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ICQIS 2024

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Sustainability, Innovation and Quality

Abstract Book

Theory and Applications

Editors: *Teresa Morgado*
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Preface

ICQIS2024 is the fifth international conference coordinated by the prestigious International Scientific Committee and Advisory Council. In 2024, ICQIS was held in the beautiful city of Lisbon. This conference series, born in the north of Portugal, is devoted to advances in quality, innovation, and sustainability.
The Polytechnic University of Lisbon, multinational and private enterprises (AERMEC, CEST, Grupo San Jose S. A., SQUARE-AM), the RIQUAL and SPM associations, and others, jointly sponsors ICQIS2024 event.
The conference involved about one hundred authors from twenty-three different countries worldwide. The conference themes, which address novel and advanced topics on Sustainability, Quality, and Innovation, focused on eight Special Sessions, namely, "Circular Economy and Waste Management – New Approaches, Innovative Technologies, and Business Models", "Failure Prevents: Reliability, Proactivity and Practice, "Lean, TRIZ methodologies Applied to Sustainability Management", "Modelling and Simulation: A way to promote system resilience and sustainability management", "Quality 4.0 and innovations in the digital era", "Recent Advances in Manufacturing", "Sustainability energy" and "Lean Sustainability". The conference also included the workshop "Brick by Brick: Exploring the Future of Quality Management through Serious Gaming" and an Open Forum on "Quality, Innovation and Sustainability Challenges and Opportunities" where an expert panel of many years of collective and active researchers and managers addressed the issue of balancing the activities of businesses, management, and engineering within the enterprises and institutions. The ICQIS2024 organizers believe that the meeting offered our delegates a forum for discussion and dissemination of their recent work in assessing the Sustainability, Quality, and Innovation of engineering and business services and promoting the exchange of ideas and international cooperation among scientists, managers, and engineers in this vital field of engineering and business. ICQIS2024 is particularly indebted to the authors, keynote speakers, and special guests for their presentations. Each of the contributions offered opportunities for thorough discussions with the authors. The organizer committee acknowledges the participants' excellent contributions, innovative ideas, research directions, novel modelling and simulation techniques, and invaluable critical comments. The organizers also take this opportunity to thank the members of the International Scientific Committee and the reviewers for their time and helpful suggestions, as well as the symposia organizers for their efforts and valuable contributions to the event's success.

The ICQIS chairs look forward to seeing all the authors at ICQIS2025 next year.

The ICQIS2024 chair

Teresa Morgado
June 2024, Lisbon / Portugal

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Veruschka Franca
Volnei Tita
Vitor Anes
Virgílio Cruz Machado

Special Session

Circular Economy and Waste Management - New Approaches, Innovative Technologies and Business Models

Pedro Dinis Gaspar
C-MAST, University of Beira Interior, Portugal

Arminda do Paço
NECE, University of Beira Interior, Portugal

Topics:

- Circular economy principles and frameworks
- Sustainable product design and life-cycle assessment
- Resource recovery and upcycling innovations
- Waste-to-energy technologies and advancements
- Circular business models and supply chain management
- Policy interventions and regulatory frameworks for promoting circularity
- Case studies highlighting successful implementations and lessons learned
- Economic analyses and market trends in circular economy sectors
- Social and environmental implications of circular economy initiatives
- Technological innovations for waste prevention and recycling

Failure prevents: Reliability, Proactivity and Practice

Suzana Lampreia
CINAV - Naval Research Center, Portugal
UnIRE, ISEL, Polytechnic University of Lisbon, Lisboa, Portugal

Teresa Morgado
UnIRE, ISEL, Polytechnic University of Lisbon, Lisboa, Portugal
UNIDEMI/FCTNOVA - NOVA Research & Development Unit for Mechanical and Industrial Engineering, Faculty of Science and Technology NOVA University of Lisbon, Portugal CINAV - Naval Research Center, Alfeite, Portugal

Mário Pereira
CDRSP/ESTG - Polytechnic of Leiria, Marinha Grande, Portugal,

Topics:

- Risk Analysis.
- Maintenance Management.
- Failure prediction and prevention.
- Artificial Intelligence applied to prevent failures in components.
- Maintenance Sustainability
- Artificial Intelligence applied to Failure Analysis.
- Study cases applied to navy, aerospace, automobile, manufacturing industry, and others.
- Discrete simulation applied to quality, innovation, and sustainability management.
- Systemic thinking - modeling and simulation for quality management

Lean, Triz methodologies applied to Sustainability Management

Helena Navas
UNIDEMI/FCTNOVA - NOVA Research & Development Unit for Mechanical and Industrial Engineering, Faculty of Science and Technology NOVA University of Lisbon, Portugal

Teresa Morgado
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UNIDEMI/FCTNOVA - NOVA Research & Development Unit for Mechanical and Industrial Engineering, Faculty of Science and Technology NOVA University of Lisbon, Portugal CINAV - Naval Research Center, Portugal

Ana Dias
UnIRE, ISEL, Polytechnic University of Lisbon, Lisboa, Portugal

Topics:

- TRIZ applications
- LEAN applications
- TRIZ-LEAN study cases
- Maintenance Management
- Production Management
- Industrial Management
- Quality Management
- Continues Improvement of Processes
- Sustainability management study cases applied to navy,
- aerospace, automobile, food industry and others.

Modeling and simulation: A way to promote system resilience and sustainability management

Vitor Anes
UnIRE, ISEL, Polytechnic University of Lisbon, Rua Conselheiro Emídio Navarro, 1, 1959-007, Lisboa, Portugal
Mechanical Engineering Institute (IDMEC), Instituto Superior Técnico, Universidade de Lisboa, 1049-001 Lisboa, Portugal

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EIGES, Faculty of Engineering, Lusófona University, 1749-024 Lisbon, Portugal

Topics:

- Modeling and simulation of system resilience.
- Solving industrial problems through simulation.
- Simulation of case studies on quality, innovation, and sustainability.
- Simulation of decision support systems.
- Modeling and optimization of operations management.
- Validation through simulation.
- Discrete simulation applied to quality, innovation, and sustainability management.
- Systemic thinking - modeling and simulation for quality management.

Recent Advances in Manufacturing

Ivan Galvão
Polytechnic University of Lisbon

Carlos Leitão
University of Coimbra

Rui M. Leal
Polytechnic University of Leiria

Topics:

- Joining processes
- Fusion welding
- Solid-state welding
- Adhesive bonding
- Additive manufacturing
- Materials processing
- Environmentally friendly processing
- Conventional and non-conventional machining
- Experimental and numerical approaches
- Process simulation

Sustainability and Energy

João Garcia
ISEL-IPL
UniRE

David Braga
SEW-EURODRIVE Portugal

Rogério Duarte
EST-IPS

Topics:

- Energy efficient materials and systems
- Sustainability in Industrial and Maintenance Sectors
- Green Processes and Technologies
- Sustainable Materials, Maintenance and Management
- Life Cycle Assessment
- Materials for Carbon Capture and Storage
- Phase Change Applications and Innovation
- Energy Management Systems
- Digital transformation in the energy sector

Lean Sustainability

Chad Laux
Purdue University

Elizabeth Cudney
Maryville University

Seamus O'Reilly
University College Cork

Topics:

- Lean
- Sustainability
- Circular economy
- Value stream mapping
- Digital transformation

Quality 4.0 and innovations in digital era

Dr Joanna Rosak-Szyrocka Czestochowa
University of technology, Poland

Dr Sandro Carvalho
School of Technology – Polytechnic Institute Cavado Ave, Portugal

Dr Gilberto Santos
Design School - Polytechnic Institute Cavado Ave, Portugal

Summary topics:

We are in the 4th Industrial Revolution era, where digitalization is essential. Implementing the technologies and processes necessary to maximize value, solve customary quality obstacles, and deliver innovative solutions. Companies must have solid innovation and transformation capability if they are to survive and stay competitive. Therefore, it is important to continuously explore novel concepts for the creation of new goods, innovative ways to save expenses, and especially for enhancing the caliber of goods and services. For businesses, innovation is primarily responsible for establishing and preserving competitive advantages. Lean tools assist innovation in guaranteeing a company's continuity and durability. Quality 4.0 is about transforming and improving organizational culture, collaboration, competences, and leadership development, among others, through the use of technology. Quality 4.0 is characterized by: Transforming and improving culture, collaboration, competence, and leadership through the use of technology. Digital Transformation of Management Systems and Compliance. Achieving Innovation is very difficult, or even impossible, without Technological Development. Winning companies are particularly agile in three areas:
1.Reimagining business models 2.Reimagining business processes 3. Reimagining work

Brick by Brick: Exploring the Future of Quality Management through Serious Gaming

Dr. Ton van Kollenburg & Levi Roovers,
MSc Centre of Expertise Wellbeing Economy and New Entrepreneurship (CoE WENE), Avans University of Applied Science

Abstract topics:

Adapting to technological advances, addressing social and environmental sustainability concerns, and transitioning toward a multi-dimensional value creation approach in business operations. All are among the complex challenges we face. These complexities prompt us to ponder: what lies in the future of quality management?
In the workshop "Brick by Brick: Exploring the Future of Quality Management through Serious Gaming" we will use LEGO to facilitate in-depth discussions and explore innovative solutions with our peers on this very topic. In a serious gaming environment, participants can creatively and hands-on explore complex concepts and challenges surrounding the future of quality management. This workshop will encourage active participation, promotes collaboration among peers and accelerates the learning process. Through this workshop we aim at challenging participants to think out-of-the- box thus uncovering new insights and co-creating innovative solutions relevant to modern business environment.

Keynote Speakers

From Concept to Practice: Overcoming Industry 4.0 Implementation Challenges in Enterprises

Robert Ulewicz
Faculty of Management, Częstochowa University of Technology

Summary

The industrial sector is at the threshold of a transformative era, marked by the integration of digital technologies across all facets of production, known as Industry 4.0. This evolution promises to redefine the landscape of global economies and production systems. Despite the potential for tremendous growth and efficiency, the transition to Industry 4.0 presents a mosaic of challenges that vary across different industries and sectors.

This lecture aims to unravel the complexities and hurdles faced by enterprises during the implementation of Industry 4.0. Drawing from multi-sectoral research and broader economic data, the presentation will provide a comprehensive analysis of the adaptation challenges and the readiness of organizations for this technological transformation. While the revolution brings forth opportunities for enhancing efficiency and productivity through automation, robotics, and virtual reality, it also requires a critical evaluation of the socio-economic and operational dimensions.

The Challenges of Digital Hospital 5.0: From Innovation4Quality, Resilience and Climate Change

Luis Velez Lapão
School of Science and Technology, NOVA University Lisbon

Summary

The concept of Digital Hospital 5.0 encompasses challenges related to innovation for quality improvement, resilience, and addressing the impact of climate change in healthcare settings. In this context, the term "Innovation4Quality" emphasizes the need for innovative solutions that contribute to enhancing the quality of healthcare services leveraging digital 5.0 approaches. The challenges associated with Digital Hospital 5.0 go beyond traditional concerns and extend to fostering resilience, ensuring the ability of healthcare systems to adapt and respond effectively to unforeseen disruptions. Additionally, there is a recognition of the role digital hospitals can play in addressing climate change impacts on healthcare delivery. Overall, the challenges of Digital Hospital 5.0 highlight the complex intersection of technological innovation, data-based decision-making, quality enhancement, patient engagement, resilience organization, and environmental sustainability in the healthcare sector. A set of examples will be presented and an agenda for research in this area will be discussed

Do standards ensure sustainability

Shahla Seifi
SRRNet Director, United Kingdom

Summary

Some years ago there was a widely recognised saying that there would be “one standard, one test method everywhere around the world”. This seems to have disappeared so what has happened? Indeed what has happened as far as standards are concerned? It is widely recognised that standards are needed in order to ensure the safety and quality of what we manufacture or what actions we perform. But any standards that do exist seem to be local or regional rather than international. As we focus more upon sustainability it would seem to be the case that standards are needed more than ever. In this talk we will explore what has happened and what the role of standards actually is or should be. We will look at whether standards are actually needed, and if so what form they should take. Do we need international standards or will local or regional be better. We will therefore look at sustainability and what the role of standards should be, and of course what actions are needed to achieve our aim.

Incorporating Sustainability and Quality Management Frameworks in Managing Construction Engineering Projects

Hossein Ataei
University of Illinois at Chicago

Summary

The construction industry plays a major role in shaping the built environment, yet it is also one of the largest contributors to environmental degradation and resource depletion. In response to the growing concerns about sustainability, there has been a pressing need to integrate sustainability principles into construction practices. Sustainability in construction encompasses various aspects, including environmental protection, social responsibility, and economic viability. Quality Management in construction projects is a crucial management tool aimed at preventing defects and ensuring high standards. Quality Control and Quality Assurance (QA/QC) are essential components of ensuring that construction projects meet specified standards and stakeholder requirements. This paper examines sustainability and the quality management frameworks in managing construction projects, and hence, exploring how the integration of sustainable practices could enhance quality control processes and ensure the delivery of environmentally responsible and resilient infrastructure. This may be achieved through more informed selection of materials, initiatives focused on recycling and reusing resources, utilization of prefabrication methods, strategies aimed at reducing waste, and adherence to environmental regulations and the globally recognized sustainability standards

Conference Session A

Moderator by Dr Robert Ulewicz & Dr Vitor Anes

Communication ID: 118
Presented by: João Lemos Nabais

Container Transport Analysis and Sustainable Decision-Making through a Modular Transport Network Library Approach

Costa, Pedro[1]; Amaral, António[2,3]; Nabais, João Lemos[4]; Pereira, Raquel[5]; Batista, Carlos[6]

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ABSTRACT

International trade is increasing worldwide, challenging the performance of transport networks. Transport networks are complex systems composed of multiple players such as cargo owners, freight forwarders, terminal operators, and transport operators. Players use the available infrastructure to deliver a specific cargo in the agreed conditions at the required destination. Cargo destination, in addition to terminal storage and transport capacities, is a piece of essential information for a wise cargo assignment to a given transport connection available. Each player has its perspective, and conflicting objectives may be present, increasing the challenge of keeping a smooth flow of cargo in the transport network and fostering the use of sustainable transport modalities. Unforeseen events, such as weather conditions, may occur, leading to congestion either at terminals or in the transport connections, adding a transport delay and, therefore, affecting the overall behaviour of the transport network.

To study the effect of player decisions on the overall network performance, this work presents a modular Transport Network Library (TNL). The Transport Network Library presents a holistic approach to capturing the primary characteristics of the transport network, storage (potential), and movement (flow) of cargo. The library is composed of components for facilities (namely distribution centers, warehouses, and factories) and for transport connections (namely road, railway, and water transport). The transport network links can link terminal agents with transport agents and allow new agents to be easily added to the existing network. Cargo assignment decisions are executed at terminals with an impact on the system performance. Container scenarios based on the Atlantic Corridor within the Trans-European Transport Network (T-NET) are presented to illustrate the library capabilities.

KEYWORDS: Transport Network, Sustainable Decision-Making, Transport Modalities, Containers.

Communication ID: 101
Presented by: Timea Cisma

Exploring Circular Economy Practices in Universities: A Student Perspective

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ABSTRACT

The university setting plays a critical role in nurturing future leaders and decision-makers. Therefore, it is essential to comprehend and integrate the perspectives of students in order to achieve long-lasting social influence in the pursuit of circular economy objectives. This study explores the implementation of circular economy practices in university settings, with a specific focus on the viewpoints of students. The research holds great importance as it has the potential to provide colleges with guidance on adopting more sustainable and circular practices, utilizing the knowledge gained from the student population. The study aims to fulfill the urgent requirement for a thorough comprehension of existing practices, assesses students' perspectives, and generates practical recommendations for improving circular activities within the university setting. The study's key findings indicate a significant association between students' age and their tendency to embrace circular behaviors. Older pupils demonstrate a greater inclination to adopt circular economy principles, suggesting a possible link between academic maturity and a feeling of environmental accountability. The recycling strategy is currently the most advanced and sophisticated. Nevertheless, the article suggests improving this approach by implementing electronic waste management, promoting reusable campus initiatives, and incorporating green building practices. The purpose of these proposals is to target the deficiencies seen in the existing recycling-focused strategy, with the goal of promoting a more thorough and efficient circular economy framework in university environments. Ultimately, this research not only adds to the ongoing discussion on sustainability in higher education but also provides practical knowledge for universities aiming to promote circular economy practices. The results establish a basis for making well-informed decisions, bringing academic institutions in line with the worldwide need for environmental responsibility and circularity.

KEYWORDS: Circular economy, Student perspectives, University sustainability, Environmental accountabilityTransport Network, Sustainable Decision-Making, Transport Modalities, Containers.

Communication ID: 107
Presented by: Teresa Nogueiro

Green Mobility in Action: Erasmus+ Contributions to Climate Action and Sustainable Development

Nogueiro, Teresa[1]; Saraiva, Margarida[1,2], Ramos Pires, António[3]

[1] University of Évora, Évora, Portugal; [2] BRU-Business Research Unit-ISCTE, Instituto Universitário de Lisboa, Lisboa, Portugal; [3] UNIDEMI-Universidade Nova de Lisboa and Instituto Politécnico de Setúbal, Setúbal, Portugal

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ABSTRACT

This paper analyses case studies and student experiences that illustrate the transformative/contributive power of green mobility in coping with climate change and contributing to SDG 13-Climate action. It highlights the scope of the Erasmus+ programme and its importance for global sustainable development. The article emphasises the importance of environmentally friendly mobility habits and examines current initiatives and collaborations/alignments between Erasmus+ and environmental groups, emphasising their influence on a global scale. Case studies and student experiences are addressed, along with the advantages and difficulties of incorporating them into the Erasmus+ programme. A qualitative research methodology was used, namely the analysis of documents, coding and categorizing the collect-ed data to ensure a systematic analysis and the implementation of triangulation by using multiple data sources or methods to enhance the credibility and validity of the findings. The conclusion highlights the fact that the symbiotic relationship between the Erasmus+ programme and eco-mobility has the potential to bring about important changes in people and their travel habits.

KEYWORDS: Climate Action, Erasmus+, Green Mobility, Sustainable Development.

Communication ID: 105
Presented by: Pedro Carmona Marques

Circular economy and sustainability in industry 5.0 – A research agenda

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ABSTRACT

Industry 5.0 is a concept that extends the advancements of past industrial revolutions, emphasizing the amalgamation of cutting-edge technologies with a focus on manufacturing that prioritizes humans and the circular economy. It foresees a future where technological advancements are utilized not solely for elevating efficiency and productivity, but also for tackling environmental and societal dilemmas. Circular economy and sustainability are significant factors in the industry 5.0 framework, aiming to integrate industrial development with ecological and societal well-being.

This study intends to conduct a bibliometric analysis of scientific publications pertaining to the circular economy and sustainability in industry 5.0, utilizing the Scopus database provided by Elsevier, to know the evolution of the publications that relate these concepts. Thus, keywords related to these topics has been analysed to determine the number of published papers, top authors, citations, leading journals, countries, and affiliations with the highest output.

A network analysis using the R-based software 'biblioshiny' revealed current research trends and interest in circular economy and sustainability in industry 5.0. The analysis is expected to unveil the intellectual framework of these areas, emphasizing the significance of sustainable economic practices, efficient resource usage and technological advances in industry 5.0. Furthermore, a thematic map highlighted crucial notions, including the transition to circular business models and the incorporation of cutting-edge technologies in Industry 5.0. The study aims to offer guidance for researchers in these domains, accentuating the capability of quantitative methods in apprehending these subjects.

KEYWORDS: Circular economy, Sustainability, Industry 5.0, Bibliometric analysis, Transport Network, Sustainable Decision-Making, Transport Modalities, Containers.

Communication ID: 130
Presented by: Ali Asghar Bataleblu

Sustainable Manufacturing Design Decomposition Based on Axiomatic Design Theory

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ABSTRACT

Over the past decade, the significance of sustainable manufacturing has surged dramatically and become a well-known catchphrase. As environmental concerns intensify and resources become scarcer, manufacturing industries have recognized the need to adopt eco-friendly practices urgently. Sustainable manufacturing plays a crucial role in ensuring a harmonious coexistence between industry growth and environmental preservation. In this respect, sustainability assessment based on systems of systems perspective considering triple-bottom-line simultaneously is an essential strategy. Sustainable manufacturing will not be realized based on name alone or establishing rules. Instead of assessing a manufacturing system as “sustainable” or “unsustainable,” it should be decomposed systematically to find feasible alternative solutions to be more sustainable. Axiomatic Design (AD) theory offering a structured framework enables a systematic breakdown of complex systems into simpler modules while preserving their physical integration and functional independence. This paper presents a comprehensive decomposition of sustainability focusing on manufacturing systems. The European Sustainability Report Standard (ESRS) is considered a basis for knowing customers' needs and covering the mentioned sustainability metrics. The research results show how an AD-based decomposition can mitigate the complexity and overlaps between sustainability pillars. In addition, it helps manufacturing systems think of other alternatives to push the boundaries of sustainability.

The future endeavors of this research will center around a comprehensive decomposition for sustainable manufacturing systems design, extending it to lower and more detailed levels based on the metrics highlighted in ESRS standards. Also, multi-objective multidisciplinary design optimization of factories' roadmaps according to the other possible and feasible alternative solutions for each functional requirement is what will be addressed in the second part of the Sustainable Manufacturing Design Decomposition (SFDD) project. Afterward, developing a digital sustainability assessment tool to streamline the sustainability reporting process and improving companies' roadmaps through scenario analysis are other future remarks of this project.

KEYWORDS: Sustainable Manufacturing, Sustainability Assessment, Axiomatic Design Theory.

Communication ID: 127
Presented by: Teresa Marques

Evolution of Life Prediction Methodologies for Aeronautic Systems in the Context of Industry 5.0

Marques, Teresa[1,2]; Morgado, Teresa[1,3,4,5]

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ABSTRACT

Aircraft are complex systems containing several connections between their different components, which perform critical functions for correct performance. To guarantee the safety and airworthiness of aircraft, the maintenance of complex systems will depend on prognoses and management of the condition of the essential subsystems or components.

One type of maintenance applied in the aeronautic industry is predictive maintenance, whose solutions depend on data used in real time to diagnose possible failures and predict, with greater accuracy, the remaining useful life of the system and its components.

With Industry 4.0, there was a boost in digital transformation, in which technologies such as the Internet of Things, Digital Twins, and Big Data Analytics allowed more precise observations to be made. These technologies have enabled the analysis of large volumes of data and the development of predictive algorithms to determine imminent failures at the level of individual components and aircraft to predict subsequent complete repair solutions.

Although Industry 4.0 has driven industrial growth, it has also presented significant challenges, such as technical integration, human resources and supply chain issues, and data security. To combat these challenges, Industry 5.0 began to develop and introduce new technologies, such as Cyber-Physical Cognitive Systems. These systems take a human-centered approach and aim to facilitate integrating and coordinating physical, virtual, cyber, and network entities.

This article aims to contextualize Industry 5.0 methodologies based on case studies from the aeronautic sector to improve the life-to-failure prediction of complex systems.

KEYWORDS: Industry 5.0, Aircraft Maintenance, Complex Systems.

Communication ID: 139
Presented by: Miguel Cavique

Educational Requirements for Humanistic Industrial Work Towards Industry 5.0

Cavique, Miguel[1,2], Fradinho, João[2], Gabriel-Santos, António [2,3], Mourão António[2]

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ABSTRACT

Since WW II, the EU has greatly developed its industrial field. By the end of the 20th century, the EU had focused on services and high-value processes. Entered the WTO in 2001, China fostered commerce and beneficiate from the relocation of factories from EU. Smoothly, the EU market no longer needed some industrial skills. Moreover, countries bet on high education to develop themselves. COVID and the new international order show the need for European reindustrialization. EU needs persons of different skills to be educated and privileged in the technical area for the new industrialized era. Industrialization and Sustainability can no longer be antonyms. Since the Brundtland report, Sustainability has been regarded as a mix of environment, enterprises, and society. Putting humanism in society is a need of present and future generations towards social cohesion, essential to the robustness of Europe. Place the well-being of the worker at the center of the production process is a must. Education redesign is a significant issue in achieving humanism targets and society resilience. All persons in society are helpful despite the work they do. Because people are different, they can help in many areas with social benefits. Industry 5.0 centers the process on people. The high-level parameters for all future education levels are societal activities, interaction with economic activities, and professional output. Based on Axiomatic Design Theory, this paper proposes an educational framework to achieve effective capabilities of autonomy, responsibility, and technical know-how achieved at level 4 of education.

KEYWORDS: Sustainability, Industry 5.0, Reindustrialization, Technical Education, Axiomatic Design.

Communication ID: 140
Presented by: Anis Benabed

Globalization, Business Leadership and Achieving Business Goals in Entrepneurship and Companies: Case of Female Business Leadership

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ABSTRACT

This paper analyzes and describes Globalization, Business and achieving business goals in business and entrepreneurship by focusing more on the case of female business leadership. The research questions are" what rate of business leadership is there for women and men?", "is business leadership linked to globalization?" and "what conditions are there to reach business objectives through business leadership?" The results show that understanding the relationship between globalization and business leadership to achieve business goals is highly important for corporate strategies under the different requirements and conditions. The success of organizational leadership lies precisely in the success of the leader and the leader's success will depend on her ability to build an environment of respect, trust and motivation. In conclusion, in the context of globalization there are symbols that represent both society and business such as integration and convenient communication, the free circulation of goods, expansion of human rights and social or business leadership. The percentage of female leaders in business in still low compared to men that has the high majority. The example of Latin American showed that in 2021 could reach 55% of female leaders in business activities and entrepreneurship according to the available data compared to a low percent in Europe and worldwide due to factors that probably business policies hide for business.

KEYWORDS: Globalization, Business leadership, companies, female leadership, entrepreneurship, goals.

Communication ID: 144
Presented by: João Matias

Logistics 4.0 issues: An exploratory Delphi study conducted by the University of Aveiro

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ABSTRACT

In an era dominated by rapid technological changes and the emergence of Industry 4.0 (I4.0), industries are compelled to adapt to remain competitive. This context underpins the development of a European project centered around advancing Logistics 4.0 (L4.0) solutions, entitled SLog4.01. The growing demand for streamlined logistics operations, enhanced by digital innovations, creates a pivotal moment for transformative approaches in supply chain management (SCM).

One of the objectives of this project is to develop a course that teaches its participants on how to implement advanced L4.0 solutions that integrate cyber-physical systems (CPS), the Internet of Things (IoT), and artificial intelligence (AI) to optimize SCM. These solutions aim to enhance real-time visibility, predictive analytics, and autonomous systems within logistics, ultimately improving efficiency and reducing operational costs.

A Delphi study conducted by the University of Aveiro and other project partners served as the foundational research method to gather expert insights and validate the need for the project. This iterative process involved multiple rounds of surveys where experts in logistics and SCM discussed and reached consensus on critical L4.0 issues. The methodology ensured that the project was grounded in expert knowledge and addressed real-world industry challenges.

The study highlighted several key areas for development within L4.0, including the need for improved data integration across supply chain networks and the adoption of AI-driven decision-making tools. These findings informed the strategic direction of our project, leading to the development of specific L4.0 modules focused on smart warehousing, sustainable logistics practices, and advanced analytics.

The project represents a significant step forward in the application of I4.0 technologies in logistics. By leveraging expert consensus and cutting-edge research, the project not only anticipates the future needs of the logistics industry but also proposes practical solutions to address them. The ongoing development of this course is expected to set new benchmarks in logistics education and innovation.

KEYWORDS: Logistics 4.0, Industry 4.0, Delphi study, Supply chain management, Sustainable logistics.

Communication ID: 145
Presented by: Mário Pereira

Otimization of Plasma Direct Energy Deposition - Additive Manufacturing of Metals Process Using Design of Experiments Methodology

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ABSTRACT

Additive manufacturing (AM) techniques have been used for producing products with complex shape and functionalities. These manufacturing techniques require less energy consumption and decrease wastes from processing stages, without compromising shape and function.

AM has been an object of intense research and development over the recent years. The increasing pressure imposed on industries, the development of new processes capable of overcoming the current needs both topologically and geometrically, namely the production of optimized components, has extensively been required. Although metal additive manufacturing (MAM) processes, are already used in many industrial applications, some of these processes represent a bottleneck in most industries in terms of productivity due to their high production time.

Directed Energy Deposition (DED) processes represent a viable and promising MAM technology for manufacturing large and complex components, because their higher deposition rates allow the reduction of lead times while reducing material waste. These processes can also be used to repair and add functionality to existing parts. However, the optimal parametrization of DED processes is still a challenge to overcome. The interrelationships between the process parameters and the component geometry are complex and unknown most of the time.

The main aim of this research is the optimization of the DED process parameters using robust Design of Experiments (DOE) techniques. This optimization will be focused on a plasma powder DED process. The aim is to understand the combined of effects of current intensity, travel speed, and feed rate on the bead geometry. Process parametrization was investigated according to the specifications of a DOE by means of a full-factorial experimental design, resulting in a test matrix of 72 parameter combinations.

The relationships between process parameters and results were determined, forming the foundation basis for future developments in this field. A reduction of the production time and an optimization of the surface finish of the manufactured component were targeted. On the other hand, the results also showed that it is possible to obtain a reduction in waste, which also contributes to the sustainability of these processes.

KEYWORDS: Optimization, metal additive manufacturing; direct energy deposition; plasma deposition; Design of Experiments.

Communication ID: 126
Presented by: Luís P. M. Abreu

Contributing to efficient resource use through sustainable production: case study

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ABSTRACT

Combining lean manufacturing principles and Six Sigma techniques, LSS - Lean Six Sigma is a methodology designed to improve processes and reduce defects within an organization. Increases in productivity, customer satisfaction and cost savings can be achieved through the implementation of LSS practices within an organization. Several authors have recently pointed out that LSS, by promoting the reduction of energy, water, and natural resource consumption, is an effective approach to implementing sustainable industrial practices and improving environmental performance.

While LSS has become a popular solution for addressing operational sustainability issues, it is not well determined how its guiding principles and practices promote sustainable production. The present work is related to a case study, where an LSS-based approach was applied to improve the process performance and minimize waste occurring in a fish processing industry. Applying the five Lean principles and the five phases of Six Sigma provided a more sustainable industrial practice and identified environmental sustainability issues, which needed to be addressed to ensure greater organizational benefits and reduce negative environmental impacts. Therefore, the adoption of sustainable production practices appears to have contributed to reducing the negative impact of production on the environment while promoted the efficient use of resources.

The implementation of this work has led to an improvement in industrial sustainability by adjusting the number of workers assigned to the fillet production line according to the cycle time, reducing fish waste, reorganizing the maintenance section, and launching challenges to improve the defrosting conditions of the fish, resulting in a reduction in water and energy consumption when implemented.

KEYWORDS: Lean Six Sigma, operational sustainability, environmental sustainability, performance, waste reduction.

Conference Session B

Moderator by Dr Chad Laux & Dr Ivan Galvão

Communication ID: 129
Presented by: Marta Sousa

Improvement of the in-store picking process using lean management: The case of a retail company.

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ABSTRACT

Order picking is a logistics process that has been extensively studied in the literature, especially when it takes place in warehouses. Nowadays, with the fast pace of the retail business, physical stores are also playing an important role when it comes to order picking. However, the process of picking orders in-store is still very little studied in the literature, and few theories have been tested. Furthermore, being one of the most labour-intensive and costly activities, it is considered one of the top priorities when it comes to increasing productivity and consequently reducing costs.

This project studies and implements various improvements with the aim of increasing the productivity of the in-store picking team through the application of lean management, including training the team in a new working methodology, identifying waste and applying concrete measures to reduce it. This was developed by working side by side with the employees to understand the real pains felt by the team and apply practical solutions that make sense to them, which promotes the sustainability of the project over time. In practical terms, the project was carried out using an action research methodology in combination with a lean implementation framework.

The case study begins with a preparation phase in which the problem is identified, followed by an awareness phase in which the team is trained in lean to better understand the measures implemented. There is then a phase of applying tools such as process mapping, the cause-effect diagram and the identification of waste, followed by the identification of actions that will increase the team's productivity. This identification is followed by the implementation of layout changes, process redefinition and the design of dashboards to monitor team indicators, followed by the definition of measures to ensure the sustainability of the actions taken. By applying this framework, it is hoped to increase the team productivity of a store, bringing it close to the company's national average.

KEYWORDS: In-store order picking, productivity, lean, lean management, action research.

Communication ID: 128
Presented by: Rafael Alves

Reducing the Internal Distribution Process Cycle Time of a 3PL Using Lean Six Sigma

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ABSTRACT

With an ever-growing competitive environment amongst third-party logistics providers (3PLs) originated from an increasing demand for lower shipping times, the reduction of a 3PL's cycle time is of crucial importance. In this specific Portuguese 3PL, the cycle time was defined as the time that two of its most crucial assets spent at the analysed warehouse, its trucks and corresponding drivers. This research examined how this provider improved said cycle time through Action Research, where academia and employees worked together with the aim of achieving the defined goal. Considering the mentioned objective, Lean Six Sigma was considered to be the appropriate methodology to be applied throughout the process improvement efforts.

Following the DMAIC theory, this research began with extensive process mapping, specific objective definition and current cycle time measurement that allowed for the establishment of a baseline measurement and the identification of the sub-processes that generated the highest portion of waste. The further analysis of the observed data led to the identification of specific causes to this aforementioned waste initiating an idea generation process involving several employees throughout the whole hierarchical chain. This employee integration is crucial to the successful understanding of the culture and company reality, but also to allow for a smoother introduction of the chosen changes reducing resistance and other adversities of the sort. In the end, to evaluate the results of the work done, a control plan was defined where, for the total of three months, the warehouse performance was evaluated to confirm that, in fact, the cycle time suffered a reduction.

KEYWORDS: Lean Six Sigma, Action Research, Warehouse, Cycle Time, Third Party Logistics.

Communication ID: 103
Presented by: Pedro Carmona Marques

Synchronizing Lean Manufacturing and Green Strategies: A Holistic Approach to Sustainable Supply Chain Operations

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ABSTRACT

The article discusses the constant need for organizations to undergo technological and management changes to meet the demands of stakeholders and stay competitive. Emphasizing the importance of reducing environmental impacts as an additional value, the text explores the relationship between Lean Manufacturing, focused on waste elimination, and green practices, aimed at reducing harmful environmental impacts. The objective is to identify how these approaches can contribute to obtain environmental improvements, especially in supply chains.

The historical perspective of Green Management and Operations is presented, including Green Supply Chain Management (GSCM). The influence of GSCM on green operations management is highlighted, emphasizing integration and coordination to meet environmental requirements.

The theoretical framework covers topics such as environmental management, sustainable strategies, Lean, Green, and sustainability. The compatibility between Lean and Green is underscored, emphasizing practices that contribute to environmental enhancements.

A case study in the supply chain of batteries and cells exemplifies GSCM practices adopted by a recycling company presents the importance of practices, such as: internal environmental management; green storage; reverse logistics and the existence and expansion of synergies.

The article concludes that Lean Management coupled with Green Management seeks balance among environmental, social, and economic goals. It outlines challenges and opportunities, underscoring the importance of awareness and understanding for sustainable practices. The article suggests expanding studies to other supply chain links and quantitative analyses of financial results associated with GSCM practices.

KEYWORDS: Lean Manufacturing, Green Supply, Chain Management, Green Strategies, Sustainability.

Communication ID: 136
Presented by: Susana Fonseca

Lean Systems in a Third Sector Organization

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ABSTRACT

More and more organizations seek to be recognized in the market for quality, efficiency, and quick response to changes. In this context, many paradigms and management methods emerge to address the external factors that make markets so volatile. Among several, Lean stands out as a management approach advocating practices and concepts of continuous improvement and waste reduction throughout the value chain, always aiming at satisfying those being served. Considered a way of thinking, it develops people by creating a culture where everyone is encouraged to use their thinking, knowledge, and acquired skills to solve problems and continuously improve.

For the realization of this scientific article, the website of the non-profit organization, namely "Association A2000", was analyzed. It was found that Lean implementation was only applied to some sectors of the organization due to a lack of qualified human resources for global implementation. It was also possible to observe the potential benefits of applying Lean management principles, even partially. However, there are difficulties in the organization regarding the implementation and continuity of its management. This is due to the lack of continuous professional training of human resources and the absence of a body/department with the necessary competencies for effective coordination of Lean management, thus jeopardizing the sustained continuity of the organization.

KEYWORDS: Strategic Management, Continuous Improvement, Kaizen, Lean, Third Sector.

Communication ID: 138
Presented by: Eduarda Duarte

Study of the Impact of Lean Philosophy on Process Improvement and Sustainability in Companies: Case Study

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ABSTRACT

Currently, we face significant global challenges such as climate change, resource scarcity, and the growing awareness of organizations' social and environmental responsibility. In this context, the pursuit of sustainability has become an undeniable priority. This is where lean philosophy comes in, a fundamental approach to address these challenges by promoting not only operational efficiency but also the adoption of more sustainable practices. The goal of lean philosophy is to improve production processes, reduce waste, and increase value delivered to the customer. However, as environmental, and social concerns gain prominence, this philosophy has been adapted to incorporate sustainability principles, aiming to minimize the negative impact of companies' operations on the environment and society. This study focused on investigating how the application of lean philosophy can contribute to process improvement and the promotion of sustainability in a company, which is essentially dedicated to the production of conveyor belts. Using the DMAIC methodology (Define, Measure, Analyse, Improve, Control), a structured approach was adopted to identify, analyse, and resolve the operational challenges faced by the company. Throughout the research, it became evident that lean philosophy strategies not only improved the production processes but also had a significant impact on its operational sustainability. The implementation of lean tools, such as the VSM (Value Stream Mapping), 5S, A3 report, Standard Work, Visual Management, among others, not only allowed for waste reduction and efficiency improvement but also enabled the minimization of the environmental and social impact of the company's operations. This integrated approach demonstrated that lean philosophy can be a powerful ally in the pursuit of more sustainable business practices. By aligning operational efficiency objectives with sustainability goals, companies can not only improve their competitiveness in the market but also play an active role in building a more sustainable future for future generations.

KEYWORDS: Sustainability, Lean Philosophy, Process Improvement, Waste Reduction, DMAIC.

Communication ID: R108
Presented by: Helena Navas

Development and implementation of Lean solutions in a Portuguese electrical systems performance testing laboratory

Navas[1,2], Helena; Dias, Ana[3]; Morgado, Teresa[1,2,3]; Anes, Vítor[3]; Abreu, António[3]; Carmona, Pedro Marques [4,5]; Canas Correia, Francisco[6]

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ABSTRACT

In today's dynamic and competitive business environment, companies are under intense pressure to outperform their competitors and provide customers with superior products and services. As competitiveness increases, it is critical for companies to apply Lean concepts to their processes to reduce waste and encourage continuous improvement. Despite the widespread application of Lean in various industries, its potential impact on laboratory operations has not been fully tapped. This article presents a case study application of the Lean philosophy in a Portuguese electrical systems performance analysis testing laboratory, divided in two phases 1) using tools such as BPMN, SIPOC, Ishikawa diagram, KPI analysis and *Gemba* walks, it was possible to analyse the current situation and the potential for improvement and 2) four *Kaizen* initiatives were implemented: organization of teams, centralization of planning and improvement of efficiency in both laboratories and field activities. There was achieved; a potential reduction in lead time of around 59%, which resulted in an anticipation of cash flows; the lack of working standards, the long preparation time of the tests and the excessive movements of operators allowed us to estimate an increase in test efficiency of around 15%; the implementation of a new organizational structure made it possible to correct the high control ratio on the part of the area manager (1:14 to 1:2) and the centralization of planning made it possible to minimize the number of trips made and associated costs. In short, the operational improvements described, not only resulted in an improvement in service quality, but also in financial benefits for the organization, estimated at 500 thousand euros. Innovation and methods like Lean are not only beneficial, but mandatory for companies to thrive and succeed, specifically in laboratories, due to the increasing volume of work in recent years and the urge to reduce costs and time.

KEYWORDS: Electrical systems testing laboratory, Lean philosophy, *Kaizen*; case study, cost and lead time reduction.

Communication ID: 114
Presented by: Juliano Endrigo Sordan

Statistical Process Monitoring in the digital era: a comprehensive literature review

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ABSTRACT

Due to recent advances in the field of digital manufacturing, quality management has evolved into the concept of Quality 4.0 (Q4.0), which covers the application of digital technologies, including machine vision, Big Data Analytics, machine learning algorithms and new data analysis techniques to increase the accuracy of predictive models and reduce process variability. Given this transformation, conventional Statistical Monitoring Processes (SMP) have moved forward to digital SMP, allowing statistical inference from real-time data, data-driven methods, and smart quality solutions. However, the current literature still lacks consistent knowledge about new applications of digital SMP. This study aims to provide a theoretical landscape of SMP in the digital era. A systematic literature review was conducted based on relevant articles published in the Scopus database from 2011 to 2024. In addition to the bibliometric analysis involving 338 selected papers, a theoretical synthesis was carried out through 27 real cases in order to outline some digital SPM practices. The study findings provide a comprehensive overview of the scientific production of digital SMP, including publication performance, influential works and authors, and thematic evolution. Conversely, the revised empirical studies provide a theoretical contribution to the advancement of Q4.0 by disclosing the most cited digital SMP solutions, their major benefits, and the key barriers and enablers. Finally, this paper highlights emerging trends and suggests potential avenues for future research on digital SPM in light of Q4.0 approach.

KEYWORDS: Digital manufacturing, Quality 4.0, Statistical Process Monitoring, Systematic Literature Review.

Conference Session C

Moderator by Dr Robert Ulewicz & Dr João Garcia

Communication ID: 121
Presented by: Arian Semedo

Innovation towards sustainability applied to a CO_2 refrigeration system using renewables - solar, wind and tidal energy

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ABSTRACT

This study describes the impact of innovation solutions in a sustainability world, focusing on four feasible alternatives for an integrated refrigerated cold storage system for fish preservation. These alternatives range from integrated systems relying on grid electricity to autonomous systems generating electricity from renewable sources, incorporating various refrigeration facility configurations. The study aims to evaluate the energy efficiency, financial feasibility, and environmental impact of these solutions. Solution A utilizes two R134a refrigeration units powered by the public grid, while Solution B employs a transcritical R744 (CO_2) system with grid electricity. Solution C integrates R744 refrigeration with autonomous renewable energy, and Solution D utilizes R744 for refrigeration with seawater heat exchange and autonomous renewable energy sources. The results indicate that Solution D is the most favourable, emitting 15,882 kg CO_2 eq and achieving a 5-year return on investment. The autonomous electricity production in Solution D reduces emissions by 95%. Despite an initial investment of €769,172.00, Solution C demonstrates financial viability, contributing to energy sustainability. Furthermore, this autonomous production reduces emissions by 360,697 kg CO_2 compared to conventional systems, emphasizing the positive impact of local renewable energy integration.

KEYWORDS: CO_2, Renewable energy, sustainable refrigeration.

Communication ID: 120
Presented by: Miguel Lança

Enhancing Efficiency via Thermal-Electric Performance Optimization of Concentrating Collectors with Bifacial Photovoltaic Cells: Experimental and CFD Investigation

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ABSTRACT

One challenge in harnessing solar energy with photovoltaic (PV) cells is the adverse impact of temperature fluctuations on their efficiency. Elevated temperatures diminish the conversion efficiency of sunlight into electrical energy and can lead to array dilatations, further degrading performance. To mitigate these effects, strategies such as air-flow ventilation have been explored. In this study, we conducted experimental and numerical simulations on a collector equipped with bifacial PV cells. Our analysis involved comparing collected data with existing literature expressions for estimating the heat transfer coefficient. We implemented forced ventilation to enhance heat dissipation within the collector. Additionally, we developed a novel correlation to estimate the heat transfer coefficient tailored to this collector's geometry, covering inlet velocities ranging from 3 to 8 m/s. Our results were bench-marked against prior research, providing valuable insights into thermal management strategies for improving PV cell performance.

KEYWORDS: bifacial PV cells, concentrators, PV cooling, CFD.

Communication ID: R125
Presented by: Tiago Trindade

Application of Design of Experiments to Automotive Components Helium Leak Testing Process

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ABSTRACT

The current global industrial landscape is highly dynamic. In an environment where characteristics such as innovation, quality, efficiency, effectiveness, sustainability, adaptability, and flexibility are of paramount importance to be able to respond to constant change, only organizations that integrate and proliferate these concepts within their structure, can occupy and sustain a place in the market. An industrial organization that wants to be competitive, must be effective in its processes from the start of the development of the industrialization of its products, always maintaining the focus on the customer and quality. To solve problems, industrial organizations have increasingly integrated proven methodologies into their structures, such as Six Sigma, which core method consists of a structured performance improvement five phases cycle, also known as DMAIC. To systematically reduce variability, by analyzing which controllable factors have an impact on quality characteristics, DMAIC has in its toolbox the Design of Experiments. The objective of the development of this case study, was the direct application of Design of Experiments in the improvement of a new production process, in the final phase of industrialization, to improve the operational effectiveness of the process, thus proving the enormous potential that this tool has in supporting the resolution of moderate and high complexity problems in an industrial environment.

KEYWORDS: Industry, Industrialization, Process, Efficiency, Design of Experiments, Experimental Design, Quality Tools, Six Sigma, DMAIC.

Communication ID: 141
Presented by: Margarida Vasconcelos

Zero Defect Manufacturing effect on Sustainability – A Rapid Review

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ABSTRACT

This paper aims to study the effect of Zero-Defect Manufacturing (ZDM) on Sustainability by analysing the state-of-the-art and identifying patterns and gaps within the available literature. Sustainability encompasses three pillars, known as the Triple Bottom Line (TBL): social (people), environmental (planet), and economic (profit) pillars. The original ideas of a number of quality gurus such as W. Edwards Deming, who states that quality improves productivity through the reduction of costs caused by non-value added activities, A. Feigenbaum, who planted the roots for the concept of Total Quality Management (TQM) as we know today, and K. Ishikawa, who defends company-wide quality, that is, the need for involvement of all employees and the actual utilization of people's intelligence, served as leverage for this study. The Sand Cone model proposed by Ferdows and De Meyer in 1990 presents a hierarchy of four concepts in the form of a pyramid that starts with "quality" at its base, succeeded by "dependability", "speed", and finally, "cost efficiency". This productivity theory underlines, as well, the importance of quality management and aims to convey how companies should primarily focus on quality to further improve costs. In this sense, to execute the idea, a Rapid Literature Review on papers concerning ZDM, quality management, and Sustainability was conducted, followed by a thematic analysis of the selected documents.

The results from the assessment show how ZDM is addressed in several types of studies, such as literature reviews on its technical approach, models, and frameworks in different industries. Nonetheless, the literature is still lacking papers focused on the effects of ZDM on Sustainability, therefore this study aims to bridge this gap.

KEYWORDS: Zero Defect Manufacturing, Sustainability, Quality Management, Rapid Literature Review.

Communication ID: 100
Presented by: Diogo Morgado

Customer Lifetime Value-Based Predictive Techniques and Product Recommendation Systems

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ABSTRACT

In today's dynamic technological landscape, access to customer data has re-defined traditional business paradigms. This shift requires companies to transition from product-centric to customer-centric models. This study delves in-to the fast-moving consumer goods (FMCG) retail sector, utilizing customer loyalty to precisely compute Customer Lifetime Value (CLV) through predictive methodologies based on decision trees. Integrating customer basket analysis into the conventional Recency, Frequency and Monetary variables, this research establishes a framework for innovative product recommendation systems. Anticipating value fluctuations within a one-year horizon, this approach provides critical insights into customer behavior, empowering businesses to proactively manage marketing strategies and customer relationships, effectively mitigating potential revenue losses. The outcomes of this predictive model promise a substantial impact on the FMCG retail sector, offering a blueprint for optimizing decisions on product recommendations. Furthermore, this study presents significant financial contributions, representing a substantial opportunity for revenue recovery by leveraging customer behavior insights and personalized product recommendation strategies.

KEYWORDS: Retail, FMCG, Customer Lifetime Value, CLV, Recommendation Systems.

Conference Session D

Moderator by Dr José Sá & Dr Gilberto Santos

Communication ID: 124
Presented by: Maciej Borkowski

Cultural Aspects of Waste Management in Poland

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ABSTRACT

The main aim of this article was to present differences in the social determinants of waste management and environmental protection in Poland. A research gap was identified related to the small number of studies referring to Poland in the field of waste management. A systematic review of the literature on waste management and society's approach to environmental protection was conducted, with particular emphasis on municipal waste. The article uses data from local databases, i.e. the Central Statistical Office (GUS) in Poland, as well as data from the World Bank and OECD. The method of comparative analysis and Hofstede's tool were used for selected aspects of the social approach to waste management in Poland. Empirical research was conducted in August 2023. Literature review based on key groups of social factors that differ in the analysed countries. These include those related to purity, religious beliefs, respect for nature, responsibility and ecology. Polish citizens approach the power supply in their environment in a individualistic way. The European Union's recommendations has positively affected management of municipal waste in Poland and led the local policy to improve local waste management. In the authors' opinion, in subsequent studies it is worth focusing on comparing other countries in terms of their social approach to environmental protection, as well as conducting surveys.

KEYWORDS: Waste Management, Municipal Solid Waste, Social Factors, Culture, Poland.

Communication ID: R104
Presented by: Cláudia Sousa Silva

Industry 4.0 and Quality 4.0: Key Research Topics, Trends and Interconnections

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ABSTRACT

This work is based on the theoretical assumption that Industry 4.0 is leading to the development of a new era of Quality Management, known as Quality 4.0, enhancing its role as a management model, both at a strategic and operational level.

Therefore, to identify the main research trends related to the link between Industry 4.0 and Quality 4.0, a bibliometric analysis using the Scopus database was carried out in the first stage. A total of 192 papers, classified as articles, reviews, and proceedings, were published according to the search criteria and taking into account the collected database. The number of publications more than doubled between 2021 and 2023 after the first document was published in 2014. This growth confirms the topic's relevance and indicates a significant effort to consolidate the knowledge of the Quality 4.0 area.

It was also found that the subject area with the most publications is the Engineering subject area. This result shows that the Quality 4.0 field might still focus strongly on the technical component of quality management at the expense of the management component.

In the second phase, the database was refined to deepen and better understand the connection between Industry 4.0 and Quality 4.0. Keyword co-occurrence analysis was performed using Vosviewer® software to identify the most prevalent key research topics in each area and how they are related, as presented following:

- Linking Industry 4.0 to the development of a more predictive approach to Quality Management, strengthening its preventive potential and its ability to support decision-making;
- Connecting certain technologies related to Industry 4.0, especially machine learning, to quality management about manufacturing process quality;
- Linking digitization benefits to strategic management and knowledge management processes;
- Highlight the link between big data and quality standards, as quality management principles are based on data analysis and fact-based decisions.

This paper presents the first results of a research project that aims to determine whether the theoretical assumption presented above has been transferred to the practical context. In other words, a questionnaire survey will be carried out to assess whether companies in practice have conducted the changes and technologies of Industry 4.0 to develop and evolve quality management to higher maturity levels.

KEYWORDS: Industry 4.0, Quality 4.0, Bibliometric analysis.

Communication ID: 135
Presented by: José Machado

Analysis of the Correlation between Collaborative Manufacturing, Industry 4.0 and Sustainability

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ABSTRACT

This paper focused on an analysis of the correlation between collaborative, manufacturing, Industry 4.0 and sustainability, based on a literature study. The study conducted did enable to realize that in the literature there are many works related to the keywords underlying the set of keywords considered in the study conducted, over the last years, and showing an increasing trend. Moreover, the study carried out enabled to realize about the existence of correlations between the most representative keywords considered. The publications reached were organized and analyzed in different ways, namely regarding the underlying metadata, namely regarding its organization by year of publication, among other main information. The main set of publications analyzed was further divided into a set of classes and groups, based on the information retrieved from the Scopus database. The ANOVA was also applied to study the correlations through the use of SPSS tool. The results showed that the classes are dependent and correlated with each other.

KEYWORDS: Collaborative, Manufacturing, Industry 4.0, Sustainability.

Communication ID: 134
Presented by: Gilberto Santos

Impact of Technological Development in the World

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ABSTRACT

The richest countries in the world are grouped together in the G7. These are considered developed countries. Meanwhile other countries are getting rich, like South Korea, and China is on the way. After all, why are a few rich or developed countries and the vast majority are considered developing countries, or more or less, poor countries? Why do developing countries not converge with developed countries? This is a big question, to which some authors have paid attention.

In this communication, the main reasons are presented why developing countries do not converge with developed countries. Namely, because engineering in developing countries is more about producing products, while engineering in developed countries is more about designing products sold through their own brands. Thus, the added value of products is kept by developed countries, which continue to develop through technological development and consequent innovation. Hence, developing countries are mere producers or assemblers of parts, receiving salaries but remaining in development for years and years.

These are issues related to the development of countries. Very few countries manage to escape and develop despite extreme difficulties, but others remain poor and in debt for many and many years. What can be done to develop and escape poverty? This is the main approach of this communication.

KEYWORDS: Developed countries, G7, Developing Countries, Technological Development, Innovation.

Communication ID: 113
Presented by: Vitor Anes

Dimensioning and validation of a logistics system through simulation

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ABSTRACT

In today's landscape, it is imperative for organizations to find strategies that lead to successful outcomes in order to remain competitive in the marketplace. To this end, it is important that companies evaluate the profitability on their investments in new technologies and processes and, whenever possible, seek optimization by minimizing costs and eliminating waste. In this context, this study aims to design, optimize and validate through simulation a logistics system of a company operating in the distribution sector. Therefore, the main objectives were to create a simulation model of the current distribution system and identify its weaknesses while proposing new improvements; to develop new simulation models that dimension the system based on these proposals; to compare the new proposal with the current system using performance metrics; to analyze the financial profitability of the logistics system. The study was carried out using the FlexSim simulation tool and showed that it is possible to increase the efficiency of the processes in the system by implementing the proposed improvements. Based on the results obtained, it is expected that the productivity of the logistics system for the national distribution process can be increased by 37%, the productivity of the regional distribution process by 56% and the financial return over 5 years by 110% compared to the current state of the logistics system.

KEYWORDS: Discrete Simulation, Logistic System, Improvement, Productivity, Efficiency.

Conference Session E

Moderator by Dr Hossein Ataei & Dr Ivan Galvão

Communication ID: 123
Presented by: João Alves

Machine Learning applied to LCA of mechanical components obtained by SLM

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ABSTRACT

Over time, industries are starting to be concern about their impact on the environment, and therefore new technologies, have arrived with the capability of improving the sustainability of the industrial paradigm. Machine Learning (ML) and Artificial Intelligence (AI) are taking over the global industry, by offering new data drive solutions capable of optimizing decision-making and operation. Meanwhile, new advanced manufacturing technologies such as Selective Laser Melting (SLM), also known as 3D printing, are spreading through the market, due to the new doors unlocked by the possibility of manufacturing high complex shapes for a minimal time and use of material. Together, these new technologies of industry 4.0, promise to bring an all-new future, sustainable and resilient.

The aim of this work is to analyze how can ML and AI expand each phase of the LCA of a light alloy, produced by SLM, in order to improve the sustainability of this new advanced manufacturing technologies.

KEYWORDS: Machine Learning, LCA, SLM, Mechanical Components.

Communication ID: 119
Presented by: Teresa Abreu

Sustainable Construction by Additive Manufacturing-Based Aluminium-Polymer Joining

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ABSTRACT

Nowadays, industry processes and technologies are facing a hybridisation trend, which consists of the production of multimaterial parts. These parts have the advantage of combining unique properties of different materials, allowing the production of structures with properties that could not be achieved by a single material, at least at a reasonable cost for most of the sectors. Two material classes whose combination has most interest are metals and polymers, because of the strength of the metals and the lightweight and corrosion resistance of polymers. Metal-polymer hybrids allow a strong increase in the efficiency of the produced structures, meeting the current sustainability concerns. However, the production of polymer-metal joints is often made by mechanical fastening or riveting, easily increasing the weight of the structures, or by adhesive bonding, which is prone to thermal and environmental degradation. In turn, the welding of these materials has also been tested by solid-sate welding, but it is still in an embryonic stage, requiring much more development. In fact, considering the difficulty of efficiently joining metals and polymers with success, it is mandatory to test the use of other manufacturing processes for producing these joints, which is the case of additive manufacturing (AM). The aim of present research is to produce aluminium-polymer joints using an AM-based technique. An optimisation work of the deposition parameters was carried out to improve the morphological properties of the joins. The mechanical behaviour of the joints was found to be strongly influenced by the design of the produced samples, which consisted of a pin-based interlocking mechanism. The joints presented good mechanical properties, although better behaviour is expected to be obtained by improving the joint design.

KEYWORDS: Additive manufacturing, Metal-polymer; Joining, Morphology, Mechanical properties.

Communication ID: 122
Presented by: João Alves

Sustainability of Selective Laser Melting Process

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ABSTRACT

New advanced manufacturing techniques, widely known as 3D printing are appearing as alternative to conventional methods (CM), by offering the possibility of high complex shapes for a minimal time and use of material, significantly improving the customization and efficiency. Therefore, technologies such as Selective Laser Melting (SLM) are being pointed out as a manufacturing alternative to achieve the sustainable development of the industrial landscape, since it is a technology with less energy and material consumption, capable of reducing the supply chain, by cutting of the logistic complexity and indirect energy "movements" and allows the improvement of machinery performance, through the use of complex alternative designs, impossible to obtained by any other methods. This paper represents a comprehensive overview, about the impact of SLM, in the sustainable development of the industry, the main ongoing challenges and how can these new advanced technologies, help to reach the proposed global goals for a better world by 2030.

KEYWORDS: Sustainability, Additive Manufacturing, Selective Laser Melting.

Communication ID: 106
Presented by: Suzana Lampreia

Ship Dynamic Maintenance – Risk Analysis

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ABSTRACT

Considering the extent of the Portuguese sea and the military ships necessary for its monitoring, it is necessary to have implemented a maintenance system that allows monitoring the condition of the ships, but also maintaining their high performance, regarding pollution control and reducing consumption of lubricants, gases and marine gasoil and systems availability. To achieve this, it is necessary to have a useful and available maintenance active system based on a dynamic management of the technical interventions to be carried out. it will be explored some risk analysis maintenance techniques, then it will be explored the most applicable techniques for chosen ship equipment. In the present research a case study of an equipment is presented and the risk analysis in maintenance context is studied. On the case study we will present the importance of having a dynamic maintenance system that allows to act when it is needed, and it can´t be performance to know online the risk of non-maintenance. To prove our theory the research results and its analysis will be highlighted, and finally some conclusions are presented.

KEYWORDS: Maintenance, Dynamic, Ship, Risk.

Communication ID: R102
Presented by: Laura Bravi

Sustainable mobility and the use of electric cars in the Italian market: the consumer's perspective

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ABSTRACT

The automotive sector finds itself at the centre of a complex dispute that gives rise to temporal, industrial, and ideological challenges connected to the problems of climate change. The need for immediate decarbonisation has led companies to innovate and experiment with new engines suitable for replacing current endothermic vehicles. This study aims to understand how attention and knowledge towards sustainable mobility concerning electric car development are spreading in Italy.

The quantitative research was conducted by administering an online questionnaire between November 2022 and January 2023. The questionnaire was focused on Generation X (those born between 1965 and 1980) and Generation Y (born between 1981 and 1996). Both online and offline communication channels were used to share the questionnaire. A sample of 1100 interviewees participated in the survey.

The results show that the car is the primary means of transport chosen by 83.4% of Italians. To reduce their environmental impact, 72.0% of those interviewed declared themselves willing to replace their means of transport with a more sustainable one but not to give up using the car (77.4%). The most hindering factor for changing the vehicle is economic investment.

The sample has a heterogeneous level of information regarding new fuel types, with females being less informed (44.54%) than males (64.47%) for both generations. Price remains the primary barrier to electric car adoption, with concerns over charging station availability, battery life, and long-distance travel. Further technical aspects like poor product reliability, after-sales guarantees, and battery quality are of little significance in justifying the lack of development of electric cars in Italy.

KEYWORDS: Green Mobility, Electric Cars, Consumer Perception, Automotive Sector, Sustainable Consumption.

Communication ID: R143
Presented by: Inês Azevedo

Making the Electropolishing Process More Sustainable - Case study

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ABSTRACT

With society increasingly prioritizing sustainability, companies are gradually working to improve the sustainability of their products and processes. In this context, the project under discussion was developed considering the three pillars of sustainability - environmental, social, and economic. These pillars are crucial for achieving harmony between human development and environmental conservation.

This article is the result of a research project carried out in a company specialising in the production of industrial valves. During this research project, in parallel with the certification process, the entire electropolishing process was analysed with the aim of identifying solutions to improve and make the process more sustainable. This article describes the actions taken, how they were implemented, and the results obtained.

The research methodology used in the project was action research, which combines academic research with practical action and focuses on three key points: planning, action, and analysis. In the planning phase, the way the electropolishing process was being conducted was studied with the aim of identifying areas for improvement and an action plan was devised. During the action phase, tests were conducted, their results analyzed, and changes were implemented in the process based on the developed tests and other process observations. Consequently, in the analysis phase the results and impact of the implemented changes were observed, and possible adjustments or improvements were identified.

KEYWORDS: Sustainability, Industrial Valves, Improvement, Electropolishing.

Conference Session F

Moderator by Dr Suzana Lampreia & Dr Laura Dell'Agostino

Communication ID: R112
Presented by: Ikrame Selkani

Implementing managerial innovation in protected areas: Comparison between Gorongosa National Park in Mozambique and Medvednica Park in Croatia.

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ABSTRACT

The Management is a tool to assist in the planning of protected areas. They relate to the objective of land management. It's about referring to the objective of the protected area to know its management category. Management has only been the function of a single individual of economic, social, and political authority who has categorically declined to share it with others.

The managerial innovation is perceived as an evolution of the management techniques that constitutes in itself a real importance towards the companies that would finish with the old modes and begin with the innovation techniques respecting the well-being of the employees and reaching a better performance.

Managerial innovation is viewed as advancement in management practices and greatly interests businesses who want to abandon the traditional ways of doing things and start using alternative methods that value the well-being of their workers while still improving their efficiency.

The contribution of my investigation is: matching between the managerial innovations with the protected areas. To deepen the research, an e-mail semi-structured interview with the National Park Manager was undertaken in order to learn more about the protected area and the management in place, as well as the use of managerial innovation inside the park. The study will compare Mozambique and Croatia through Gorongosa National Park and Medvednica Park.

KEYWORDS: Management, Direction; Innovation, Managerial Innovation, Protected Areas.

Communication ID: R115
Presented by: Jorge Miguel-Oliveira

ISO 9001 Certification: A picture of Temporary Accommodation Centres in Portugal

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ABSTRACT

The implementation of a Quality Management System (QMS) is fundamental to promoting more efficient management oriented to continuous improvement in any organisation, including social organisations that frequently deal with limited resources. Although it is a challenge to implement a QMS in these organisations, the benefits achieved in terms of the optimisation of processes and resources are significant. Obtaining ISO 9001 certification can extend these benefits, influencing positively the image of the organisation, its internal structure, and other aspects.

The aim of this paper is to present a study that focused on Temporary Accommodation Centres (CAT) in Portugal, which are social organisation, investigating their motives for obtaining ISO 9001 certification, as well as the difficulties they encountered, and the benefits perceived during the process.

A qualitative, descriptive and exploratory methodology was adopted, using interviews as the main data collection tool. We interviewed those responsible for the Quality Management Systems of Portuguese CATs that are ISO 9001 certified until December 2021. This study is a very valuable contribution, in a area where there is a lack of research, to understanding the current state of quality management in CATs, providing important insights for the area.

The results show that the motivations for CAT certification are to improve the institutional image, reinforce its reputation and offer a better level of service. As for the difficulties faced in implementing the requirements and certifying the system, they described the complexity of the standard, the excessive documentation, and the increased administrative workload. As for the benefits perceived by the interviewees, they are essentially related to improving internal communication, reinforcing the institution's image and reputation, and improving relations with stakeholders.

KEYWORDS: ISO 9001, Temporary Accommodation Centers, social organisation, critical factors.

Communication ID: R200
Presented by: Raúl D.S.G. Campilho

Validation, commissioning, and optimization of beverage filling lines

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ABSTRACT

The beverage industry is a major pilar in the global economy, remaining practically unaffected by the constraints imposed by the pandemic or the increase in the prices of raw materials and fuels. This sector is also responsible for one of the highest consumptions of water and electricity in the entire industry. Ensuring the quality of the finished product that reaches the hands of the consumer is a critical factor to control. Therefore, all processes and equipment must be validated and controlled to meet increasingly stringent restrictions imposed by legislation and satisfy a market with growing demands. The acquisition by the studied company in this work of a new can filling line entails the validation of the equipment and the entire operation of the line. This work aims at possible optimizations and improvements of the current processes, not only in the can filling line but also in the bottle and keg lines. To achieve this, the integration of various branches of engineering is required, including mechanical, automation and chemical engineering, as well as the fields of microbiology and chromatography. The equipment validation procedures were stipulated by the Quality Department of the company and carried out in articulation with the suppliers and technical experts of the brands. After the validation phase was completed, a detailed study of the line operation was conducted to identify areas for productivity and quality improvement, as well as cost reduction. The project was successfully completed and implemented by the partner company. As a result of the implementation, productivity was increased and waste from can inspection was reduced significantly, while also reducing thermal energy cost and clean-in-place procedure effluents.

KEYWORDS: Beverage industry, filling line, process optimization, productivity, waste reduction.

Communication ID: R116
Presented by: Jorge Miguel-Oliveira

Exploring Barriers and Critical Success Factors in Implementing the EFQM 2020 Model: A Survey-Based Analysis

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ABSTRACT

This article presents a study that was developed to investigate the complexities of implementing the EFQM 2020 model, aiming to identify and understand the barriers and critical success factors associated with its adoption. Fuelled by gaps in existing literature regarding the novel EFQM 2020 model and its implementation challenges, this study combines a comprehensive literature review with a survey sent to 258 European organizations that have implemented the EFQM 2020 model.

The literature review provides insights into common barriers and critical success factors in EFQM model implementation, irrespective of its version. Subsequently, a questionnaire survey was conducted to organizations that had embraced the EFQM 2020 model. Out of the contacted 258 organizations, 55 completed questionnaires were collected.

The findings underscore the persistence of identified barriers and critical success factors across EFQM model implementations. Notably, the barrier labelled "Motivation and involvement of managers" emerged prominently, obtaining the highest average rating in both public and private sectors (4.1). On the other hand, the critical success factor with the highest mean (4.5) was "Top management commitment," identified as pivotal for success in both sectors.

These results provide valuable insights for organizations navigating the implementation of the EFQM 2020 model, shedding light on specific challenges and critical success factors. The emphasis on managerial motivation and involvement, along with top management commitment, suggests that organizational leadership plays a central role in the successful implementation of the EFQM 2020 model.

KEYWORDS: EFQM model, barriers, success factors.

Communication ID: R117
Presented by: Rogério Duarte

Energy Management in logistic warehouses: Auditing results and lessons learned

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ABSTRACT

Responsible, globally, for sales of the order of 10 billion US dollars, the logistics operation sector had a significant boost with the growth of electronic commerce and will continue to grow and diversify in the future. The complexity of inventory management, product separation tasks, and the specificity of food or pharmaceutical product storage justifies, on the one hand, the specialization of logistics storage companies and, on the other hand, the significant growth of this branch of activity that has more than 150,000 warehouses worldwide. This high number of operators is a sign of fierce competition, with reduced profit margins, success being measured by business volume and process efficiency. The scientific literature on production optimization in logistics warehouses is vast; significantly less vast are the studies on energy efficiency in these warehouses. This article addresses, precisely, this topic. Aiming at the integration of energy management (ISO50001) into a quality management system of a logistics company, it describes the energy diagnosis carried out, analyzes the monitoring results, identifies significant users, specifies relevant energy indicators and reference consumptions, laying the foundations for a more efficient management of energy consumption, with financial benefits and contributing to the preservation of the environment.

KEYWORDS: Energy management, Logistics, Warehouse Monitoring, ISO 50001.

Communication ID: R131
Presented by: Jorge Miguel-Oliveira

Startups' Quality Management: A Path Untraveled

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ABSTRACT

Quality management through its different approaches and tools is a well-established reality in the routine of various organizations, regardless of the sector they operate in, with the aim of increasing efficacy and efficiency.

The 21st century is marked by the emergence of a new organizational model: the startup, newly created companies characterized by technological innovation, predominantly supported by information and communication technologies, and dealing with a high degree of uncertainty.

There are few scientific studies that address the relationship of this type of organizations with the different approaches or use of quality tools. In this context, researchers, aiming to study the relationship of startups with quality management and its impacts, developed and applied a questionnaire to Portuguese startups from different sectors, based on the national network of incubators. The results of 97 completed questionnaires were collated and processed.

The results show that a significant part of the surveyed startups do not adopt any quality management practice, with the main reasons being the focus on business growth, lack of time, and the scarce benefits. On the other hand, the startups that invest in quality management preferentially use tools rather than any structured approach supported by standards or models.

KEYWORDS: Startup, quality management, quality tools.

Communication ID: R132
Presented by: Guido Capanna Piscè

Decoding the Visual Language: Semiotic Analysis of Wine Labels Across Italian Generations

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ABSTRACT

The practical application of semiotic studies in crafting food and wine packaging is a topic that has yet to be studied in depth by current literature, even if many authors have confirmed its relevance and possible applications for product marketing. Considering wine marketing, in a purchasing context where consumers lean towards supermarkets and e-commerce platforms rather than dedicated shops or direct purchases from the producers, many authors determined how the visual elements of wine bottles play a crucial role in influencing consumers, as they cannot directly taste the product or receive any guidance from specialised staff. Wine bottle front labels specifically have been described by many authors as the "first point of contact" between the consumer and the product. This paper is a continuation of a previous study on the topic, "The value of semantics in food and wine labelling: research on Italian wine consumers" and aims to advance the discourse concerning the application of semiotics in food and wine labelling by filling a gap in the current literature concerning how different generations of Italian consumers perceived the same visual aspects that compose wine labels. Specifically, four digital wine bottle front labels created precisely for the study were employed together with 5-point Likert scale questions to understand the values consumers associate with wine bottle labels.

Overall, 546 respondents from four different age groups participated in the study, and the results showed that despite minor variations, all the age groups shared a common perception and interpretation of the visual aspects presented.

KEYWORDS: Wine labels, Semiotics, Italian Consumers, Labeling, Marketing.

Communication ID: R109
Presented by: Ikrame Selkani

The impact of a festival on improving the city image through city marketing: Case of Fez Festival of World Sacred Music – Morocco

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ABSTRACT

City marketing is a new concept, but its use has long been effective under a different terminology. Today, local decision-makers have become aware of its effectiveness on a global scale. The aim is to enhance the attractiveness of the territory.

Festivals are potential tourist opportunities, as are museums, galleries, concerts and other cultural products to the aim of building heritage. The importance attributed to festivals and festivals is favored by a context of decentralization and by the policy of promoting "a new alliance between economy and culture" (Lefebvre, 2002).

The Fez Festival of World Sacred Music is part of the strategy for the development of the city of Fez Morocco by relying on the heritage and the spiritual dimension of its medina. Its radiation is explained as much by its own characteristics as by the environment in which it takes place. A questionnaire has been used to collect empirical data for this research. It has been used with 500 people and consists of a series of questions that try to assess the image of the city and the attractiveness of the festival according to the Likert scale from 1 to 7.

The aim of this study was to analyze more closely the city image and the influence that the festival can play on the variable of the image of the city responding to the essential hypotheses of all this work which are summarized in two:

Hypothesis 1: the attractiveness of the festival influences the image of the city. Hypothesis 2: the attractiveness of the festival does not influence the image of the city. Secondly, a qualitative research was carried out in order to analyze the impact of this festival, on the city image and its repercussions on society: economically, socially, and culturally.

To sum up, festivals have become important events in many cities in Europe and the rest of the world. The reasons for this proliferation may lie in a number of interrelated factors, such as new approaches to urban management, the use of cultural policies aimed at positively restructuring wealth creation, structural changes in economic production and the progressive naturalization or symbolization of the traditional economic sector (Quinn, 2005; Scott, 2000).

Presently, culture and tourism are two variables that have a very strong positive correlation and develop different and diversified objectives. In this case through the Fes Festival.

Essentially, the Fez Festival of World Sacred Music as a cultural product: contributes directly to economic development, neighborhood improvement, and the creation of new social relations; and gives a very positive image of the city, since it conveys a success and a favorable image at different levels (inside and outside this territory) that will have a great impact in the future.

KEYWORDS: Transport Network, Sustainable Decision-Making, Transport Modalities, Containers.

Communication ID: R142
Presented by: Laura Dell'Agostino

Towards Double Materiality: an Analysis of the Pharmaceutical Industry

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ABSTRACT

Materiality analysis is a crucial component of corporate sustainability reporting. At the EU level, the recently approved Corporate Sustainability Reporting Directive (CSRD) requires large companies to disclose information on their impacts on a range of Environmental, Social and Governance (ESG) issues, undertaking a materiality assessment and, starting from 2025, to adopt the principle of double materiality, which considers both the impacts of the firm on society and the environment, and the impacts of society and the environment on the firm. In this assessment, the sector a firm belongs to plays a role due to industry-specific challenges and the regulatory landscape, which affect the identification of the ESG issues.

This paper explores how companies in the pharmaceutical sector are applying materiality assessments focusing on the type of materiality analysis conducted, the steps run in the analysis, the ESG topics identified, the main stakeholders involved, and the assessment of risks associated with these topics.

Specifically, we analyze a sample of the largest pharmaceutical companies based in Italy, and benchmark them against the largest pharmaceutical companies headquartered in other EU countries, Switzerland and the US, as similar contexts in terms of sustainability disclosure and stakeholder sensitivity to ESG issues and climate risks. Our analysis is based on a qualitative content analysis of the most recent corporate sustainability documents.

We observe significant heterogeneity in how pharmaceutical companies disclose their materiality analysis. Only a small subset of companies has conducted materiality analysis from a double materiality perspective. This suggests that full adoption of the CSRD will necessitate changes in how companies approach materiality, requiring the development of related knowledge and competences. Few companies detail their processes for identifying and prioritizing material issues, while others present more concise analyses. Commonly mentioned ESG issues include *Climate change, GHG and energy, Equitable access and pricing of medicines and treatments and advancing public health, Safe and quality treatment for patients, Working conditions* and *Product innovation and research*. We also find that the stakeholders involved are typically limited to internal and industry-specific categories. Additionally, there is a significant gap in the disclosure of methodologies used for impact quantification and risk assessment. Larger international companies tend to integrate sustainability risk and climate risk quantification in their risk assessments, while Italian companies lag behind, indicating that they may encounter major challenges in applying double materiality assessments in the coming years.

KEYWORDS: Transport Network, Sustainable Decision-Making, Transport Modalities, Containers.

Communication ID: R137
Presented by: Rute Gomes

Proposing a PSS model for local furniture makers and creative networks

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ABSTRACT

In the last decades, the number of small furniture makers businesses have been decreasing from Portuguese local economies. This happens due their difficulty on competing with big chains of globalized furniture suppliers, that offer more appealing prices and constant updating with market tendencies. Having local services and producers, contributes towards more sustain-able consumption habits from consumers, by preferring long lasting and customized furniture for their households, that can be maintained and upgraded throughout time. Having in mind the principles of design for sustainability, the following question arises: Which design strategies could be adopted to increase the competitiveness, economic and social value of small furniture businesses in local contexts? To answer this question, a literature review on design for sustainability has been carried out, crossed with case studies on product service systems. The results lead to identify that the adoption of a product service system, focused on production, maintenance and updating furniture, along with networking with creative design communities, will contribute towards a more sustainable service, as well as a more conscious consumption near local consumers, contributing for the increment of sustainable, social, and economical value of these small economies.

KEYWORDS: Design for Sustainability, Product Service Systems, Furniture Design, Small economies

About the book:
This volume contains the Abstracts of papers accepted for presentation in the ICQIS2024 – 5th International Conference on Quality Innovation and Sustainability, held in Lisbon – Portugal, from 16 to 19 June 2024, organized by a group of Professors from the Engineering School of Lisbon - Polytechnic University of Lisbon.

ICQIS2024 has a prestigious advisory council constituted of eighteen members from Portugal, Brazil, the United States of America, England, Ireland, Wales and and the Netherlands. The scientific committee that supports all the review processes has twenty-three countries represented (Albania, Austria, Brazil, Bangladesh, Chile, Colombia, Czech Republic, England, Irland, Italy, Lithuania, Netherland, Norway, Poland, Portugal, Romania, Serbia, Slovakia, Spain, Turkey, Ukraine, United States of America, Wales).

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The conference themes, Sustainability, Innovation, and Quality focus on novel and advanced on Theory and Applications in Engineering, Social Sciences, Architecture, and Design, including Processes, Materials, Procedures, Normalization, Energy, Construction, Aeronautic, Naval, Food, and Management, among other topics.

The Chair
Teresa Morgado

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