

Accepted Manuscript

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PII: S0959-6526(18)32626-X

DOI: [10.1016/j.jclepro.2018.08.275](https://doi.org/10.1016/j.jclepro.2018.08.275)

Reference: JCLP 14059

To appear in: *Journal of Cleaner Production*

Received Date: 12 February 2018

Revised Date: 13 August 2018

Accepted Date: 26 August 2018

Please cite this article as: Accorsi R, Cholette S, Manzini R, Tufano A, A hierarchical data architecture for sustainable food supply chain management and planning, *Journal of Cleaner Production* (2018), doi: 10.1016/j.jclepro.2018.08.275.

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A hierarchical data architecture for sustainable food supply chain management and planning

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Abstract

The agro-food industry is one of the largest parts of the European Union's economy and faces economic and environmental stresses. While food traceability systems (FTSs) inform supply chain actors of product and logistical attributes, large scale implementations are scarce and do not support active decision making. We present a framework developed for FUTUREMED project used to perform a data-driven analysis that considers both micro and macro aspects of a food supply chain (FSC). With its comprehensive multiple-depth data architecture incorporated within a tailored decision-support platform, this framework and the resulting decision-support tool is the first to move beyond simple traceability implementation to the sustainable planning of food logistics, bridging the gap between research techniques and real-world data availability. We define KPIs that measure a subset of economic and environmental factors to quantify the impact of logistical decisions. We validate the framework with the case study of an Italian fruit trader that is considering opening a new warehouse. We conclude by suggesting that this framework be applied to more complex case studies and be enhanced through including more dimensions of sustainability.

Keywords: *Food operations, Sustainable Planning, Traceability, Food Supply Chain, Data architecture, IoT*

Acknowledgement

This research has been developed within the European Union and Mediterranean Project FutureMED under the grant (Grant Agreement MED/2007-2013 – FUTUREMED) of the European Regional Development Fund (ERDF). This project has been supported by the Institute of Transport and Logistics (ITL) of Emilia-Romagna, whose Alberto Preti, Stefano Dondi, and Chiara Iorfida offered valuable cooperation. The authors heartily mention Stefano Soli by Ciao S.r.l., for the data provided and the fruitful comments shared during the whole project. Other companies have been involved in the data collection and need to be thanked. Specifically, Andrea Severi and Chiara Zazzini by Naturitalia Soc. coop. Agricola, Duccio Caccioni and Gianmarco Debiase by CAAB – Centro Agro Alimentare Bologna, Sandro Stefani and Andrea Lenzi by CAMST Soc. Coop. a r.l. - La Ristorazione Italiana, Enrico Silighini and Christian Donati by Granfrutta Zani, Francesco Bassi by Agrintesa soc. coop. agricola, Massimo Savini by R.L.A. s.r.l., Stefano Soli ALEGRA Soc. coop. agr., Giordano Bianconi by N.C.V., Angelo Aulicino by Interporto Bologna, Fabrizio Bugliani and Federica Montaresi by Porto La Spezia, Claudio Torchia by Gruppo CFT, Bruno Piraccini and Gianluca Amadori by Orogel S.p.A.

This project also gains some contributions, in any way, by some Engineering students at University of Bologna that contributed at gathering and manipulating data and hence deserve mention: Giulia Olivi, Simone Sassi, Federico Losappio, Elisabetta Pazzaglia, Giulia D'Addato, Simone D'Andrea, Andrea Degiorgis, Vanessa Catalano, Irene Ciliberto, Elisa Ciaccheri, and Vittoria Calfurni.

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