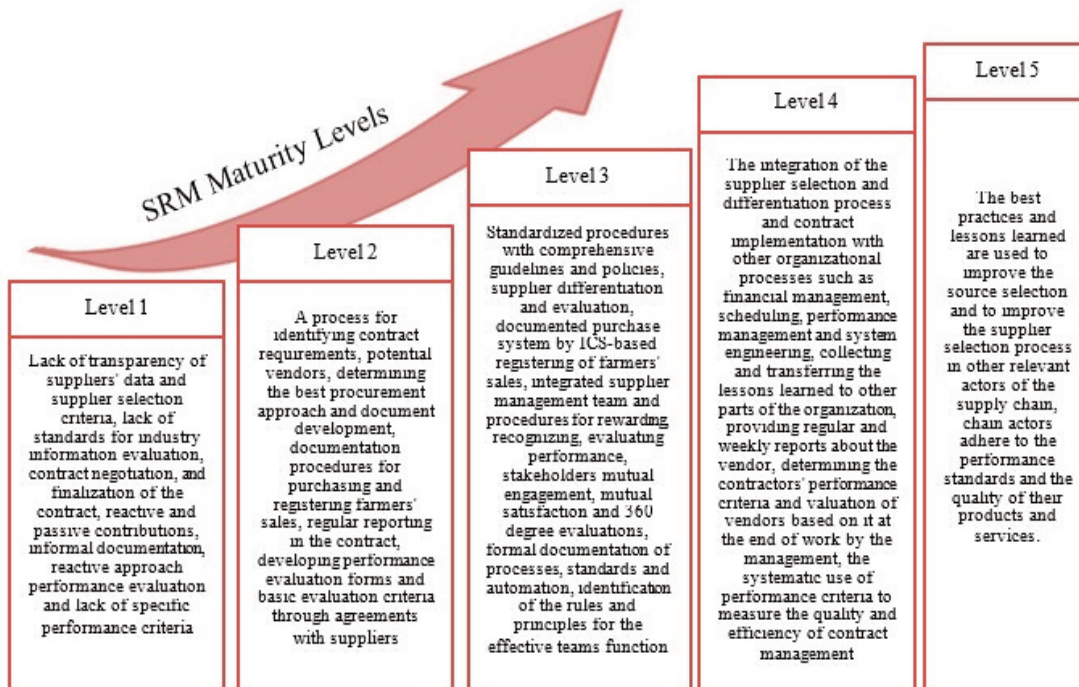


Figure 6. Supplier relationship management process maturity levels (Source: INSO11000, Simon et al., 2015, and the GSCF framework)

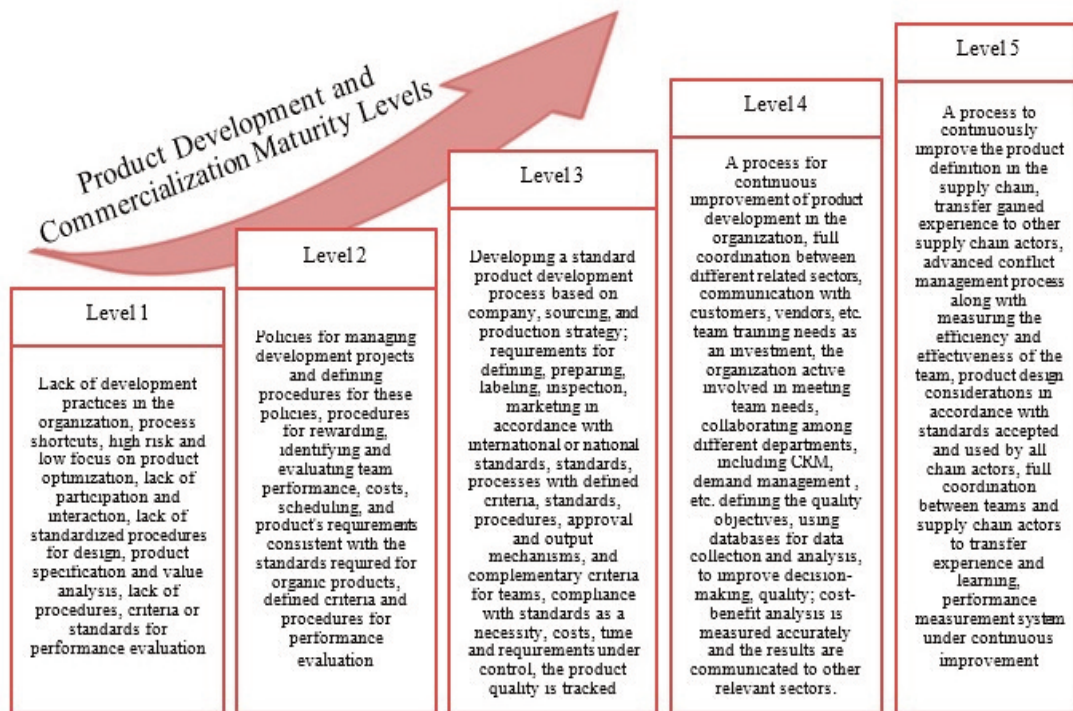


Figure 7. Product development and commercialization management process maturity levels (Source: Hynds et al., 2015, INSO11000, Simon et al., 2015, GSCF framework)

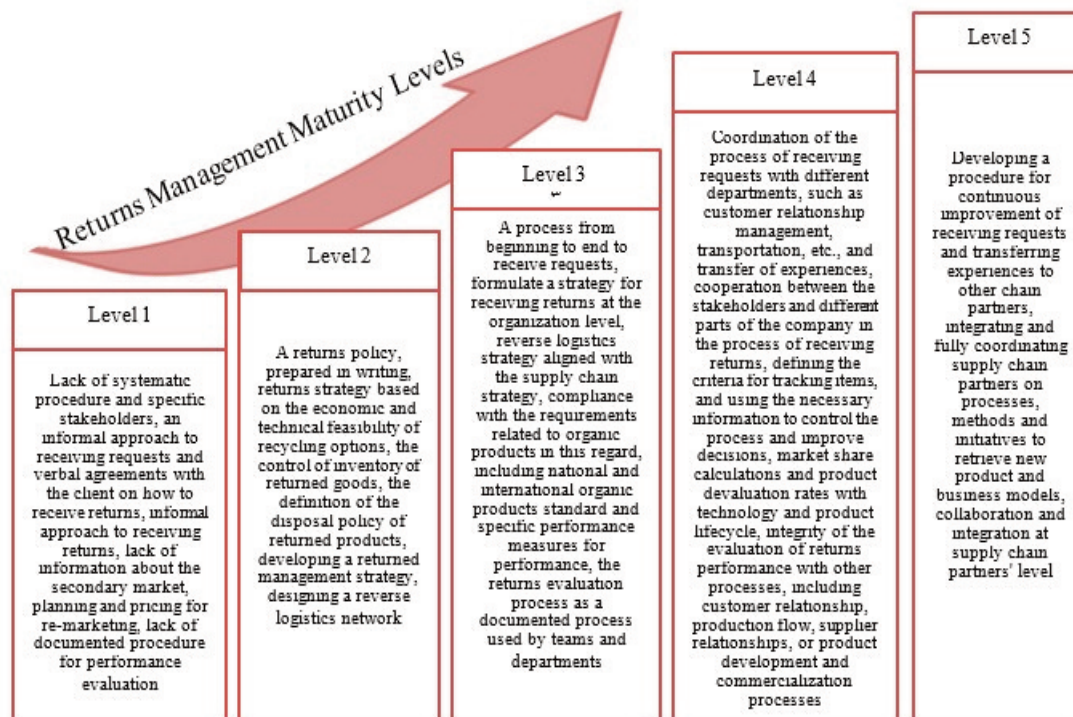


Figure 8. Returns management process maturity levels (Source: INSO11000, GSCF framework)

CASE STUDIES

A maturity questionnaire is developed in this stage based on the maturity levels defined in the previous section. The materials needed for the development of the maturity questionnaire were extracted from the literature, as well as conducting interviews with experts on the organic products standards. These materials include:

- Processes and sub-processes based on the supply chain architecture frameworks, including GSCF
- Standards of production and supply of organic products
- Maturity levels defined for each supply chain process (previous section)

Accordingly, the initial form of the maturity questionnaire was designed. The content va-

lidity was then assessed by Waltz and Bausell methods. In this regards, five experts evaluated "relevancy", "clarity" and "simplicity" of each item based on a 4-point Likert scale and the Content Validity Index (CVI) for the questionnaire was calculated using the following formula:

Since the minimum acceptable value for the CVI index is 0.79, if the CVI index is less than 0.79, then the item should be removed. The questionnaire was then corrected according to the experts' comments, and some questions were removed and indicators were recalculated. Finally, the validity of the questionnaire was confirmed. An example of the maturity questionnaire questions is presented in [Table 1](#) for the maturity level 1 of one of the supply chain management processes:

Table 1

An Example of Maturity Questionnaire Questions (Customer Differentiation Sub-Process)

Code	Questions	Answer	
		Yes	No
CD101	Are the customer-related information gathered, even if it is occasional and without any clear procedure at the organization level?		
CD102	Is there a way to communicate customers, albeit at the discretion of the relevant director?		
CD103	Is there a way to collect information and differentiate customers, albeit at the discretion of the relevant director?		

In the next step, two sub-categories of the organic agricultural product supply chain were studied, including an organic tea producer, and a producer of a wide variety of products including vegetable, fruit, cereal, paste, etc. At this stage, a meeting was held with the manager or evaluators, familiar with the various aspects of the supply chain of the relevant company, during which the maturity questionnaire was completed in cooperation with the relevant director. Then, the results were analyzed by different statistical methods and the maturity scores were calculated for the processes and supply chain. The ma-

turity score for each process was calculated by the following formula:

Sub-process maturity score = number of levels with full score + the percentage of "yes" response at the next level

For example, if the answer to all questions of the maturity level 1, as well as 20 percent of the questions of the maturity level 2 are "yes" for a sub-process, its maturity score will be 1.20. The maturity score of the whole process is also the average of the maturity scores of its sub-processes. Based on the ma-

turity score obtained from the questionnaire, the final maturity score for the processes and their priorities are calculated.

After identifying the processes with higher priority for improvement, improvement strategies were collected based on the experiences of managers, evaluators, and reviewing research literature for each process, and prioritized according to the general criteria of cost, time, stakeholder satisfaction, goal fulfillment, and feasibility using the Analytical Network Process (ANP).

Improvement roadmap for Organic Tea Company "A"

In the supply chain of Company A, the cus-

tomers service management process needs the most attention. Accordingly, the improvement practices for this process, tailored to the needs and weaknesses of the supply chain, are presented in consultation with the relevant company executives. According to the researchers' investigations and information received from the company, as well as the maturity status and strengths and opportunities for improvement at Company A, and also, reviewing literature, the obtained improvement solutions were as [Table 2](#).

Table 2
Customer Service Management Suggested Solutions for Company A

Process	Sub-process	No. of proposition	Proposition
Customer Service Management	Recognizing event and evaluate situation and alternatives	1	Providing a list of possible events, their causes, and required deliverables
		2	Creating an event response procedure by enhancing internal and external collaboration
		3	Providing the necessary infrastructure for accountability
	Implementing solutions	4	Identifying the information resources needed to deal with any event
		5	Identifying the appropriate communication tools for internal and external cooperation

[Figure 9](#) is related to the output of the Analytical Network Process (ANP) by the Super Decisions Software. As can be seen, according to the mentioned criteria, the solutions No. 2, 1, 3, 4, and 5, are in priority, respectively in relation to the customer service management process, in terms of experts, and according to the Company A supply chain status.

improvement roadmap for Organic fruits, vegetables, dried fruit Company "B"

In the supply chain of Company B, the CRM

process is most in need of improvement. Accordingly, the improvement practices for this process, tailored to the needs and weaknesses of the supply chain, are presented in consultation with the relevant company executives. The obtained improvement solutions for the Company B were as [Table 3](#).

According to [Figure 10](#), the solutions No. 4, 2, 1, 5, and 3, are in priority, respectively in relation to the CRM process, in terms of experts, and according to the Company B supply chain status.

Table 3

Customer Relationship Management Suggested Solutions for Company B

Process	Sub-process	No. of proposition	Proposition
Customer Relationship Management	Implement the product/service agreements	1	Holding regular meetings with clients
		2	Exchanging information with other departments and processes affected by PSA implementation
	Measuring performance and generate profitability reports	3	Extensive use of IT in contract execution
		4	Developing comprehensive metrics for customer profitability reports
		5	Measuring value created in terms of costs, impact on sales, related investments, and so on.

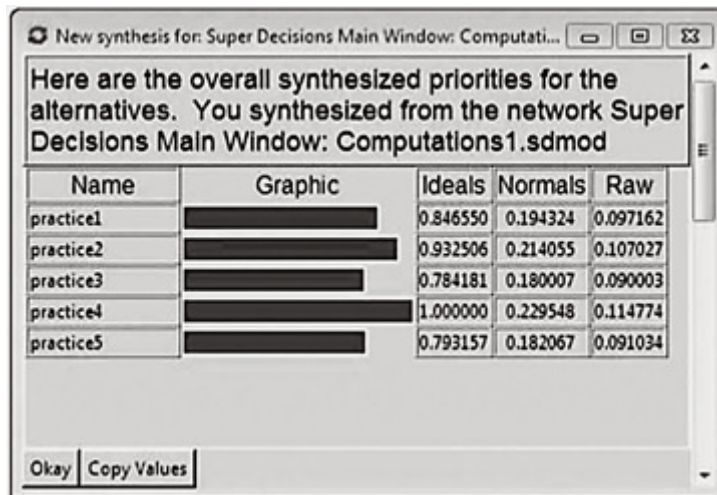


Figure 9. Prioritization of Improvement Solutions for Customer Service Management Process in the Company A

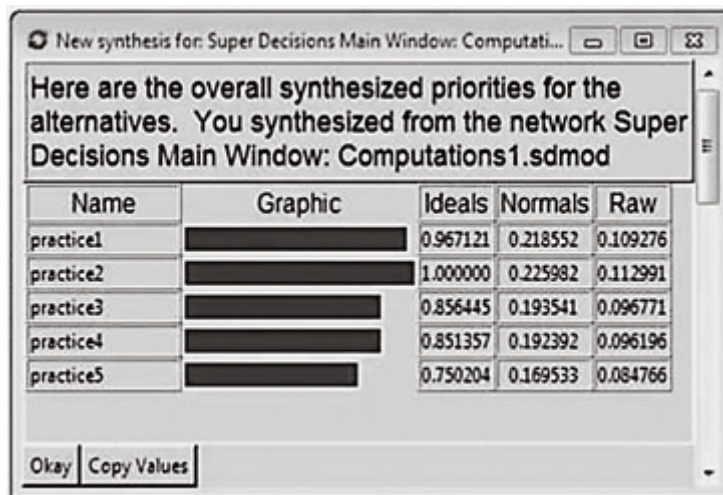


Figure 10. Prioritization of Improvement Solutions for Customer Service Management Process in the Company B

DISCUSSION

Different aspects and importance of the subject show the need to pay special attention to the supply chain of organic products and provide solutions and tools to improve it. Accordingly, a maturity model was presented in this study including the definition of maturity levels and a questionnaire with inclusive approach in order to scrutinize all stages of the supply chain. The results of the implementation of this model in the two sub-chains of the organic agricultural products sector, namely an organic tea company (*A*) and a fruit and vegetable production company (*B*) show that the two companies had the highest score in the production process while achieved the least scores in the processes associated with customer relationship management and customer service management. As mentioned in the literature section, fewer studies have been conducted in Iran focusing on assessment of the maturity or supply chain performance of organic agricultural products; however, relevant research such as Borimnejad (2011) has focused on customer-related factors on organic products and provided strategy including "leading market and consumer preferences", and launching of public awareness to stimulate demand". Also, Molainasab et al. (2011), while outlining the problems facing the organic supply chain, stipulates that the relationship between demand and production market in organic agriculture is not appropriate in Iran; retailers are reluctant to introduce these products to customers and due to lack of information, farmers are influenced by market intermediaries. Also, the chairman of the Iran Organic Association, in a conversation published on the site of the Iran Organic Association, said that lack of proper information on these products and the higher price of these products in the market are among the factor influencing low demand and low share of these products in the household basket.

The results obtained from a more in-depth review of each case study, obtained by inves-

tigating and holding meetings with managers and evaluators of the surveyed companies, show that:

Company *A* has weaknesses in customer service due to lack of direct communication or online communication platforms to communicate widely with customers, and this is why it had earned the lowest in maturity score this area. Of course, the company also has strengths due to the good quality of products, which leads to loyalty in customers and repurchase.

To improve the company *A*'s weaknesses, some practices were proposes including the preparation of a checklist of events, the creation of the necessary infrastructure and the formal response procedure to events, in consultation with the practitioners and during the brainstorming session.

Company *B* also has weaknesses including the lack of systematic procedures for collecting and documenting customer information. Also, the company's strengths in this area are close relationship with some key partners such as health and medical consulting organizations to collect customer information.

Among the improvements proposed to this company are enhancing organizational learning to create a common understanding among the members of the organization about customer relationship issues, creating formal information collection procedures, and establishing a formal assessment procedure for the organization's performance.

It should also be noted that both companies have earned the highest scores in the manufacturing flow processes, which can be attributed to the need to implement organic product standards and the existence of supervision in this regard.

As can be seen from the results, a maturity model is capable of recognizing the status quo, as well as the path to future improvement. The maturity model does not address only the chain's weaknesses but also highlight the strengths so that companies and chains can achieve competitive advantage focusing on these areas.

CONCLUSION AND RECOMMENDATIONS

The organic products market has grown in recent years, and it has become a mature market in many countries due to government support, national and international active marketing and growing consumer demand. The issue, neglected in the meantime, is to investigate the specific characteristics and complexities of the organic agricultural products supply chain to meet its goals of maturity and evolution. Given the specific characteristics of the organic agricultural products supply chain, including the increasing complexity and a growing market, developing a maturity model for performance evaluation, as well as determining the strengths and the improvement opportunities is essential.

Maturity frameworks can be used to support the analysis and evaluation of skills and the level of development of products, processes, or organizations, by defining different levels of maturity, in order to assess the extent to which a goal achieves the defined qualitative requirements. These models are also used to measure and evaluate the progress (Kluth et al, 2014).

In this research, we tried to take a step towards the advancement of processes, considering the specific requirements of the organic agricultural supply chain that distinguishes it from other production and service chains, through providing a supply chain management maturity framework. Then, the proposed model was implemented in two organic supply chains in Iran, as a country with high potential in the production of organic products, and it is tried to identify ways to improve the processes by providing improvement practices.

Based on the results of this study, the following recommendations are offered to managers and practitioners in this field:

- Because of the specific customer's preferences in organic products supply chain, including attention to health, safety, environmental considerations, etc., as endorsed in previous research, particular atten-

tion should be paid to customer relationship processes, and understanding their needs and priorities, customer data collection procedures and information processing methods.

- According to the results of the current research, the companies active in the organic agricultural supply chain often focus on technology and production methods, and less attention is paid to other chain processes, such as customer relationship management, customer service management, supplier relationship management etc. while balanced and sustainable development requires equal attention to all sectors of the supply chain.

- It seems that companies active in this area, are affected by the lack of integration between different sectors of the chain. Hence, they can apply models such as the maturity model proposed in this study and achieving integration through higher maturity stages.

Since maturity models are applicable to all companies and supply chains at any level of maturity, and excellence has no ending point, it is recommended that managers, regardless of their company growth stage, use such models to help develop their chains.

- Since the present study has been carried out by collaboration between academic researchers and organic industry practitioners, including organic products inspectors, more collaborations between managers and academics can help further development and excellence of this supply chain.

As suggestion for future research, the proposed maturity framework can be implemented in the supply chain of other organic products and the results can be compared with the present study. Also, more maturity models can be designed according to the customers' requirements and the specific conditions of the other countries.

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