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Industrial Engineering and Operations Management – Special Issue

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Abstract

This Special Issue of the International Journal of Industrial Engineering and Management (IJEM) features papers selected from the XVIII International Conference on Industrial Engineering and Operations Management (ICIEOM). This editorial paper introduces the special issue and summarizes 10 selected contributions that embrace researchers from Brazil, China, Colombia, Germany, and Portugal.

Key words: Industrial Engineering, Operations Management, Supply Chain Management, ICIEOM

1. INTRODUCTION

The International Conference on Industrial Engineering and Operations Management (ICIEOM) is the main International event in this area of knowledge organized by the Brazilian Association of Production Engineering (ABEPRO) since 1995. With the objective of internationalization the ABEPRO association decided to cooperate with the Department of Production and Systems (DPS) of the School of Engineering, University of Minho (UMinho) in the organization of the XVIII International Conference on Industrial Engineering and Operations Management (ICIEOM 2012). The Department of Production and Systems is the oldest university department in Portugal in the area of Production Engineering, having been the originator of the first university degree in Production Engineering in the country. This event (ICIEOM 2012) was co-organized by ABEPRO and DPS and took place in Guimarães, Portugal, between July 09th and 11th, 2012.

The Industrial Engineering and Operations Management is the knowledge area related with the project, improvement and management of systems composed by people, materials, equipment, financial resources, information and energy, which execute production processes for the production and delivery of products and services [1-2].

Industrial Engineering (IE) and Operations Management (OM) professionals need deep and solid interdisciplinary technical competences in order to cope

with the economic, social and environmental dimensions of sustainability. The ICIEOM 2012 joined teachers, researchers and professionals concerned with sustainability aspects as well as with the IE and OM knowledge areas.

This area of knowledge as a different number of designations that are commonly identified with this engineering branch: Industrial Engineering and Management, Industrial Engineering, Manufacturing Engineering, Engineering Management and Production Engineering are some examples. The variety of designations reinforces the diversity of organizational / industrial tasks and functions that are characteristic of IE&OM. Furthermore, this diversity can also be showed by the analysis of scientific publications on the area and this editorial paper aims to reflect on the diversity of the area centred on analysis of the keywords of several renowned scientific journals.

Using the previous referred analysis of the diversity of the area this editorial paper will contextualize a set of extended papers, selected from ICIEOM 2012 to be published in the International Journal of Industrial Engineering and Management.

2. ANALYSIS OF JOURNALS' KEYWORDS

Some of the most renowned journals of the IE&OM area of knowledge are: International Journal of Production Economics (IJPE); International Journal of

Production Research (IJPR); International Journal of Operations and Production Management (IJOPM); Production and Operations Management (POM). Using the SCOPUS (<https://www.scopus.com/>) bibliographic database is possible to get the keywords of all published papers in a specific year. In this work an analysis of these keywords is presented. This analysis is centred in the top 20 used keywords, which includes all keywords with a frequency that would include it in this top 20 rank. This means that a set with more than 20 keywords are presented in all figures.

According to the SCOPUS the IJPE published 419 papers with 5737 keywords. **Figure 1** represents the top 20 keywords of IJPE in 2012. It is possible to identify a focus on supply chain aspects for the two keywords most used. After that, the 3rd most used is Industry, followed by Sales, Costs, Optimization, Profitability and Manufacture. After these there is a high step for the following ones. It is important to note that Sustainable Development is one of the keywords of this list, which is aligned with the general theme of the ICIEOM 2012.

IJPE keywords	Count
Supply chains	87
Supply chain management	69
Industry	68
Sales	62
Costs	60
Optimization	59
Profitability	54
Manufacture	51
Inventory control	26
Competition	24
Economics	23
Numerical example	23
Sustainable development	23
Commerce	21
Research	18
Scheduling	18
Investments	17
Decision making	16
Inventory	16
Game theory	15
Industrial engineering	15

Figure 1: Top 20 IJPE keywords of 2012

According to the SCOPUS bibliographic database the IJPR published 475 papers with 2092 keywords. **Figure 2** represents the top 20 keywords of IJPR in 2012. It is possible to identify a focus on three main keywords immediately followed by another one, respectively: Scheduling; Genetic Algorithms; Supply Chain Management; Simulation. The list of top 20 keywords shows that this journal as a focus on scheduling and optimisation methods. Nevertheless, one can see that there are more three entries in this list related with supply chain, which gives also a high relevance of this area of knowledge in the IJPR publications.

IJPR keywords	Count
Scheduling	28
Genetic Algorithms	28
Supply Chain Management	24
Simulation	19
Reverse logistics	14
optimisation	13
Supply chain	13
particle swarm optimisation	12
manufacturing systems	10
production planning	10
supplier selection	10
AHP	9
Multi-objective optimisation	9
preventive maintenance	9
heuristics	7
inventory	7
batch scheduling	6
empirical study	6
inventory control	6
inventory management	6
mixed integer linear programming	6
quality control	6
supply chain design	6
Tabu search	6

Figure 2: Top 20 IJPR keywords of 2012

According to the SCOPUS bibliographic database the POM journal published 133 papers with 715 keywords. Figure 3a represents the top 20 keywords of POM journal in 2012. It is possible to identify a focus on three main keywords: Supply Chain Management; Operations Management and Manufacturing Industries. This is a result equivalent to the IJOPM. These are immediately followed by Pricing. There are some new keywords in this journals comparing with the previous journals, like Lean and Learning, for instance.

According to the SCOPUS bibliographic database the IJOPM published 62 papers with 413 keywords. **Figure 3b** represents the top 20 keywords of IJOPM in 2012. It is possible to identify a focus on three main keywords: Supply Chain Management; Operations Management and Manufacturing Industries. It can be noted that, similar to POM journal, there are some new keywords comparing to IJPE and IJPR, namely: Countries names, Lean Production and Learning.

After these there is a step down for the following ones, which include once more. It is also important to note that sustainability aspects are present in both lists through the keywords Sustainable Development and Environmental Management, which is aligned with the general theme of the ICIEOM 2012.

POM keywords	Count
Supply chain management	17
Operations management	12
Manufacturing industries	10
pricing	8
Organizational performance	6
Product development	5
simulation	5
competition	4
Empirical research	4
New product development	4
Performance	4
revenue management	4
Spain	4
supply chain	4
Buyer-supplier relationships	3
Competitive strategy	3
Decision making	3
dynamic pricing	3
Enterprise resource planning	3
Environmental management	3
Information sharing	3
Knowledge management	3
Lean production	3
Learning	3
Operations and production management	3
remanufacturing	3
service operations	3
Supply chain integration	3

Figure 3a: Top 20 POM keywords of 2012

IJPOM keywords	Count
Supply chain management	14
Operations management	12
Manufacturing industries	10
Organizational performance	6
Product development	5
Performance	4
Spain	4
Buyer-supplier relationships	3
Competitive strategy	3
Decision making	3
Empirical research	3
Environmental management	3
Knowledge management	3
Lean production	3
Learning	3
New product development	3
Operations & production management	3
Supply chain integration	3
United States of America	3

Figure 4b: Top 20 IJOPM keywords of 2012

3. ANALYSIS OF ICIEOM 2012 KEYWORDS

The International Conference on Industrial Engineering and Operations Management (ICIEOM 2012) had a total number of 258 submissions of full papers, and 176 papers published in proceedings. As the conference has been shaped around sustainability fields, the main keyword is Sustainability (Figure 5). This keyword was followed by Business Process Management, Ergonomics, Fuzzy Logic, Industrial Engineering and Risk Management.

ICIEOM2012 KEYWORDS	Count
Sustainability	7
business process management	5
ergonomics	4
fuzzy logic	4
industrial engineering	4
Risk Management	4
Brazil	3
lean manufacturing	3
operations management	3
Certification	2
continuous improvement	2
Corporate Social Responsibility	2
human factors	2
innovation	2
ISO 9001	2
logistics	2
marketing	2
neural network	2
optimization	2
process management	2
project management	2
quality management	2
risk	2
services	2
six sigma	2
statistical process control	2

Figure 5: Top 20 ICIEOM 2012 keywords

Sustainability was the conference theme, so it does make sense being the main keyword listed in Figure 4. Sustainability concerns to the principles of integrating economic, environmental and social imperatives, the so called triple bottom line. Achieving sustainable development requires a careful balance of these aspects [3]. This term has increasingly become important to business research and practice over the past decades as a result of rapid depletion of natural resources and concerns over wealth disparity and corporate social responsibility [4].

4. OVERVIEW OF THE SELECTED PAPERS

Some of the ICIEOM 2012 papers with higher ranks from reviewers related with management aspects were selected for this special issue. These papers passed by

a new blind review towards being accepted for publication.

The ten papers selected for this special issue embrace researchers from Brazil, China, Colombia, Germany and Portugal and can be classified in the following areas of knowledge:

- Four papers of Production Management, including one from Lean Sustainability;
- Two papers from Service Systems, including one from Health Care Systems and another from Courts of Law;
- Three papers from Supply Chain and Logistics,
- One paper from Project Management.

A brief of the goals of each paper is provided next.

Frazzon et al., from the Federal University of Santa Catarina (Brazil), present an approach for the integration of production and transport logistics in global supply chains using a simulation model. Their approach is based on a generic framework where the supply chain is structured into a chain of operational planning entities. Ferreira et al., mostly from the Federal University of Bahia (Brazil), offer a method of selection, classification and clustering load curves which is able to identify a greater diversity of consumption patterns existing in the electricity distribution sector. The method was successfully implemented and tested in the context of an energy efficiency program developed by a company associated to the electricity distribution sector (Electric Company of Maranhão, Brazil). Martins and Carvalho, from the Instituto Universitário de Lisboa – Business School (Portugal), identify reasons why civil cases do not flow through the court system as expected, and discuss ways to shorten lead-times in the court process. A comparative analysis of two case studies, with six court departments and a representative sample of 299 civil summary cases is used. Drohomerecki and Favaretto, from the FAE Center University and Federal University of Itajuba (Brazil), identify how different types of inventory control affect inventory accuracy. Their study is a descriptive research and the approach adopted was the use of multiple cases. Ceryno et al., from the Pontifical Catholic University of Rio de Janeiro (Brazil) and Fraunhofer IML and TU-Dortmund (Germany), present a systematic review of the literature on SCRM using a content analysis approach. Araújo et al., from the Instituto Militar de Engenharia (Brazil), evaluate the operation of the main actors in the Brazilian market of road freight transportation: autonomous carriers and carrier companies. Sampaio et al., from the Pontifical Catholic University of Paraná (Brazil) and the Nanjing Normal University (China) evaluate the Pricing Capacity of Resources at Low Levels of Utilization in Production Planning using the clearing function. Gutiérrez and Vidal, from the Universidad de Antioquia and the Universidad del Valle (Colombia), provide a reference framework for Home Health Care logistics management in order to identify research perspectives in the field. With this framework these authors present a review of

the current literature in models and methodologies used to support logistics decisions and identify research gaps. Maia et al., from the University of Minho (Portugal), discuss Lean Production as a work organizational model that fosters a sustainable work environment in the companies. They focus on the Textile and Clothing Industry and bring up proposals, initiatives and/or projects that are related with Lean Production aims. Aquere and Oliveira, from the University of Brasilia (Brazil), aims to define performance indicators for the concrete structures design in residential buildings and focuses on the consumption of the three main raw materials used in the designed structure: concrete, steel and formwork. These authors intend to build a database with performance indices from buildings and to classify the surveyed buildings.

5. FINAL REMARKS

The XVIII International Conference on Industrial Engineering and Operations Management (ICIEOM 2012), held in Guimarães (Portugal), has encouraged communication among researchers and practitioners in the different fields of Industrial Engineering and Management.

The guest-editors of this special issue believe that the ten papers provide an interesting contribution to the different fields of Industrial Engineering and Operations Management by offering a broad look to practitioners and academic researchers obtained at the ICIEOM conference. Taken together, the papers constitute stimulating reading for different audiences in the different fields of industrial engineering.

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Industrijsko inženjerstvo i operacioni menadžment – posebno izdanje

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Rezime

Ovo posebno izdanje Međunarodnog časopisa za industrijsko inženjerstvo i menadžment (IJIEM) sadrži radove izabrane sa XVIII Međunarodne konferencije o industrijskom inženjerstvu i operacionom menadžmentu (ICIEOM). Rad urednika predstavlja ovo specijalno izdanje i daje sažetak 10 selektovanih priloga koji uključuju istraživače iz Brazila, Kine, Kolumbije, Nemačke i Portugala.

Ključne reči: *industrijsko inženjerstvo i menadžment; industrijsko inženjerstvo, operacioni menadžment, menadžment lanca snabdevanja, ICIEOM*