



## THE ROLE OF DISRUPTIVE TECHNOLOGIES OF THE FOURTH INDUSTRIAL REVOLUTION ON COMPETITIVE ADVANTAGE

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## Abstract

As a transforming manufacturing arena, Industry 4.0 blends innovative technologies with digital surprises. In connecting to the paradigm of Industry 4.0, in current years, organizations intend to achieve competitive advantage in their business activities. Moreover, organizations face challenges to meet ever-changing customer demands and maintain sustainable practices in the production system. Therefore, organizations intend to implement Industry 4.0 to construct an innovative and sustainable business atmosphere. In link to the model of Industry 4.0, the government of Malaysia is taking different initiatives to adopt the latest technologies in the industrial sector. Additionally, Malaysia has acknowledged the importance of future manufacturing systems to provide competitiveness and sustainability. Yet, it lacks an understanding of how organizations execute the disruptive technology of Industry 4.0, and the impact of the technology on the manufacturing chain is uncertain. In the background of Malaysian industries, the study highlights the effect of these smart technologies on the competitive advantage that can help to broaden the concept of the paradigm. This study will employ a cross-sectional survey of Malaysian SMEs and set a target to collect samples using simple random sampling from the different states of Malaysia. The study also planned to use a questionnaire-based survey, and for data analysis, Structural Equation Modeling (SEM) will be used.

## Research Highlights

Industry 4.0 integrates modern and divergent technology to industrial manufacturing processes that enable product value addition (Dalenogare *et al.*, 2018; Wang *et al.*, 2016b). Industry 4.0 promotes human function development in all activities, using intelligent techniques (Stock *et al.*, 2018; Longo *et al.*, 2017). The disruptive technologies involve enormous effects on existing industrial structures with significant organizational processes advancements and allow organizations to gain strategic success through planning, teamwork, and quick decision-making in real-time (Sanders *et al.*, 2016). These innovative technologies will help build a flexible structure where modular lines dynamically change functional frames in various product categories (Wang *et al.*, 2016a; Schuh *et al.*, 2017). Industry 4.0 enhances organizational performance, profitability, and versatility by providing quality and cost-effective products (Dalenogare *et al.*, 2018; de Sousa Jabbour *et al.*, 2018).

The Internet of Things (IoT) is a digital infrastructure where self-directed computers, analytical forecasting, and human-machine association are merged to achieve competitive advantage (Wong & Kim, 2017; Thramboulidis & Christoulakis, 2016). Big data analytics help organizations collect real-time data from various sources, including inclusive data interpretation, immediate decision-making, improve production system, and increase product value and competitive advantage (Bahrin *et al.*, 2016; Li *et al.*, 2017). Cloud technologies enable information exchange between smart factories and improve system performance by



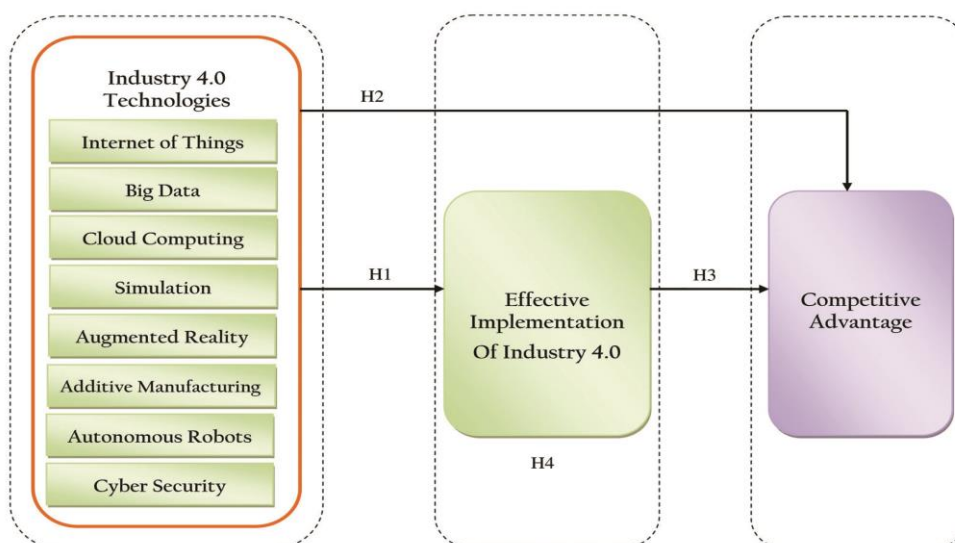
increasing agility and flexibility while reducing production expenses (Liu & Xu, 2017; Tao *et al.*, 2014). Simulation helps organizations track and maximize system configurations for the upcoming product before the simulated world's actual transition, thus reducing system start-up times and cost and enhancing product efficiency (Bahrin *et al.*, 2016). Additive manufacturing enables creating and distributing small groups of modified products, with multidimensional, lightweight, and desirable patterns (Stock & Seilger, 2016) and minimizing delivery distances and supply from the factory (Strange & Zucchella, 2017), leading to achieving competitive advantage. Organizations may utilize Augmented Reality (AR) for their employee training, maintenance operations, quality management, and product design to build competitive advantage (Elia *et al.*, 2016). By employing robots in the production system, organizations can receive a brilliant variety of capabilities from them, and robots can perform most of the smart manufacturing (Fragapane *et al.*, 2020).

## Research Objectives

The study deals with some specific objectives, and they are as follows,

- Inspect the impact of Industry 4.0 technology on its effective implementation.
- Scrutinize the impact of Industry 4.0 technology on competitive advantage.
- Recognize the effect of Industry 4.0 on competitive advantage.
- Reveal the mediating role of Industry 4.0 between the disruptive technologies and competitive advantage.

## Research Framework



**Fig. 1:** Research Framework



## Methodology

This study will use the quantitative method as it takes a reductionist viewpoint, provides a relationship structure, and minimizes respondents' biases. The SMEs of central Malaysia will be contacted for data collection. The managers are the targeted respondents since they are involved in decision-making and access the necessary information required by this research. A set of questionnaires will be sent to the respondents through e-mail as it is a popular tool to collect a higher response rate in a short time. The sample size will be determined using G power, a straightforward tool to conduct a power analysis to ensure the sample size is required to create the outcome with a strong effect. The responses will then be analyzed by Structural Equation Modeling (SEM).

## Findings

The study aims to reveal the connection between disruptive technologies and competitive advantage, where Industry 4.0 is a mediating factor. The study will enable organizations to recognize the function of Industry 4.0 technologies on its effective implementation that will help them take appropriate initiatives for the adoption of disruptive technologies to build competitive advantage.

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#### Author's Biography



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