

# The philosophy of contemporary industrial design in the light of the fourth industrial revolution

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## **Abstract:**

The design is linked to both social and technological forces, which in turn influence the form, nature and implementation of the design and by the fourth industrial revolution a prelude to the philosophy of contemporary industrial design based on contemporary technologies such as 3D printers and the revolution of ultra-fast communications in its various forms such as the Internet of Things and others, contributed to the transition from quantitative production to individual production (more personalized manufacturing). This requires a different way of designing and updating the product where advances in design theory and computer technology provide greater opportunities for new products and systems for rapid success without added cost, and provides the opportunity to pay attention to the development of the model as one of the satisfactory solutions for product development and ensuring its competitiveness and speed, and the use of new computer-supported design tools to deal with a full range of planning and design requirements. Fundamental changes must be made to understand how to take full advantage of new technologies as much of the success of the global economy in the third millennium will depend on the ability to find a way to share developments in design technology and market knowledge.

In order to contribute to the consolidation of this concept, a study should be presented on the impact of high-speed market requirements on the process of product modernization and utilization of the use of manufacturing technology in line with contemporary requirements taking into account the contribution of design education in building the knowledge of the learner's knowledge of the requirements of the development and transformation of production from quantum to the production of fast and flexible batches covering the demand for it in limited quantities by issuing a new model of the product, in view of reducing the cost in order to meet the urgent need of markets for renewal in record time. The study plan on the use of research and the in-kind approach provided a proposal for how industrial design contributes in the light of the data of the fourth industrial revolution through how to guide and use contemporary possibilities to design the fastest and cheapest model of products and services in keeping with the current nature of the market.

## **Key Words:**

4<sup>th</sup> industry revolution, 4.0 Industry, smart Factories, Smart Design, Smart products; Smart Production, Mass customization, Individual Production, Restyling, 2020 Design Trends, AI, IOT, Robots, Blockchain, cloud computing, 3D printing, Industry 4.0; New product development, Cyber-physical systems.

**Summery:**

Meeting individual customer requirements and on-demand production will soon become the most important factor in determining the competitiveness of the organization. Companies striving to achieve the smart factory concept will become leaders in this field, with a focus on automated collection, data processing about processes and production machines and the use of modern information technologies, such as cyber physical systems or the "big data" interface (processing huge amounts of "big data"), as the basis for the concept of what is known as industry 4.0. "Fourth Generation Industry", where recent technological developments have led to the industrial transformation to develop and deliver smarter products with new models with the ability to produce rapid lye, which means profound changes in the processes of product development that have seen many advances in recent years in terms of theory, methods and approaches under the fourth industrial revolution, which includes technological developments consisting of combining optimal industrial manufacturing systems, digital technologies and advanced physical Internet systems (CPS).

The research presents knowledge about the smart product development approach (SPD) and the introduction of a new model of the product in the light of the emergence of advanced digital tools for the development of products and prototypes that allow the introduction of individual and urgent products, including advanced computing platforms, such as virtual reality. These technologies allow for the combination of digital and physical models and rewrite the rules of product development processes, creating opportunities and challenges for the development of smart products (SPD). The research also presents a general concept of intelligent design (Individual Design “ Restyling”) and production assistance as key elements for efficient operation of the smart plant through various technologies that help the design of individual products" and organize their production in the context of achieving a comprehensive customization strategy (MC), which allows for shortening the development time of a new product.

**Application: Individual Design Making by industrial design students.**

The design of a new model proposed to take advantage of the requirements of the fourth industry. In parallel with the changes of the high-speed market, and under the requirements of the fourth industry, the idea of introducing a new model was chosen as a proposal for the fast design that can be produced with 3D printing techniques and cutting machines and laser engraving by making minor adjustments to the current product productively (smart production) by changing some parameters in production without the need for a huge production beyond the need on the one hand, and on the other hand it appears in the eye of the customer as a new model that likes him to own and use. In an attempt to train students (1st Division 2019/2020- Department of Industrial Design - Faculty of Applied Arts - Beni Suef University - Egypt) on the concept of designing a model for the industrial product to improve it to suit contemporary design trends under the fourth industrial revolution, and explained the concepts associated with the design of the model, as well as the design tools that qualify them to produce their proposals in the product renewal by introducing a new model.

The results were: Some students turned to revive classic products, in line with one of the design trends 2020 as the following:



**Designing proposed models for students in light of modern design trends and the possibilities of the fourth industry.**

Students have created new models for the selected products to appear as a new model by updating the raw material and color or some parts that can be fed to the product, or by adding contact on the outside, or some drilling or printing work to achieve a newer appearance of the market, under simple production adjustments that are easy to print and assemble productively.

### Results:

- 1) The design direction of the model is the most appropriate direction to develop the design to match the requirements of the 4<sup>th</sup> industrial revolution, to provide a new product for the user easy, fast and productively economical.
- 2) Positive interaction from students and higher-than-expected results in the model design training period according to the individualized production is due to their feeling that it is a trend that is in keeping with the novelty of intelligent manufacturing.
- 3) A production efficiency test simulation saves high costs when stopping the production line for the "Zero Lot", which confirms or demonstrates the productivity of the design.
- 4) Employing digital technology tools in product design, production, monitoring and testing in a way that reduces the likelihood of errors and ease of reference feeding.
- 5) The speed and quality of products are the triangle of success for products under the fourth industry.
- 6) The requirements of the fourth industrial revolution in the next few years will support the thought of individual production and on-demand production and the technologies of high-tech production units will evolve from their potential to this goal.
- 7) The idea of partnering companies in different disciplines will support the goal of joint development (such as carbon and Adidas' partnership in the on-demand production project).
- 8) The potential of modern technology can be an inspiration for design, so that the design can be technically and geometrically handled to perform its function better, address the problems that traditional production has been unable to address, and appear to be more user-preferred.

- 9) Research predicts that the Fourth Industrial Revolution will help environmental resources, product sustainability, and the development of the production process.
- 10) 4<sup>th</sup> Industry helps meet the needs of market size without surplus and provide different ways of luxury that increase the competitiveness of industrial enterprises for development and creativity.
- 11) 4<sup>th</sup> Industry meets future needs by developing and adopting new technologies for the product.

### Recommendations:

- 1) TVET institutions need to adjust the way their education and training are carried out on the basis of science and technology, particularly in closing the efficiency gap with the requirements of the Fourth Industrial Revolution.
- 2) According to the World Economic Forum, only 0.5% of today's workers are employed in these smart sectors, so it is a fruitful trend to prepare the student for the future labor market by including curricula that suit the elements of the fourth industry and their impact on the field of design in particular.
- 3) Holding seminars and conferences on the requirements of the 4<sup>th</sup> industrial revolution and how to benefit from it.
- 4) To provide an educational system aimed at establishing the concept of rapid individual design in response to the limited market needs of the same product to enable young people to enter the labor market in keeping with technical and informatics developments.
- 5) The inclusion of a Re-styling Design curriculum (Individual Design) in the design curriculum as a contemporary design trend, but not limited to radical developments, or over-the-top changes that cause high production costs.
- 6) Providing an opportunity for investments with the ability to work in the information sector and with experience, entrepreneurship and advanced management, which is a great opportunity for the new generation of investors and benefits from the Internet and the use of information technology.
- 7) Establish high-quality research and development systems to enhance the research capabilities of individuals.

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