Introduction

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Biographical notes: Josip Stjepandić is the Head of business unit 3D Product Creation at the PROSTEP AG, the leading product data integration company worldwide. He is in charge for consultancy and solution development in the areas design methodology, supplier integration, systems engineering, knowledge-based engineering, product data validation and visualisation, configuration management and CAD data exchange for many industries (automotive, aerospace, shipbuilding, and machinery). In the past, he gathered strong research experience in these areas including his current research on systems engineering, modular design, and digital factory. He is the author of various scientific articles and publications in the field of virtual product creation and a board member of the International Society for Productivity Enhancement Inc. (ISPE).

Although the term sustainability sounds like an invention of the past two decades, it has been first used by Hans Carl von Carlowitz in his book *Sylvicultura Oeconomica. Die Naturmäßige Anweisung zur Wilden Baum-Zucht*, published 1713 in Germany. The term sustainability has gained a more particular attention since the 1992 Rio Earth Summit with the motto sustainable development. The core idea consists of preserving natural resources for maintaining the quality of life of future generations (Stjepandić et al., 2015).

Investigation into the subject of sustainable transport broaches the question of mobility. Mobility is an end in itself, and transport is the means by which it is satisfied. The current hunger for mobility is a vital part of the human essence, similar to food, clothing, the exchange of ideas or goods, consumption and evacuation, etc. For all these activities, humanity is confronted with the crucial challenge of combining a harmonious development that provides good levels of well-being, with protecting the limited and fragile resources present in our environment (Favre, 2014).

Sustainable vehicle design process, therefore, should include further criteria such as technical performance, design, vehicle production, cost, quality and so on. In order to achieve greater benefits in terms of minimised environmental load and cost, sustainable design principles are to be integrated into the development process (Jonker and Harmsen, 2012).

There are many factors that will affect future developments in transport and energy use, including the availability and cost of fuel; regulatory standards governing fuel economy, exhaust emissions, and the use of renewable fuels; technological advances; globalisation and urbanisation (especially changes in the way vehicles are used and the organisation of transportation hubs); infrastructure; and economic growth, especially in emerging and developing markets (Gudmundsson et al., 2016).

Recent development shows that the incorporation of information and communication technologies within vehicles and transportation infrastructure will revolutionise the way we travel today. The enabling technologies are intended to realise the frameworks that will spur an array of applications and use cases in the domain of road safety, traffic efficiency and driver's assistance. However, dependable, reliable and real-time communication between vehicles and transport infrastructure are still critical challenges and need to be tackled for the success of these applications (Alam et al., 2016).

With this issue, we address four areas of sustainable mobility from the concurrent engineering research perspective (Stjepandić et al., 2015): the sustainable design and their interfaces, the framework to facilitate the biunivocal relation between a physical individual aircraft and its equivalent digital counterpart, the cloud service-oriented approach for managing and analysing big data required by transport applications, and the system for the management of marine logistics in the case of an emergency or disaster.

This special edition includes invited papers selected from contributions to the 22nd ISPE Inc. International Conference on Concurrent Engineering held in Delft, The Netherlands, on 20–23 July 2015 (Curran et al., 2015).

Vitor de Souza and Milton Borsato have contributed a review on sustainable design and their interfaces. The authors highlight the importance of sustainable principles in the product development process. To be considered truly sustainable, a product must be designed respecting three dimensions: economic, environmental and societal, in a systemic approach. From this perspective, this paper aims to overview sustainable product design and interfaces with its supporting processes, taking advantage of the knowledge development process – constructivism, a bibliometrics tool. Research domains and keywords were defined in the preliminary steps to narrow the search. Scientific databases were selected and researched using Boolean logic. The resulting article list was finally evaluated and filtered accordingly. Findings present bibliometric evaluation with the evolution of number of published papers and a list of articles per journal; a list of authors and, finally, a brief overview of the most relevant papers organised in eight proposed categories (seven support processes and the ecodesign) containing their results and trends for future research.

Findings for authors and articles quantity have showed a broad pattern. One could argue that these results did not reach the primary purpose, as it presents results in so many different fields of research. On the other hand, if the objective is to study sustainability in a systematic approach, to identify different interpretations of sustainable development according to the differences among environments in which sustainability is measured, diagnosed and implemented, is valuable information, especially if one's attempt to formulate research inquiries that will result in holistic researches.

The choice of the eight categories representing the interfaces of sustainable product design with their supporting processes is presented in this article as a proposition, based on findings of the literature review. A deeper exploration and analysis of the literature would probably bring forward more (or different) interfaces and present a more detailed framework of sustainable product development and its interfaces.

Ríos et al. introduce, with a specific focus on the aerospace sector, a starting point in the definition of a framework to facilitate the biunivocal relation between a physical individual aircraft, identified by means of a 'manufacturing serial number' (MSN), and its equivalent digital counterpart. Their paper reviews the different topics involved in the creation of an aircraft digital counterpart, i.e., complexity, identification, lifecycle, information and configuration, and the main software applications involved. Then, it

shows the implications on the digital counterpart creation from the view of the aircraft industrial design.

Considering the first tests executed, the main conclusion is that digital aircraft at product item level, with individual structures for each item, is a feasible approach, where the 'parent product avatar' concept can be combined with the current iDMU baseline configuration to produce the parent iDMU concept. Although based on tests comprising basic prototype aircraft components, the obtained results shows that the proposed framework, based on MSN, would not increase the complexity of the current effectivity-based approach.

The parent iDMU approach would facilitate the enhancement of the current 'as built' aircraft digital counterpart. The feedback of the real configuration of each physical aircraft could be incorporated into the corresponding digital counterpart, enabling the biunivocal relation between both items. Further tests and execution of case studies are needed to fully identify the implications of the alternatives dealing with when the MSN digital counterpart shall be initiated. There is a need to analyse the impact on the change management procedures and to define ways to facilitate the application of the corresponding changes to each digital aircraft. Aiming to make the current change management process simpler, case studies should also involve suppliers to evaluate their collaborative roles, security context and access to software infrastructure.

Kemp et al. have developed a cloud service-oriented approach for managing and analysing big data required by transport applications. Big data analytics brings new insights and useful correlations of large data collections providing undiscovered knowledge. Applying it to transport systems brings better understanding to the transport networks revealing unexpected choking points in cities. This facility is still largely inaccessible to small companies due to their limited access to computational resources. A cloud-oriented architecture opens new perspectives for providing efficient and personalised big data management and analytics services to (small) companies.

Cloud computing and big data have grown to become major contributors for intelligent transport system. Big data and cloud are a good combination since big data need a substantial computer power and cloud computing provides cheap and fast instantiation of computer power through the use of virtualised on-demand resources. What is more, cloud computing encourages the use of service-oriented computing providing further agility to application development. In this spirit, the authors propose a service-oriented architecture for a big data management, hosting several individual services for each step of big data analytics. These services can then be composed to produce a decision support service.

The contribution of this work is demonstrating the effect of the various strategies involved in sharding. Based on the authors' observations, the ranged strategy is the least interesting since potentially having impractical query times. On the other hand, authors believe this could be greatly improved provided better data distribution. The choice of a sharding key that is globally efficient is an uphill task as sharded collections provide the fastest query times but also the longest due to the difficulty in distributing the data evenly and providing an efficient index. This relies on very deep understanding of the data collected. Also, as the collection grows the databases will have to call onto extra shards to store the data. At that point, the sharding strategy used will fall apart as it was configured for a smaller number of shards.

Wang and Tanaka propose a system for the management of marine logistics in the case of an emergency or disaster with focus to a planning model for marine logistics in case of disaster or emergency situation. This is important to improve measures of recovery from disasters. In past disasters, most of the goods were transported by land logistics. On the other hand, marine logistics have some advantages in emergency transportation: It is believed that marine logistics suffer less damage than land logistics when a disaster occurs. If it occurs close to the coast line, we can provide goods for evacuees more efficiently and effectively by using marine logistics.

In this model, authors optimise marine logistics by assigning ships to transportation routes. This system includes a reassigning algorithm, which decreases the number of required ships for transporting goods. Compared with previous approaches, this model determines quantitative results using optimisation. By using this model, we can calculate required resources for supply and demand of goods for evacuees. Then this model has been applied to estimate the required resources for marine logistics in the case of the Tonankai earthquake. Two scenarios of damage caused by this earthquake have been designed, and applied this model to each scenario. This model suggests that for the case of the Tonankai earthquake, 24 ships and 392,000 tons of goods should be prepared. These figures only consider the transportation between origin port and destination port, not the transportation between destination port and evacuees.

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