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## Benchmarking Agri-Food Value Chain Performance Factors in South Mediterranean Countries

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### ABSTRACT

Fruits and vegetables (F&V) and olive oil are in South Mediterranean Countries (SMCs) two prominent agricultural activities in terms of contribution to national economy and exports. However, both are affected by inefficiencies and poor performance, in particular on the export market. In this paper we assess and compare performance factors between F&V and olive oil value chains (VCs) in Tunisia, Morocco, Egypt and Turkey, on the one side, and in Spain and Italy taken as benchmarks, on the other side. We propose an adapted Value Chain Maturity Model to benchmark performance factors in these VCs in SMCs. The proposed method could help to identifying poor performing areas in these VCs in order to suggest measures to improve their overall performance in general and export performance in particular. Findings confirm a robust association between VC maturity and performance. VC participants should learn from best practices and incorporate them for improvement, in particular in the areas of VC organization, responsiveness and technology adoption and implementation. In addition, more efficient agri-food exportation from SMCs needs more focus on trade facilitation issues including improvements in administrative procedures, infrastructure and technologies that reduce costs and time to export and facilitate investment. Further challenges outline the need for improvements in the areas of transparency, standards, certification, food safety, traceability and sustainability, taking into consideration that long-term partnerships are desired by international buyers to ensure product supply and quality. Public policies should be refocused towards these new challenges considering not only purely economic performance in these countries but also social development and environmental protection and resource preservation.

**Keywords:** *Benchmarking; Performance; Agri-food Value Chains; South Mediterranean Countries.*

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### 1. Introduction

Agri-food value chains (VCs) are faced by increasing global competition, demanding consumers, decreasing response times, and rapid policy and technical changes. In this context, modern food companies do not compete as independent entities but rather as part of collaborative VCs and networks. Partners of a VC share information and skills to offer more value to their customers. They require efficient chain management to cooperate in order build sustainable competitive advantage in a highly competitive market.

Conceptually, VCs can be defined as “systems whose constituent parts include material suppliers, production facilities, distribution services and customers linked together via the feed forward flow of materials and the feedback flow of information and finance” (Stevens, 1989; Fearn, 2009). The key idea of the VC concept is that customer needs satisfaction depends on integrated efforts of suppliers, manufacturers, and distributors; performance improvements of individual VC partner may not be enough to achieve that goal. VCs are characterized by their network structure, their governance form and the way that value is added (Gereffi et al., 2005; Trienekens, 2011).

In order to improve efficiency, VCs have continuously been exploring best levers leading to superior performance. Benchmarking is one of them and has emerged as an effective tool for assessing and improving performance. Performance benchmarking is also used to drive business improvement continuously and set directions for future organizational strategies. Benchmarking of agri-food VCs is complex due to their unique features including perishability, seasonality of production, variability of quality and need of specialized logistics (Moazzam et al., 2012).

Fruits and vegetables (F&V) and olive oil are in Southern Mediterranean Countries (SMCs) two prominent agricultural activities in terms of contribution to national economy and exports. However, both are affected by inefficiencies and poor performance, in particular on the export market, mostly located in Europe. In this paper we analyze and compare performance levels between F&V and olive oil VCs in Tunisia, Morocco, Egypt and Turkey, on the one side, and in Spain and Italy taken as benchmarks, on the other side. We propose an adapted VC Maturity Model to benchmark performance factors in these VCs. The method could help to identifying poor performing areas in these VCs in order to suggest measures to improve their overall performance in general and export performance in particular.

The paper contributes to the existing literature in three ways. First, it gives new insights about performance and benchmarking factors in target VCs adding to the very scant evidence available; it should be pointed out that benchmarking studies at VC level are very scarce, and for target VCs in SMCs they are inexistent to the best of our knowledge. Second, it highlights that heterogeneity between countries and VCs has important implications not sufficiently addressed so far in the available evidence based mostly on aggregate inquiries or specific case studies. Third, results reveal a need for specific policies established at different VC stages, and suggest that food companies from SMCs may greatly benefit in terms of export from policies aimed at facilitating their effective participation in global VCs.

The subsequent sections are structured as follows: Section 2 delivers background information on study VCs. Methodology is explained in section 3 together with the data collection process. Main findings including comparative VC performance assessment in benchmarked countries are discussed in section 4 and conclusions are drawn in section 5.

## 2. Background

F&V and olive oil are agricultural activities of utmost importance in all Mediterranean Countries in terms of production and exports. Olive oil production is almost exclusively a matter of the Mediterranean countries, with Spain, Italy, Greece, Tunisia, Turkey and Morocco being the major producers and exporters.

Most of F&V and olive oil exports from SMCs are destined to the European Union. Exporters to Europe face stricter sanitary, phytosanitary and environmental barriers (Maertens et al., 2012; Malorgio et al., 2016). Consumers demand high-quality fresh products during all the year with increasing emphasis on the origin of products (Nielsen, 2016). Concentration of sales in super and hypermarkets is a general tendency in Europe. Lifestyles based on growing income, more leisure time, travelling and other trends of high income but aging societies have pushed an increase of consumption of products such as oranges,

grapes, strawberries, onions (Kalaitzis et al., 2007), where the price often is not as important to consumers as certain quality attributes (Sausman et al., 2015). Meanwhile, the last decade economic downturn brought about more conservative consumption lifestyle in certain consumer segments.

In Europe, the need for effective service and compliance to consumer's wishes is pushing in the direction of more consolidated VCs and more vertical coordination, supported by the use of electronic communications and traceability. For instance, the VC for F&V in Germany shows a rather straightforward way from importer to final consumer. Forty to 50% of fresh imports are acquired by buying centrals of food retailers, where this produce is joined by F&V of domestic origin. Wholesalers handle an important fraction of imports, and supply either the food retail trade directly or the above mentioned buying centers. Another interesting example is the VC for imported F&V in The Netherlands which shows a more complex structure, due to the re-export (transit) trade. According to available estimations, The Netherlands are importing some 3.3 million tons yearly, of which 2.8 million tons are re-exported. The wholesale stage is composed by a range of players, including a large number of wholesalers and exporters (around 1200 in each activity), traders on commission (121 companies) and packers/traders (156 units). This crucial stage feeds re-exports, retailers and the food-service industry.

In Spain, one of the distinctive characteristics of the food VC is the very important role played by central markets that gather a large array of intermediaries at the edge of important urban consumption centers. This structures control 50% of the Spanish domestic trade of F&V and competes directly with the supply system build up by large retailers. The preferences of a large fraction of less mobile consumers for buying in their residential areas and a *de facto* fractioning of the home market along the lines imposed by the administrative regions, put hurdles to the development of a larger retailing networks (Briz and De Felipe, 2011) and is partially responsible for this prolonged division of the VC. Due to this fact, retail chains have directed their efforts to the opening of neighborhood supermarkets and discount outlets. This last type of point of sale has experienced a very rapid growth since 1996, and it continues today under increased demand for low priced products on the wake of the economic crisis.

In Italy, the number of food outlets is decreasing due to the progress of supermarkets at the cost of small traditional outlets. The Italian Competition Authority launched in October 2010 an inquiry on large food retail distribution (Autorità Garante della Concorrenza e del Mercato, 2010). The main findings include the significant increase of concentration, the relatively weak association forms (e.g. cooperatives, buyer alliances, franchises), the increased vertical relationship with suppliers and the importance of joint purchasing agreements, the increased practice of large retailers to request from suppliers contribution to distribution costs. The case of Italy shows clearly how structures located close to the market have evolved, tightening the competition upstream in the VC through the command of information and control of decisive market outlets.

In the South Mediterranean shore, significant efforts have been undertaken in the last decades to improve F&V and olive oil production and export capacity. Reforms have been introduced along the VCs but with limited success. Among the difficulties identified some are clearly technical at growers' level, namely irrigation constraints, varieties not always well adapted to tastes in foreign markets. Most growers are under-resourced being only few of them in a position to acquire international quality certifications required by importers. Low productivity and integration through the VC are other points to be improved.

In Morocco, for instance, several players of the VC operate at logistic points on consignment for wholesalers and supermarket chains, charging a commission of five to ten percent. Buying houses, collaborating with large distribution chains, work applying modern techniques and sometimes longer term contracts. Packing stations provide technical advice and communication with other stages of the VC. As a matter of fact, packing stations are a strategic link where much of the information concerning

producing and logistics concentrate. Foreign representatives, acting on behalf of importers and foreign retail chains are also present. Transport aspects are managed by French and Spanish transporters and some private shipping companies. Like in other SMCs, the Moroccan VC has well positioned players but has to overcome difficulties a several levels, like serious water shortages and dual farm structure. Exports to Europe are attractive for the sector, but the home market is very unstable and the country faces fierce competition in foreign markets. The severe European exigencies regarding produce quality standards are also a constraint for many growers and exporters.

Egypt is making institutional efforts to help its producers and traders to develop modern VCs in specific products such as oranges. Orange production accounts for 50% of the total Egyptian fruit production. Eighty per cent of that production grows on larger farms, being Navel the predominant variety. The uneven quality of Egyptian oranges is a problem for exports to developed markets. Many traders accept lower prices in order to avoid being excluded from foreign markets due to quality or sanitary problems. The export market is dominated by three large private companies selling 80% of exports. Horticultural Export Improving Association is an organization with 380 members, devoted to technical improvements at growing and post-harvest levels. Training to comply with Global GAP and BRC levels is an important part of its activity. The Refrigerated Perishables Terminal at Cairo Airport is one of its main achievements.

Turkey has the most developed VC for F&V among all the studied countries. Its focus is set on the EU-markets, but not exclusively. Turkish fresh produce is present in more than 50 countries. Vertically integrated chains are being set up with the help of foreign traders from *inter alia* The Netherlands and Spain, starting with the ownership and control of producing systems under modern greenhouses. Citrus exports represent 72% of all Turkish fruit exports. Turkish lemons are available throughout the year. Natural growing conditions are complemented by modern cool storage systems. The most important vegetable exported is tomato. The use of official and private quality systems (ISO, HACCP, GAP) is widespread. About a dozen large scale packing companies gather 15 000 t of produce for upscale packaging, both for the home and foreign markets. It is a risky business and many packagers seek to minimize risk through vertical integration with growers. Exporters unions operate in the orbit of the Under Secretary for Foreign Trade, representing the interests of exporters and organizing activities and solving problems. Among the most important tasks are the organization and control of export activities like quota observation, registration of products to be exported under special conditions, and keeping up-to-date export statistics.

In all SMCs VCs are shifting from state control to organized private or public-private structures aimed at doing and promoting business (Malorgio et al., 2016). A high percentage of exports of Moroccan, Turkish, Egyptian and Tunisian origin is being captured by large specialized buyers and integrated in European supply chains. However, a significant fraction of potential trade originating in small, poorly structured, traditional growing units is not able to be integrated in those highly demanding commercial channels. Its integration in modern markets is an important challenge for those countries.

Besides, special mention should be given to the impact of public and private standards on export activity in the over-mentioned VCs in SMCs. Standards play a crucial role along the VC. Dominant players in the VC impose the use of concrete standards along the chain through mechanisms that are a significant part of chain governance. The different standards are sometimes imbricated with each other thus there are no clear-cut differences among them.

Two of the most relevant and illustrative for the present research are the British Retail Consortium (BRC) and the Global GAP. Both are important instruments for conveying foreign growers and manipulators of fresh produce general quality demands of the European markets. Growers that are not in a position to

comply with the demands taking shape in those standards would have serious difficulty to become suppliers to these global VCs.

The Global GAP standard is a framework for good agricultural practices at farm level. It is required by most European retailers. Its control points and compliance criteria cover an array of technical issues, from planting to harvest, including besides traceability, record keeping and workers' health.

The BRC standard has been developed by the majority of British supermarkets and it is requested by those retailers to their suppliers. It is designed for food processing and packaging. Obtaining the BRC certification requires adoption and implementation of HACCP standard and also effective quality management systems. The BRC covers the control of factory environmental standards, products, processes and workforce. In spite of the complexity of its implementation, the system is widespread in Egypt, Morocco and Turkey, and is starting to be introduced in Tunisia.

The use of Global GAP certification parallels the use of BRC certificates. Three SMCs lead the way regarding crop certification for European markets (Egypt, Morocco and Turkey), with Tunisia seeming to follow the same path also, but presently to lower extent. Table 1 describes the adoption of Global GAP certification in target SMCs. Available data from Global Gap indicate that the largest areas of protected crops are in Morocco where the Spanish influence is large. It is worth remembering that many Spanish tomato and strawberry growers are presently producing also in Morocco.

Table 1: Global GAP certificate holders and certified crop area.

	Certificate holders	Protected crops (ha)	Non-protected crops (ha)	Total certified crops (ha)
Egypt	290	1 695	65 491	67 187
Morocco	408	8 067	23 041	31 108
Tunisia	29	86	1 689	1 776
Turkey	203	453	32 276	33 229

Source: Global GAP.

Overall effects of standards on trade between the EU and SMCs do not seem to be negative. If government involvement is supportive, it improves standard capabilities of exporters. Regarding the effects on growers, the results of the Moroccan tomato exports to Europe should provide an illustrative example. Due to the quota system of the EU for those exports, considerable revenue has flowed to the Moroccan exporters.

An important point is that participation in a quality certification program needs an investment that could not be easily faced by an individual small or middle sized grower without external support (Aloui and Lahcen, 2004). Another issue is what happens with small growers integrated or not in the standardized VCs. Regarding this point, horizontal integration seems to be more important than size to be able to comply with the requirements of quality programs. This pushes smaller growers to coordinate horizontally their actions in order to supply the chain and improve their position within it. It is important also to consider that 'small' is relative when speaking about integration in VCs. 'Small' members of the international VC are often middle sized within a country's context. On the other hand, dropping out of a VC does not mean necessarily to be driven out of business, especially when alternative home markets are available.

Moreover, standards impact significantly VC systemic and individual efficiency. As a factor connecting VC members they affect the terms of entry into foreign markets and the capacity of individual producers to upgrade (Kaplinsky and Morris, 2001). They involve closer cooperation between intervenients contributing to better organizing information flows and taking care of intangible assets such as trust and transparency among chain participants.

### 3. Research methodology

Benchmarking is a direct comparison for selected factors pointing to defined characteristics of a technical or socioeconomic process. The factors to be benchmarked are assessed and compared with similar ones of competing systems or systems considered to be on a stage worthy to be achieved.

In this research, the objective focuses on evaluating and comparing target VCs performance factors between the selected countries. In this cross national comparison, special emphasis is placed on comparison between Northern and Southern Mediterranean countries. The choice of Spain and Italy as comparators was because they have similar growing conditions and they operate successfully in the same international competitive space the SMCs would like to occupy. To perform this, we propose an operational framework to benchmark performance factors in these VCs. This framework basically consists in identifying performance gaps leading to improve overall performance in general and export performance in particular, with the appropriate adaptation in each case.

The research method used is relatively straightforward. The procedure starts by setting the benchmarking cycle with its main stages involving the definition of factors to be benchmarked, data collection, assessment and gap analysis, and recommendations (Figure 1).

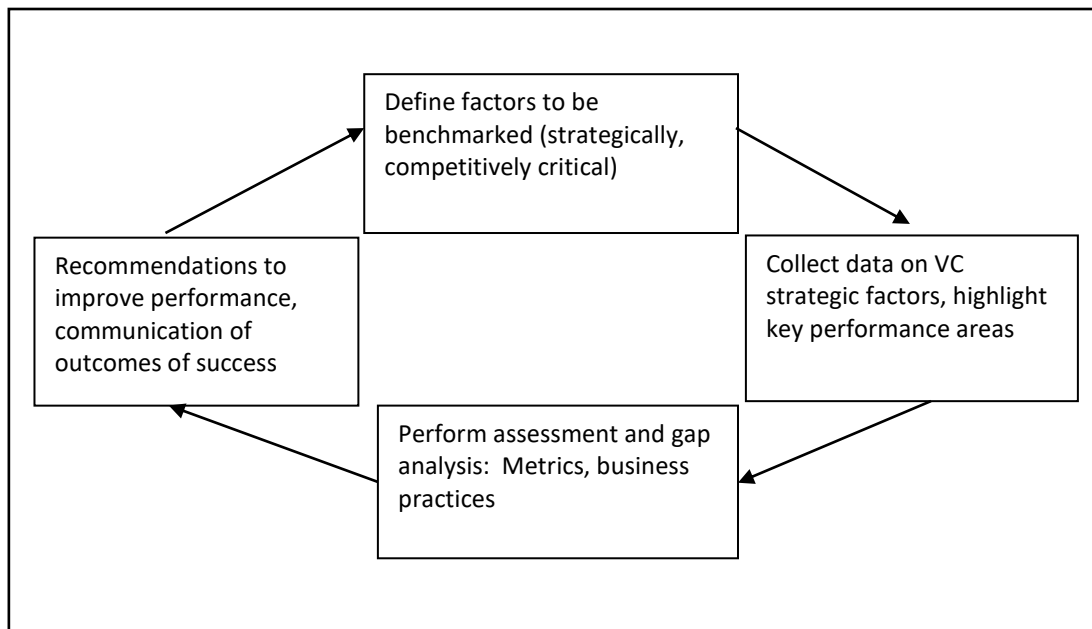


Figure 1. Stylized outline of benchmarking cycle.

Based on literature (Lockamy and McCormack, 2004; Yaibuathet et al., 2006; Tuominen et al., 2009; Gong et al., 2011) and taking into account practical constraints, especially the difficulties to collect consistent information in SMCs, we decided to apply a VC Maturity Model with 5 maturity levels from the performance management point of view: Unstructured, Defined, Linked, Integrated and Extended, defined in order of increasing maturity. These maturity levels show the progression of activities towards

effective management and further performance, and can be described as follows (Lockamy and McCormack, 2004; Tuominen et al., 2009):

- 1) Unstructured: VC management is unstructured, ill-define and not measured. Targets, if defined, are often missed. Management costs are high and functional cooperation is also low. Performance is unpredictable and customer satisfaction is low.
- 2) Defined: Basic management processes are defined and documented but their costs remain high. Performance is more predictable however performance targets are still missed frequently. Customer satisfaction has improved, but is still low.
- 3) Linked: This represents the breakthrough level. VC management is employed with strategic intent and results. Human resources are formed and share common vision. Performance becomes more predictable and targets are often achieved. Continuous improvement efforts take shape focused on root cause elimination and performance improvements. Management costs begin decreasing. Customers are included in process improvement efforts and customer satisfaction begins to show marked improvement.
- 4) Integrated: VC management measures and systems are deeply embedded. Advanced management practices such as collaborative forecasting and planning with customers and suppliers take shape. Performance becomes very predictable and targets are reliably achieved. Management costs are dramatically reduced and customer satisfaction becomes a competitive advantage.
- 5) Extended: Competition is based on multi-stakeholder VCs. Collaboration between different VC stakeholders operates on routine basis. Trust and mutual dependency holds the members of the VC together. Multi-firm management teams with common processes, goals and broad authority take shape. A horizontal, customer focused, collaborative culture is firmly in place. Performance and reliability of the extended system are measured and joint investments in improving the system are shared, as are the returns.

In the model, unstructured level of maturity is given the lowest score (1) and extended level of maturity is given the highest score (5). The measurement of performance maturity level was made using a scorecard taking into account the proven positive correlation between higher levels of maturity and improved organizational performance. Scorecard includes different performance factors evaluated along the 5-points additive maturity scale overmentioned. Transition states (in-between the levels) are considered in scoring when describing better the VC position, e.g. 1.5 if the VC is in transition from the first to the second level.

Primary data were obtained by a questionnaire supplemented by in-depth interviews to a selective sample of relevant VC actors at different VC stages in each country, including input/service supply, production, processing, marketing, logistics and exporting activities. The diversification of perspectives is important to avoid the risk of single source bias as it takes into account perceptual differences of different VC members. The number of informants varies between 15 and 25, depending on countries. The secondary data used in the analysis come from public and private sources including various national representative surveys.

#### 4. Results and discussion

Table 2 summarizes the scorecard results in terms of average scores for each VC in each country. The answers were grouped along three main dimensions:

- *Reliability*, which addresses the ability to perform tasks as expected and where focus is on the predictability of the outcome, stability and certainty.

- *Responsiveness*, which is a performance dimension evaluating VC agility and adaptability to market change.
- *Technology adoption and implementation*, which describes the ability to rapidly and efficiently implement technological innovation to improve performance.

Table 2: Scorecard results.

		<i>Tunisia</i>	<i>Morocco</i>	<i>Egypt</i>	<i>Turkey</i>	<i>Spain</i>	<i>Italy</i>
<i>Reliability</i>	F&V	3.09	3.47	3.20	3.68	3.95	3.74
	Olive oil	3.70	<u>2.68</u>	--	3.28	4.16	3.96
<i>Responsiveness</i>	F&V	<u>2.86</u>	3.10	<u>2.87</u>	3.69	4.35	4.05
	Olive oil	3.21	<u>2.92</u>	--	<u>2.59</u>	4.52	3.85
<i>Tech adoption/ implementation</i>	F&V	<u>2.25</u>	<u>2.30</u>	<u>2.15</u>	3.08	4.30	4.53
	Olive oil	<u>2.90</u>	<u>2.34</u>	--	<u>2.58</u>	4.60	3.76

Cross comparisons show that overall there are significant differences between the scores of Northern and Southern countries. The most notable gaps are about VC responsiveness and technology adoption and implementation, especially in the F&V VC in Tunisia, Morocco and Egypt, and in the olive oil VC in Morocco and Turkey (the score is not computed for Egypt since olive oil exports are not relevant for the country).

Further results from expert interviews highlight the challenges for exports from SMCs contributing to hamper VC performance. In case of olive oil, the main barriers to export from SMCs to the international market are related to VC structure and organization issues including poor organization, instability of supplies and high logistical and transaction costs. For fresh produce, export constraints stem from importer requirements usually imposed to exporters. Highest priority is put on transparency and information sharing, quantity and quality to ensure stability of supplies. Service quality, commitment and standards and certification also are highly important. Then appear aspects such as experience, innovation and variety of products. Resource sustainability, especially water and other natural resource management also is becoming increasingly important. In general, long-term partnerships are desired by international buyers to ensure product supply and quality.

Besides, it should be recalled that VCs are integrated in the whole economic system. The general economic environment is therefore the first conditioning factor that a VC faces for its development. For instance, in SMCs macroeconomic problems (inflation, fiscal pressure, trade deficits) as well as political instability have seriously afflicted the whole agricultural sector (King-Okumu and Aboukheira, 2015). Similarly, the lack of effective adoption and implementation of digital technologies in SMCs is depleting their potential for promoting more competitive and transparent environment leading to gaining efficiency and performance in all economic activities including the agri-food industry (OECD, 2017).

A way to assess the competitive environment in which VCs are inserted is the Global Competitiveness Index (GCI) of the World Economic Forum (WEF). According to WEF (2011), competitiveness can be



defined as the set of institutions, policies and factors that determine the level of productivity of a country. The level of productivity in turn determines the rates of return obtained by investments (physical, human and technological) in the national economy.

An evaluation of the competitiveness of Mediterranean countries grouped in two sets which include the study countries: Northern Mediterranean (EU member states that border the Mediterranean) and South Mediterranean (countries of the Middle East and North Africa having a Euro-Mediterranean Partnership agreement with the EU), reveals strong differences in competitiveness terms between the two regions and among countries in each region (WEF, 2011).

In Northern Mediterranean countries, key strengths rest on sophisticated business sectors that are able to adopt new technologies quickly and efficiently as well as on the good quality of transport, energy and telephony infrastructure. To some extent, the competitiveness of Northern Mediterranean countries also benefit from more flexible labor regulations and fiscal consolidation, while preserving growth-enhancing investments.

Meanwhile, the competitiveness assessment for South Mediterranean shows that, despite their heterogeneity, these countries share common strengths. They benefit from healthy and mostly literate populations and the economies are large enough to allow economies of scale. However many countries in the region struggle with institutions that are inefficient and insufficiently transparent, and have markets that lack dynamism and a suitable level of competition. This restrains business activity and entrepreneurship. Other weaknesses relate to educational systems that are not adapted to the needs of the labor market and a lack of meritocratic incentives in the work environment (Figure 2). These elements need to be addressed on a priority basis to increase competitiveness as well as reduce social inequality in the region.

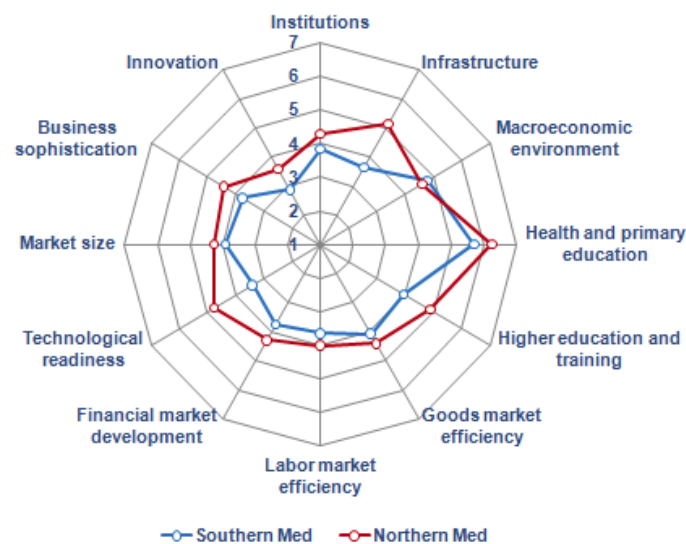


Figure 2. Competitiveness indicators, Northern and Southern Mediterranean (WEF, 2011).

Moreover, being the values for SMCs available it is possible to benchmark them against the Spanish and Italian references. However the significance of measurements differs across countries, and especially according to the socioeconomic development stage of each country. For different socioeconomic development stages, different types of indicators mirror greater effectiveness. Following Schwab (2011)

and the aforementioned WEF, countries follow a certain path to development. The development stages of that path are:

- I. Factor driven economies depending on basic requirements.
- II. Efficiency driven economies depending on efficiency enhancers.
- III. Innovation driven economies depending on innovation and sophistication factors.

To the former two intermediate stages (from I to II and from II to III) should be added. Along that path, different factors build the base of competitiveness (Table 3). A country in the first development stages (a factor driven economy) bases its competitiveness in certain factors as cheap labor, for instance, which are not the same as the factors supporting the welfare of an economically mature country.

Table 3: Competitiveness stages and related factors.

<i>Stage</i>	<i>Base for competitiveness</i>	<i>Competitiveness factors</i>	<i>Weight of basic factors in final index</i>	<i>Countries</i>
<i>Basic requirements/ factor driven</i>	Resource endowment (natural, unskilled labor)	Institutions Infrastructure Macroeconomy Health /primary education	60 %	
<i>Transition I to II</i>			40- 60 %	Egypt
<i>Efficiency driven</i>	Efficiency Product quality	Higher education /training Efficient markets ( goods, labor, finance) Use of technology available Large domestic /foreign markets	40 %	Morocco Tunisia
<i>Transition II to III</i>			20 – 40 %	Turkey
<i>Innovation driven</i>	New and unique products	Sophisticated production processes Continuous innovation	20 %	Spain, Italy

Source: Adapted from Schwab (2011).

According to their development stage, countries compete in a different fashion as described in Table 3. In order to enhance competitiveness and jump to the next stage, different sets of measures are advisable. This statement, however, does not mean that a country placed in a more advanced stage should abandon measures aiming to improve more basic skills or institutional features, but that new ones, which wouldn't have made much sense before, should occupy the center of the attention. A country that can be considered at a certain development level could also hide important regional and sectoral differences, as it is often the case for agriculture and related industries in developing countries including SMCs. The GCI captures a weighted average of many different components, each measuring a different aspect of that competitiveness. These components are grouped into factors of competitiveness and are assigned different weights in the index as indicated in Table 3, according to development stage of the country analyzed.

## 5. Concluding remarks

The approach followed in this contribution supports the use of benchmarking as a tool to find out poor performing areas in target VCs, suggest improvements and inform policy. The benchmarking exercise brings better understanding on which areas were developed least and which, in consequence, would benefit the most from knowledge and technology transfer. It also shows that the proposed maturity model is a valuable tool to assess the current *versus* the desired position with respect to different performance levers. Collaborative metrics which involve key stakeholders participating in the VC better represent interdependent nature of the relationships between target VC members. However, it should be noted that extensive data collection required for a holistic CV benchmarking makes benchmarking exercise more difficult compared to that based on individual partner performance metrics.

Findings confirm strong association between VC maturity and performance. VC participants should learn from best practices and incorporate them for improvement, in particular in the areas of VC organization, responsiveness and technology adoption and implementation. In addition, more efficient agri-food exportation from SMCs needs more focus on trade facilitation issues including improvements in administrative procedures, infrastructure and technologies that reduce costs and time to export and facilitate investment. Further challenges outline the need for improvements in the areas of transparency, marketing standards and certification, food safety, traceability and sustainability. Public policies should be refocused towards these new challenges considering not only purely economic performance in these countries but also social development and environmental protection and resource preservation.

Benchmarking procedures deliver insights about how to select effective policies to achieve expected goals. They help in developing measures for making VC operators aware of market opportunities and supporting their actions for creating competitive advantage through harmonized activities between chain members for meeting final market requirements using resources and capabilities more effectively. The suggested approach allows collecting successful experiences and implementing good practices. It can assist companies from SMCs in solving their market access problems through exploring opportunities for reducing bottlenecks and strengthening success drivers by combining complementary resources and capabilities of chain members. This cannot be achieved without more effective exchange and dissemination of market information in order to augment knowledge and enhance trust between chain members, in particular between SMCs operators and their international partners.

It also should be pointed out that the development of global food VCs, especially in European markets represent an interesting option for SMCs well placed to satisfy these markets. This is however an option highly conditioned by the requirements of destination markets especially in terms of quality and safety standards, and where long-term partnerships are desired to ensure product supply and quality. Results show that certification and fulfilling both mandatory and non-mandatory requirements are major obstacles for SMC producers and exporters operating in the international market. Compliance with these requirements is costly and represents a major barrier especially for weaker growers. The latter is particularly relevant to the question of the effects of global VCs on poverty reduction in SMCs. In order to reduce poverty in significant levels, an array of conditions should be fulfilled. Besides the need for more business friendly environment within the countries, it is paramount that a maximum number of growers hold the technical and financial capacity to comply with VC requirements. A possible pathway to achieve this would initially be through horizontal cooperation among growers, sometimes encouraged by buyers themselves, though difficult to reach without decided government support. Moreover, through innovation and offering differentiated products and post-harvest services, the competitive position can be enhanced and better deals can be obtained usually through tighter relationships throughout the export VC.

## Acknowledgements

This research was carried out in the framework of the EU's FP7 project "Sustainable Agri-Food Systems and Rural Development in the Mediterranean Partner Countries" (Grant Agreement 245233).

## References

- Aloui, O., Lahcen, K. (2004). The costs of compliance with SPS standards for Moroccan exports: a case study. Agricultural and rural development discussion paper nº 47483. Washington, DC, The World Bank.
- Autorità Garante della Concorrenza e del Mercato (2010). Apertura indagine conoscitiva, available at: [http://www.agcm.it/indagini-conoscitive-db/open/C12564CE0049D161/E09E068FBAA154F2C12577DC\\_003E772C.html](http://www.agcm.it/indagini-conoscitive-db/open/C12564CE0049D161/E09E068FBAA154F2C12577DC_003E772C.html).
- Briz, J., De Felipe, I. (2011). La cadena de valor como espina dorsal del sistema alimentario español. In: Alimentación en España 2011. Madrid, Ed. Mercasa, pp 16 – 26.
- Fearne, A. (2009). Sustainable Food and Wine Value Chains. Adelaide Thinkers in Residence, Department of Premier and Cabinet, South Australia.
- Gereffi, G., Humphrey, J., Sturgeon, T. (2005). The governance of global value chains. *Review of International Political Economy* 12 (1), pp 78 – 104.
- Gong, J., Ogasawara, T., Suzuki, S. (2011). Supply Chain Operational Performance and Its Influential Factors: Cross National Comparison between Japan and China. *Brazilian Journal of Operations & Production Management* 8 (2), pp 67-87.
- Kalaitzis, P., Van Dijk, G., Baourakis, G. (2007). Euro-Mediterranean supply chain developments and trends in trade structures in the fresh fruit and vegetable sectors. In: 1st Mediterranean Conference of Agro-Food Social Scientists. 103th. European Agricultural Economists Seminar, Barcelona, 29 p.
- Kaplinsky, R., Morris, M. (2001). A handbook for value chain research. Report to the International Development Research Center, available at: <http://www.srp-guinee.org/download/valuechain-handbook.pdf>.
- King-Okumu, C. and Aboukheira, A. (2015). Challenges to Achieving Sustainable Exports of Fruits from Small-Holdings under Water Scarcity Conditions of the Southern Mediterranean. In: Building Sustainable Agriculture for Food Security in the Euro-Mediterranean Area: Challenges and Policy Options (M.C. Paciello, Ed.). Roma, Edizioni Nuova Cultura, pp 113-137.
- Lockamy, A., McCormack, K. (2004). The development of a supply chain management process maturity model using the concepts of business process orientation. *Supply Chain Management: An International Journal* 9 (4), pp 272-278.
- Maertens, M., Minten, B., Swinnen, J. (2012). Modern Food Supply Chains and Development: Evidence from Horticultural Export Sectors in Sub-Saharan Africa. *Development Policy Review* 30 (4), pp 473 – 497.
- Malorgio G., Biondi B., Perito, M.A. (2016). Strategic behaviour of Italian fruit and vegetables importers from South Mediterranean Countries faced with safety standards. *New Medit* 15 (3), pp 29-36.
- Moazzam, M., Garnevska, E., Marr, N. (2012). Benchmarking Agri-food Supply Chain Networks: A Conceptual Framework. In: World Business Capability Congress, 5-7 December 2012, Auckland, New Zealand.
- Nielsen (2016). Made in... which country? Perceptions about brand origin shape purchase intentions around the world. The Nielsen Company, April 2016.
- OECD (2017). Benchmarking Digital Government Strategies in MENA Countries. Paris, OECD Publishing.
- Schwab, K. (2011). The global competitiveness report. Geneva, World Economic Forum.
- Stevens, J. (1989). Integrating the supply chain. *International Journal of Physical Distribution and Materials Management* 19 (8), pp 3-8.
- Sausman, Ch., Garcia, M., Fearne, A., Felgate, M., Ait El Mekki, A., Cagatay, S., Soliman, I., Thabet, B., Thabet, C., Ben Saïd, M., Laajimi, A., Al Ashkar, H., El Hadad, F., Mili, S., Martínez C. (2015). From Value Chain Analysis to Global Value Chain Analysis: Fresh Orange Export Sector in Mediterranean Partner Countries. In: Sustainable Agricultural Development. Challenges and Approaches in Southern and Eastern Mediterranean Countries (M. Petit, E. Montaigne, F. El Hadad, J.M. García Álvarez-Coque, K. Mattas, S. Mili, Eds.). Heidelberg, Springer, pp 197-225.

- Trienekens, J.H. (2011). Agricultural Value Chains in Developing Countries: A Framework for Analysis. *International Food and Agribusiness Management Review* 14 (2), pp 51-82.
- Tuominen T., Kitaygorodskaya N., Helo P. (2009). Benchmarking Russian and Finnish food industry supply chains. *Benchmarking: An International Journal* 16 (3), pp 415-431.
- World Economic Forum (2011). *Scenarios for the Mediterranean Region*. Geneva, World Economic Forum.
- Yaibuathet, K., Enkawa, T., Suzuki, S. (2006). Supply chain operational performance and its influential factors: cross national analysis. *Journal of Japan Industrial Management Association* 57 (6), pp 473-82.