

IEOM Society International

The 2nd South American International Conference on Industrial Engineering and Operations Management

Sao Paulo, Brazil, April 8-5, 2021

Certificate of Presentation

This is to certify that

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Diponegoro University, Semarang, Indonesia

Delivered an Oral Presentation entitled *"ID 665* Supply Chain Performance Measurement with Supply Chain Operation References Approach (a Case Study in a Batik Company)

Dr. Ahad Ali Conference Co-Chair Associate Professor Director of Industrial Program Engineering Lawrence Tech University Southfield, Michigan, USA

aul M. Remi

Professor Don Reimer Director of Membership and Chapters, IEOM Society President, The Small Business Strategy Group Detroit, Michigan, USA



IEOM Society International, 21415 Civic Center Dr., Suite # 217, Southfield, Michigan 48076, USA, www.ieomsociety.org



Abstract

In carrying out the business activities especially in procurement process, CV. PT experienced some problems, such as incompatibility the material specifications and broken stitches on cloth. This problem causes a decrease of company productivity. Therefore, an evaluation of supply chain performance is needed in order to identify problem indicators, and determine improvement strategies for problem indicators. In this study, the measurement of the company supply chain performance is using the Supply Chain Operation Reference (SCOR) approach. The initial hierarchy model of performance measurement is adjusted to the condition of the company to measure supply chain performance the matrix values derived from company annual data. The final stage in this study is measuring the importance of performance indicators using pairwise comparison weighting. The results obtained in

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IEOM Society International, a 501(c)(3) non-profit organization, is a premier international platform and forum for academics, researchers, scientists and practitioners to exchange ideas and provide insights into the latest developments and advancements in the fields of Industrial Engineering and Operations Management. After having successfully 1 South American Conference in Bogota, the IEOM Society is organizing the 2 South American Conference in Sao Paulo, Brazil during April 5-8, 2021. The event will be virtual.

Call for Papers Flyer

Paper Template and Guidelines Abstract Template and Guidelines

All papers are subject to double peer review. IEOM Template must be followed. Accepted papers will be indexed in SCOPUS. Presentation can be delivered with abstract only. Full paper is optional.

The IEOM Sao Paulo Conference aims at providing a platform for academics, researchers, scientists and practitioners to exchange ideas and to bridge the gap between the Industrial Engineering and Operations Management theory and its application in solving the most current problems and challenges faced by 21st century organizations. Hence, the conference is also expected to foster networking, collaboration and a joint effort among the conference participants to advance the theory and practice as well as to identify major trends in Industrial Engineering and Operations Management.







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6:00 - 7:00 pm, Monday, April 5, 2021 - Keynote I



Ximena M. Córdova, Ph.D., was the first woman to graduate in Mathematics from the National Polytechnic School, Quito-Ecuador. She has a Master's in Quality, Management and Productivity and a Master's in Actuarial Sciences from The University of Iowa, Iowa, USA. She holds a Ph.D. in Industrial Engineering from Wichita State University, USA. She was also the first woman to hold the position of Provost at the San Francisco de Quito University (USFQ) until 2020. She has served as a Professor at the San Francisco de Quito University for more than 20 years and was Dean of the School of Engineering of the College of Sciences and Engineering. She is currently a Senior Professor in the Department of Industrial Engineering. She is one of the founders of the project "Women in Science and Engineering", WISE, to encourage women to study in the areas of science and engineering. She has managed to influence at least 5 female alumni of the USFQ of Industrial Engineering to obtain their Ph.D. in Engineering and for many graduates to continue their four-level studies.

Her research is applied to Green Supply Chains through the modeling, analysis and optimization of logistics systems using CO2 emissions as a performance measure and the use of Ecuadorian anthropometry data for the ergonomic design of work spaces.

Keynote II (Opening Address): 9:45 am - 10:00 am, Tuesday, April 6, 2021



Director FACENS University Sorocaba, Sao Paulo, Brazil

Born in June, 1951, with elementary and high school courses in Sorocaba, having received several awards such as the best student in school. In 1968 was granted a scholarship by AFS- American Field Service International Scholarships and spent his senior high school year in Worthington High School, Ohio, USA, graduating in 1969. Graduated in Electrical Engineering, with emphasis in Digital Electronics, in the University of Sao Paulo- USP- in Dec. 1974. Later completed post-graduation (MBA) in Higher Education Pedagogy by UNIP.

As an internship student in 1973 participated in the software development group of automatic analysis of electrocardiograms, in the Hospital do Servidor Publico de Sao Paulo. In 1974 participated of the software simulation of the electric system of FEPASA – Sao Paulo Railways system, by PRAICE consulting company

with orientation of two USP professors. From 1975 to 1979 was a research and development engineer at Engematic in Sorocaba, where he developed digital alarms annunciators and systems for oil industries. He was later appointed as coordinator of the technology transfer program of Hitachi industrial instruments.

In 1979 he started teaching Digital Electronics at FACENS in Sorocaba, where he continued as a professor and head of Electrical Engineering course up to 1984. From 1980 to 2000 worked in Splice Group, starting as Electronics Division manager, then Technology Director, and later V.P. Business Development.

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During the 80's main activities were the development of several products for telecom, such as signal analysers, traffic analysers, small PABX, digital telex machine, digital payphones. All with own technology.

During the 90's, with Brazilian government opening, negotiated several technology transfer and distribution agreements, such as Marconi Italy/UK (optic fibre transmission systems), Allen Telecom US (mobile telephony amplifiers), Comverse Israel/US (voice messaging systems). Participated actively in the auction for privatization of mobile telecom in Brazil, where Splice was the only Brazilian winner group (1998).

From Oct.2000 to 2006 became the Operations director for Marconi. This British company decided to have its own factory in Brazil and acquired the corresponding division of Splice. The factory was transferred from Sorocaba/Votorantim to Barueri. In 2005 Marconi was acquired worldwide by Ericsson. In 2006 coordinated the integration of Marconi´s factory with Ericsson`s in Sao Jose dos Campos. From 2007 to 2012 was Superintendent Director at Wobben Windpower, Brazilian subsidiary of German Enercon, leader in the manufacturing of wind electrical converters in Germany.

From 2013 in Facens, initially as vice-director, then director from 2015. Under his leadership Facens acquired the status of university, after reaching maximum evaluation by the Ministry of Education. Since 2012 is part of the Administration Council of FUNDEC, Sorocaba´s Cultural Development Foundation, responsible for the municipal music school and symphonic orchestra. Also, member of the Sorocaba CMCTI- municipal council for science, technology and innovation.

Opening Keynote III, 10:40 am - 10:40 am, Tuesday, April 6, 2021



Vice President and Country Manager Siemens Digital Industry Software South America São Paulo, SP, Brazil

Title of Keynote: Digitalization and Industry 4.0 as catalyst for sustainable work

Daniel Scuzzarello studied Mechanical Engineering at Lund Tekniska Högskola, Sweden and completed his Master Degree on optimization of composite structures at Ducati Motor Holding, Italy in 2007.

Since the beginning of his career, Digitalization has been a very central topic in his work, Daniel Scuzzarello today is responsible for Portfolio Development and strategy for Siemens Digital Industry Software South America. In his 10 years in Brazil he managed engineering services teams, drove and structured CD-adapco's operations in South America and nurtured the company's integration into Siemens in 2016.

Opening Keynote IV, 10:40 am - 11:20 am, Tuesday, April 6, 2021



Regional Operation Director - South America Valeo Sao Paulo, SP, Brazil

ID 928: Integration of the Business Strategy with the Operational Excellence Model

Ricardo Mourad is graduated in Mechanical Engineer at UNESP – Bauru and also in Technology of Precision Mechanics at FATEC – São Paulo. He is postgraduate in Occupational Safety Engineering at USP-São Paulo and Master Degree in Science – Automation in Lean Manufacturing at UNICAMP – Campinas. In the Automotive industry in the last 20 years working for multinational companies, he has occupied different positions in Methods and Processes, Quality, Production, Logistic, Maintenance, Development, HSE, Industrial and General Management. He ´s an expert on methods and processes for assembly lines, lean manufacturing, six sigma methodology and techniques of analysis and troubleshooting. During his professional career, he performed several travels for starting new production lines, transferring technology, commissioning new machines, giving and receiving training, participation in different workshops, benchmarking and business

meetings in countries like Germany, Slovakia, China, France and USA. He was also an Associate Professor and has taught classes and gave lectures in different Universities. Currently he occupies the position of Regional Operations Director for South America at Valeo – Powertrain Actuators and Sensors Product Group.

11:20 - 11:30 Break

Keynote V, 11:30 am - 12:10 pm, Tuesday, April 6, 2021

Industrial Engineering Executive Manager Continental Automotive do Brasil Ltda São Paulo, Brazil

5/12/23, 11:25 AM

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ID 487: Digital Transformation at Continental World - Examples, Barriers and Corporate Strategies



João Frare is a professional with more than 20 years of experience working for companies of the auto parts segment. Currently he is working for Continental Automotive do Brasil being responsible for Industrial Engineering, Manufacturing, Facilities, Maintenance and Plant Energy Management. He has background in Key Account Management, Project Management and Operations. Graduated in Industrial Engineering with MBAs in Industrial Management and Business Administration by Fundação Getulio Vargas – FGV. Professor in post-graduation courses for disciplines like Project Management, Operations Management, People and Leadership, etc., his passion is developing people competences for future, looking for a better world.

Keynote VI, 12:10 pm - 12:50 pm, Tuesday, April 6, 2021

Full Professor and Past Department Head Production Engineering Department Polytechnic School University of São Paulo Sao Paulo, SP, Brazil



Professor Fernando José Barbin Laurindo is a Full Professor in the Production Engineering Department (USP). He has B.S. Degree in Production Engineering and B.S. Degree in Law from USP, MBA from FGV-SP, MSc in Production Engineering and PhD in Production Engineering from USP, Post-doctoral research in Ingegneria Gestionale in the Politecnico di Milano and Associate Professor Degree from USP. He is the former Head of Production Engineering Department (USP). His research interests are in the following areas: Business Strategy, Information Technology (IT) Strategy and Planning, IT Strategic Alignment, IT Governance, IT Management, Knowledge Management, Competitive Intelligence, Analytics, Innovation, Enterprises Network, Collaboration and Cooperation.

Keynote VII (Welcome Message): 9:45 am - 10:00 am, Wednesday, April 7, 2021

Rector/Dean Federal Institute of Education, Science and Technology Sao Paulo, Brazil



Doctoral student of Civil Engineering at the University of Campinas (Unicamp), the rector of the Federal Institute of São Paulo, (IFSP) was a student at the Federal Technical School of São Paulo, where he became Technician in Edifications in 1976. He has been a professor in the area of Civil Construction since







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Supply Chain Performance Measurement with Supply Chain Operation References Approach (a Case Study in a Batik Company)

Novie Susanto, Ratna Purwaningsih, Rani Rumita and Emanuela Septia Industrial Engineering Department, Faculty of Engineering Diponegoro University, Semarang, Indonesia nophie.susanto@gmail.com, ratna.tiundip@gmail.com, rani_rumita@gmail.com, emanuelaseptia@gmail.com

Abstract

In carrying out the business activities especially in procurement process, CV. PT experienced some problems, such as incompatibility the material specifications and broken stitches on cloth. This problem causes a decrease of company productivity. Therefore, an evaluation of supply chain performance is needed in order to identify problem indicators, and determine improvement strategies for problem indicators. In this study, the measurement of the company supply chain performance is using the Supply Chain Operation Reference (SCOR) approach. The initial hierarchy model of performance indicators. A Snorm De Boer then is utilized to serves and equalize the matrix values derived from company annual data. The final stage in this study is measuring the importance of performance indicators using pairwise comparison weighting. The results obtained in this study are the total supply chain performance of CV. PT is 69.983 included in the average category. There are several performance indicators included in the average and marginal categories, so it needs to be improved. The improvement is given based on the practices in SCOR 12.0.

Keywords

Supply Chain, Procurement, Batik.

1. Introduction

The development of the industrial world which is increasingly fast challenging between companies is also increasingly stringent. In the past few years, excellence in supply optimization and integration has become the focus of several large corporate organizations in the world. The increasingly fierce business competition in this era of globalization requires every effort to rearrange its business strategies and challenges. The essence of competition discusses how companies implement processes in producing products that are better, cheaper and faster than produced (Amit and Zott 2010).

The high business competition is one of the reasons companies must fulfil customer orders in the right amount and time. It is intended that the company can control the market share in the community. This condition shows the importance of improving performance, not only within a company but also other parties in the supply chain involved, in order to compete with other companies or supply chains.

Performance measurement is very important because it can control the system both directly and indirectly. Performance measurement serves to keep the company on track to achieve supply chain goals. In the context of supply chain management, performance measurement is very important to support the success of a supply chain management. The concept of supply chain management is able to integrate the management of various management functions in a relationship between organizations forming an integrated and mutually supportive system (Mutakin 2011).

CV. PT is one of the batik industries that located in Solo, Central Java. In carrying out its business activities, this CV has problems starting from the procurement process to the production process which will affect the quality of batik. In the process of procurement, CV has many problems, which is the incompatibility of the specifications of the material sent, such as the incompatibility of the load of the dye drug, causing the resulting a dull colour. Another

Production Disturbances Handling: Where Are We and Where Are We Heading?

Adriana Ito, Torbjörn Ylipää, Anders Skoogh

Department of Industrial and Materials Science Chalmers University of Technology Gothenburg, Sweden

adriana.ito@chalmers.se, torbjorn.ylipaa@chalmers.se, anders.skogh@chalmers.se

Per Gullander RISE Research Institute of Sweden Gothenburg, Sweden per.gullander@ri.se

Abstract

Half of manufacturing companies' production capacity is estimated to be compromised due to disturbances. With the upcoming Industry 4.0, this problem is expected to be minimized through technological solutions. The aim of this article is to propose alternatives to handle production disturbances by means of technological support, to minimize their occurrence and impacts. To this purpose, we conducted a literature review and a series of interviews with five companies. We distinguish six stages for handling production disturbances: detection, diagnosis, mitigation/correction, root cause analysis, prevention, and prediction. Our results indicate that all these stages are expected to benefit from Industry 4.0 technologies significantly. Furthermore, our results point out that practitioners perceive the stages of prevention and prediction with the highest potential for improvement. However, focus on the diagnosis and root cause analysis stages is also necessary since those stages are coupled to the prevention and prediction. The contributions of this article are twofold. Firstly, it provides a holistic view of the stages and technologies to handle production disturbances in Industry 4.0, from which practitioners can extract directions for implementation. Secondly, the paper provides focus for further research in the field of disturbance management with the identification of the current challenges.

Keywords

Production disturbances, Industry 4.0

1. Introduction

With the advent of Industry 4.0, production systems are envisioned with nearly zero disturbances (Eleftheriadis & Myklebust, 2016; May & Kiritsis, 2019). Different technologies support the Industry 4.0 era to become a reality. Among the leading technologies are smart sensors, smart devices, big data, data analytics, internet of things (IoT), cloud computing, additive manufacturing, augmented and virtual reality (Posada et al., 2015; The Boston Consulting Group (BCG), 2015). These technologies will provide the means for developing self-adaptable, self-optimized, and self-maintained production systems (Lee et al., 2015).

However, there is a long way to go until we reach a disturbance-free system. The overall equipment effectiveness (OEE) of manufacturing companies is only around 50% (Ylipää et al., 2017). In other words, about half of the manufacturing capacity is not utilized, primarily because of disturbances. Therefore, the reduction of production disturbances causes a significant impact on financial performance. Furthermore, it also affects the environmental and social aspects of sustainability. It is possible to achieve more efficient resource utilization in a production system with fewer disturbances, as well as safer working conditions.

But what is a production disturbance? There are different definitions in the literature, ranging from "unexpected and unplanned events" to "all events that affect quality, operational performance, security or working conditions" (Stricker & Lanza, 2014; Bokrantz et al., 2016; Kaya & Bergsjö, 2018). In this paper, we consider that a production disturbance is "an undesired and unplanned event that causes the production system not to perform as planned".

Simulation Improves Service and Resource Allocation at an Automotive Garage

Wenqi Deng, Yang Yang, Di Zhao, and Edward J Williams

Business Analytics, College of Business, University of Michigan – Dearborn Dearborn, MI, 48126, USA wengid@umich.edu, umethan@umich.edu, dizhao@umich.edu, williame@umich.edu

Abstract

Discrete-event process simulation historically began its now long and distinguished "career" in support of manufacturing operations, ranging from assembly lines to make-to-order operations. From than auspicious beginning, it has expanded its usage to many other fields, such as warehousing, public transport (e.g., airports, bus terminals, railroads...), health care delivery (e.g., hospitals, clinics, urgent care centers, dental practices...), government functions (e.g., welfare administration, timing of traffic lights, courthouses...), and the service industry. Service industry applications of simulation have included restaurants, retail stores, hotels, and drive-through oil change centers. In this paper, we describe the important and productive role of simulation in improving the service performance metrics and resource allocation within an automotive service center.

Keywords

Discrete-event process simulation, Automotive repair, Service industry, Resource utilization, Queueing system performance metrics

1. Introduction

The first commercial uses, and still among the most numerous uses, of discrete-event process simulation have been in the manufacturing sector of the economy. There, simulation first and dramatically showed its abilities to identify bottlenecks, evaluate proposals for eliminating them, improve and level usage of scarce and/or expensive resources, and improve performance metrics such as total output, queue lengths, and time waiting in queues. As a result of and spurred by these successes, simulation usage rapidly expanded into the warehousing sector, health care (particularly hospitals), government work, transportation networks, and service industries, as documented by Greasley (2005). Cepera and Konrad (2019) applied simulation to governance of complex transportation systems and traffic jams in Germany. Many examples of simulation analyses applied to service industries have been documented in the literature. For example, Villarreal-Navarro et al. (2017) applied simulation analysis to reduce shoppers' exasperation at empty shelves at a network of Mexican convenience stores. Call centers are a frequent service-industry application of simulation, as recognized by Mathew and Nambier (2013). Williams et al. (2005) applied simulation to improve operations and traffic flow at a drive-through oil-change center.

The remainder of this paper is organized as follows: The next section presents an overview of the services provided by and the operations of the repair garage. Next, we describe the data required by the model and describe the collection of those data. Next, we present the process of building, verifying, and validating the simulation model. Subsequently, we describe the results provided by the model and our analysis of them, leading to recommendations provided to the garage managers and owners. We conclude with a summary of the project and indications of likely future work.

2. Overview of Repair Garage Services and Operations

Servicing consumers' vehicles is a huge market worldwide, with three types of participants: Dealers who also sell vehicles, independent repair shops, and a miscellaneous category including, for example, filling stations and specialty shops, as described by Horowitz and Shilling (1989). The automotive service center studied in this simulation work is of the second category; it was opened in 2017, and is located near the economic development district of Beijing, the capital of China. This garage enjoys, has earned, and very much wishes to maintain, an excellent reputation for repair services performed with integrity and quality (in sharp contrast to worldwide stereotypes of automotive repair shops). The center operates five days a week (Monday through Friday), opening each day at 8am. After 4pm, no new arrivals are accepted for service that day, but the mechanics and other service personnel stay on duty until almost all (exception noted below) vehicles arriving that day have received service. Therefore, a customer (e.g., an employee in a nearby office building) can and routinely does drive his or her vehicle (drivable but in need of repairs and/or routine maintenance) to the garage, leave it there, and

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Sustainability Best Practices for Oil and Gas Sector in Mexico

María del Rocío Soto-Flores, Raúl Rodríguez-Ávila, Christian Muñoz-Sánchez, Ingrid Yadibel Cuevas-Zuñiga Business School (ESCA-STO) National Polytechnic Institute of Mexico (IPN) Mexico City, Mexico msotof@ipn.mx, raul.rodrigueza@pemex.com, cmunozs@ipn.mx, icuevasz@ipn.mx

Abstract

The objective of the research is to identify the best sustainability practices most used in companies in the oil and gas sector to reduce the environmental damages of their activities, in order to take them into account in Mexico. The research is documentary, in which the leading companies in the oil and gas sector were considered as subjects of study based on their environmental performance and the development of substantive activities. The results presented are the best sustainability practices and the environmental impacts derived from the central activities of the oil and gas sector, as well as the mechanisms for implementing best sustainable practices in the case of Mexico. There is evidence that companies in the sector invest in sustainability practices to improve their environmental performance, while continuing to obtain economic benefits, in the direction of low carbon economies, however, it is necessary to give greater impetus to renewable energy sources that have taken relevance in recent decades.

Keywords

Sustainability Best Practices, Environmental impacts, Oil and Gas Sector.

1. Introduction

The oil and gas sector is considered vital and strategic for the development and economic growth of many countries, including Mexico. This sector plays a central role as a supplier of hydrocarbons around the world, which are considered the largest sources of primary energy in global consumption with a participation of 57% (BP, 2017), they also represent economic potential and military strategic value (Puyana, 2015). The value chain of the sector consists of the Upstream, Downstream and Midstream phases, being its main activities: exploration, production, industrial transformation and hydrocarbon logistics.

Activities throughout the value chain of this sector have caused serious impacts on the physical and biological means of its areas of influence (Roa, 2011), leaving serious environmental liabilities and deteriorating the quality of the environmental services they provide, of which there is evidence throughout the world and in the history of this industry (Oilwatch, 2006). Globally, it is estimated that in the next 20 years, hydrocarbons will continue to contribute a significant share in global energy consumption (EIA, 2016), therefore, the sector would be carrying out activities around this projection, but facing fundamental challenges, on the one hand, the supply of these resources and, on the other, how to achieve it through ethical behavior in the economic, social and environmental dimensions (Saavedra & Jiménez, 2014). The incidence of companies in this sector in Mexico has taken on greater relevance today, mainly due to the implementation of the Energy Reform of 2013, which now allows private participation in the activities of the sector, which were previously exclusive to the Mexican state (SENER, 2013). In this research, the sustainability management carried out by leading companies in the sector is analyzed and compared, which have been considered based on their relevance and participation at the international level in terms of sustainability and, some of which develop activities in important natural areas protected from the planet, in addition to being dabbled in alternative energy sources, all in search of those sustainability practices with which they have managed to reduce the impacts on the means of areas of influence, as well as the mechanisms they use for their implementation. This paper is organized as follows; in the following section of the literature review is developed. Second, methodology is introduced. Third, sustainability management and best sustainability practices in the oil and gas sector are discussed. Fourth, mechanisms for implementation of sustainability best practices for the case of Mexico are presented. Finally, the theoretical and applied contribution of this research is provided.

2. Literature Review