

5<sup>th</sup> World Congress on  
**DENTISTRY AND MAXILLOFACIAL SURGERY**  
September 18-19, 2023 | Rome, Italy

Received Date: 05-09-2023 | Accepted Date: 05-10-2023 | Published Date: 10-20-2023



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**To what extent does modern Dental engineering fit into the integrated model of the industry sustainable development, which takes into account the expectations of consumers**

**Statement of the Problem:** The classic model of H. Kagermann of the current stage of Industry 4.0 contains only nine IT technologies referred to as cyber-physical systems, which the originator recognized as IT only after ten years. This model ignores the need for progress in the field of materials, without which it is impossible to produce any product, as well as machines and production technologies limited only to additive manufacturing, without considering the necessary development of all other technologies. The diagram above shows the proprietary Industry Integrated Idea 3xI 4.0 model/5/0, showing two approaches of producers and consumers focused on products. They are illustrated by parallel planes: technological with four determinants, materials and multi-cyber- physical factors, and consumer with ecology and economy, recognized as coincident horizontal factors. The model captures the three most important challenges regarding the sustainable development of engineering materials and the ongoing revolution in digitization, and ecological challenges related to the need to minimize the environmental footprint out of concern for the well-being of present and future generations. Over the last few decades, there has been a systematic development of modern dentistry, described by the proprietary model of Sustainable Development of Dentistry (DSD) > 2020, consisting of Global Dental Prophylaxis (GDP), Advanced Interventional Dentistry 4.0 (AID 4.0) and the Dental Safety System (DSS). The Dentistry 4.0 model is about dental engineering fully corresponding to the 3xI 4.0/5.0 model of industrial development, and the modern prosthetic production center's standards fully correspond to the smart factory. This concept is characterized by advances in cloud computing, 3D imaging using CBCT, computer-aided design and manufacturing CAD/CAM, data manipulation, personalized incremental technologies so-called 3D printing. This requires complete understanding on the part of dentists and close cooperation with highly specialized dental engineers with fluent knowledge of technology, material engineering, and applied IT. Due to poor substantive education, stereotypes, simplifications, and erroneous and anachronistic solutions in this area are often disseminated to the detriment of patients, which is often reflected in specialist and scientific literature.

**Conclusions:** A highly developed level of engineering support for dentistry requires systematic education of dentists in the field of advanced issues of dental engineering and revision of medical study programs in this area.

**Recent Publications**

1. Dobrzanski, L.A.; Dobrzanski, L.B. (2020) Dentistry 4.0 concept in the design and manufacturing of prosthetic dental restorations. Processes, 8: 525.
2. Dobrzanski, L.A. (Ed.) (2020) The Concept of Sustainable Development of Modern Dentistry. Processes, 8(12): 1605;
3. Dobrzanski, L.A. (Ed.) (2018) Biomaterials in Regenerative Medicine; IntechOpen: Rijeka, Croatia.

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### Biography

Leszek A Dobrzanski has been a full professor and Director of the ASKLEPIOS science center for five years at the design, research, and production center of medical and Dental engineering ASKLEPIOS Ltd. in Gliwice, Poland. At the same time, he is a professor at the department of Biomedical engineering of the Koszalin university of technology in Kozalin, Poland. He worked in the years 1971-2017 at the Selesian university of technology in Gliwice as a full professor, vice-rector and dean of the faculty. He is the president of the World academy of materials and manufacturing engineering WAMME, Vice president of the engineering academy in Poland and a foreign member of the engineering academy of Ukraine and Slovakia, editor-in-chief of the journal of achievements in materials and manufacturing engineering JAMME, and archives of materials science and engineering AMSE. He is a member of Editorial Boards, incl. at Taylor & Francis, MDPI, ASTM International, and others. The title of professor was awarded to him by the President of the Republic of Poland in 1995, and abroad in 2017 the title of honorary professor of the Lviv state university of technology in Ukraine, and three honorary doctoral degrees in 1997 from the University of Ruse (Bulgaria), in 2007 from the State University in Khmelnytsky (Ukraine) and in 2016 at the university of Miskolc (Hungary). His works are cited at least 16,000 in

world journals according to Web of Science, Scopus, and Google Scholar, and a number of Citations: 5,189 (SC), 3,040 (WB), 16,000 (GS), h index: 52 (GS), 33 (SC), 26 (WS). He is the author of approx. 3,000 scientific publications and books which includes, 60 books and monographs, 250 articles in the journals referred in Web of Science core collections, over 100 lectures at international conferences worldwide. His research interests include materials, biomedical and dental engineering, surface engineering, organization and management, manufacturing engineering, nanotechnology and additive manufacturing, and technological foresight

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