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SMART LOGISTICS 5.0 TRANSFORMATION STRATEGY APPLIED TO BRIDGING THE ANALYTICS HIERARCHY PROCESS AND DISRUPTION INTELLIGENCE INVENTORY MANAGEMENT TRENDS

Amornsiri DISSORN[1] and Pennapa SUWANBAMRUNG[2]

1 Faculty of Business Administration, Rajamangala University of Technology Phra Nakhon, Thailand; amornsiri.d@rmutp.ac.th

2 Faculty of Science and Technology, Rajamangala University of Technology Phra Nakhon, Thailand; pennapa.s@rmutp.ac.th

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Abstract

As smart transformation strategy to bridge the model of the implementation of logistics 5.0 in small medium-sized enterprises, the analytics hierarchy process and disruption intelligence goals have been highlighted. Therefore, the goal of this research is to bridge the analytics hierarchy process of the logistics 5.0 implementation model to the disruption intelligence goals. The results showed that based on the analytics hierarchy method applied to the analytics hierarchy process of the logistics 5.0 implementation model raised that concerned about 5 group elements of the analytics hierarchy alternatives consisted of about 5 group elements of the analytics hierarchy a alternatives consisted of infrastructure, organization and human resources as well as green logistics, which are divided into three components, green packaging, green warehousing, and green transport. By bridging the disruption intelligence inventory management trends, these results establish logistics 5.0 in terms of smart transformation strategy.

Keywords: Logistics 5.0, Analytics Hierarchy Process Alternatives, Disruption Intelligence, Inventory Management, Smart Transformation Strategy

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Introduction

The fourth industrial revolution's logistics processes are still being challenged by the Analytics Hierarchy Process (AHP Method) and disruption intelligence goals. These innovations, which were cited as being crucial for these are the mainstreams of the implementation of industry 4.0. It emphasized a significant impact on industry 5.0 as well as the logistics 5.0 Internet of Things (IOT) Internet of service (IOS) Cloud Computing, Big Data etc. (Mashayekhy et al., 2022) components when considering the theoretical background as well as the terms. The analytics hierarchy process alternatives (AHP alternatives) and disruption intelligence goals. This causes a rise in smart transformation strategies to bridge the model of the implementation of logistics 5.0 in small and medium-sized enterprises (SMEs) (Liu et al., 2017; Machado, 2016). The logistics 5.0 elements will be used for the AHP alternatives' implementation, as can be seen from the definition above. This will be provided in relation to this case by AHP method (Sgarbossa et al., 2020). The five groups of logistics 5.0 elements follow from AHP alternatives that make up this strategy have potential advantages (Saaty, 1988; Trstenjak et al., 2022). These elements, which deal with the logistics component for using AHP alternatives from logistics 4-0 to 5-0, are also based on the previous work of this research and are displayed in the following section of the literature review. Academic authority, Saaty (1988), Trstenjak et al. (2022) suggested that to bridging the disruption intelligence goals and AHP alternatives that were discovered: 1) return on investment time, 2) initial investment, and 3) implementation and risk complexity. There is related to the output is a ranking of detailed overview of logistics 5.0 by group, which are divided into five groups of green transport, warehousing, and packaging are also related to the transformation of "traditional" logistics elements. For the purposes of achieving the objectives of disruption intelligence, this research seeks to bridge AHP alternatives and disruption intelligence goals that related to disruption intelligence inventory management of the logistics 5.0 implementation model. Relative to the author concluded that 2021 was a turbulent year, marking a transition from the VUCA world of 2020 to the revitalizing of the post-COVID-19 recovery, in order to expand the original concept or perspective of this research. It saw more disruption of best practice inventory management and the broader world of logistics. The 5.0 transformation strategy has played a significant role in business, especially SMEs' survival in these disrupted years, and what constitutes best practice has changed as well. Therefore, the author's goal was to bridge the output data from this model and the priority of logistics 5.0 elements (AHP alternatives) for the best implementation, based on the disruption intelligence goals that SMEs aim to accomplish in the future trends of both best practice inventory management and the larger world of logistics 5.0 transformation strategy (Swanson & Santamaria, 2021; Queiroz et al., 2022).

Literature Review

State-of-the-Art Solution to the Topic of the Implementation of Logistics 5.0 Elements

Based on AHP process of the logistics 5.0 implementation model raised concerns about 5 groups elements. Clearly, details overview of logistics 5.0 by 5 group is shown in Table 1.

Table 1 Detailed overview of logistics 5.0 by group

Green Transport	Green Warehousing	Green Packaging	Infrastructure	Organization and Human Resources
- Reduce paper consumption - Toner and ink recycling - Shutting down computers when not in use - Use of reusable containers and transport equipment - Use of reusable pallets - Reduction of unused space in the vehicle - Reducing downtime - Increasing the usability of space in height within the vehicle - Use of a vehicle with alternative (renewable) fuel sources (energy) - Introduction of alternative energy sources in refrigerated vehicles - Route optimization	- Reduce paper consumption - Toner and ink recycling - Shutting down computers when not in use - Use of more efficient lighting devices - Using light sensors inside the aisle to turn the light on only where someone is - Use of more efficient heating devices - Use of more efficient air conditioning devices - Optimization of transport flows within the warehouse - Introduction of fans for circulation of hot and cold air - Using a door with automatic closing sensors - Increasing the energy efficiency of warehouses - Using materials that are better insulators (warehouse walls and roofs) - Use of renewable energy sources - Introduction of new storage technologies Use of automated transport systems	- Requiring the supplier to take over his packaging in which he delivers the goods - Existence of pallet management (return) system - Using packaging materials that have less weight - Use of biodegradable materials - Use of recycled packaging materials - Use of recyclable packaging materials - Packaging design to facilitate separation and sorting of different types of materials - Packaging optimization (for secondary and tertiary packaging) - Use of environmentally friendly paints on the packaging	- Collection of data into databases in real-time - Data archive - Use of data from the database when defining a new work warrant - Use of predictive analytics methods - Connectivity to external databases - Big Data Manipulation - State-of-the-art computer infrastructure - Flexible and modular hardware solutions - Flexible and modular software solutions - State-of-the-art internet infrastructure available to everyone - Cloud Computing-online data processing - ERP systems - High network and data security - Predictive hardware and software maintenance	- Top connectivity with everyone in the value chain - Special and high-performance communication channels (social networks) - Decentralization within the company - High motivation of each employee - Willingness of workers to change - High innovation of workers - Adoption of the principles of lifelong learning - Adoption of the principle of continuous improvement (lean, kaizen) - Horizontal and vertical integration

Source: Trstenjak et al. (2022); El-Berishy et al. (2013); Opetuk (2016); Zhang & Zhao (2012); Jafari et al. (2022); Winkelhaus & Grosse (2020); Aoun et al. (2021); Bhargava et al. (2022); Figueiras et al. (2021)

Rule of the AHP Process for the Optimal Implementation Based on Three Disruption Intelligence Goals

The best on the previous literature study to applied three disruption intelligence goals of an academic authority, Friedman concept for the optimal implementation of logistics 5.0 of this research objective. By using the Friedman test ranking method (Friedman, 1940: 86-92) to qualify the final input data for the AHP alternatives are 1) weights of return on investment time, 2) weights of initial investment, and 3) weights of implementation and risk complexity. Consequently, these three disruption intelligence goals to establish value of SMEs priority are the ranking of the elements of logistics 5.0.

The Most Important Inventory Management Trends for 2022 to the Post COVID-19 Recovery at Bridging Three Disruption Intelligence Goals

Relative to the results of the ranking of the elements of logistics 5.0 is performed according to the following principles which bridging both disruption intelligence inventory management trends and the wider world of logistics 5.0 transformation strategy for pick of the most important inventory management trends for 2022 to the post COVID-19 recovery (Sharma, n.d.; Roughan, 2021).

1) Implementation of elements with are shorter ROI time have a higher weight and the most important trends of just in time becoming just in case.

2) Implementation of elements in which SMEs are more willing to invest have a higher weight are shown in the digital data processing consisted of 1) cloud technology accelerates, 2) IoT and ROI accelerator, 3) more widespread use of multi-warehousing 4) more widespread 3PL as mindsoft for SMEs, 5) inventory analytics, and 6) inventory forecasting.

3) Implementation of elements with less risk complexity of organization and human resources implementation which means that elements that are easier in terms of implementation and risk management have a higher weight that pick of 1) warehouse automation, 2) connected omni channel services, 3) sustainable supply chain, and 4) more resilient supply chain.

Research Methodology

This study was conducted via future research method by using three rounds based on Delphi techniques was used to establish consensus from 18 purposive experts selection criteria by Urquhart et al. (2010), Zhong et al. (2020), including academic authority were Ivey & Ivey (2008), at least 5 years professional experience in relevance to this research study, policy makers, local elders experts and academic expert. The sample size of the expert selection from Macmillan's table criteria by Thomas Macmillan in the 1971 (See Table 2).

Table 2 The determination of expert's selection based on error rate is acceptable

Numbers of Experts	Error Level	Errors Reduced Unit Constant
1-5	1.02-0.70	0.50
5-9	0.70-0.58	0.12
9-13	0.58-0.54	0.04
13-17	0.50-0.48	0.04
17-21	0.48-0.46	0.02
25-28	0.46-0.44	0.02

Source: Macmillan (1971)

All expert's data were in accordance with Thailand's ethics of data projection regulations the consensus process in corporate a three-round interviews (round 1), rating questionnaires (round 2 and 3) method, including triangulation which took place between data was analyzed by the descriptive statistics were median and Interquartile Range (IR).

Research Results

Looking at logistics 5.0 elements and three disruption intelligence goals based on to bridging the model of the implementation of logistics 5.0 in SMEs. For this result, logistics 5.0 in terms smart transformation strategy of AHP alternatives for the purpose of this research revealed that:

1) Infrastructure presented logistics 4.0 to the logistics 5.0 is mass personalization of service sustainability, the importance of human development, optimizing service quality, and reducing errors in complex environments.

2) Organization applied to SMEs and human resource focused on the transformation of logistics processes and based on new logistics 5.0 minority model.

3) Green logistics will be observed as a system divided into; 3.1) Green packaging, included green structure of physical warehousing with the terms ecological warehousing or elementally friendly warehousing as package of product applied to green logistics. 3.2) Green warehousing, included in other green logistics parts that following green elements, such as a focus on ROI, transformational assets and productive assets etc. 3.3) Green transport is the main source of the human factor in digital logistic systems for route optimization, app base management, included the entire logistics system.

From the previous section more detailing results showed that in Table 3-rank of elements.

Table 3 Logistic 5.0 in terms smart transformation strategy-rank of elements

Rank	Infrastructure	Organization and Human Resource	Green Logistics		
			Green Packaging	Green Warehousing	Green Transport
1	Digital information platforms management	Readiness for market logistics 4.0 to the logistics 5.0 focused on the transformation of logistics centers by presenting 12 critical criteria decision-making methodology rank of elements. 1) Smart handling (C1) 2) Smart zero emission (C2) 3) Smart mobility (C3) 4) Smart freight exchange platforms (C4) 5) Smart digital	1) Use of environmentally friendly within and outside the warehouse 2) Using packaging material that have less weight 3) Use of recycle physical warehousing such as structure as packaging and real packaging materials (packaging in which delivers the goods) 4) The warehouse as	1) Introduction of new storage technologies 2) A focus on ROI 3) Productive assets 3.1) Skills and knowledge 3.2) Professional reputation 3.3) Professional networks 4) Transformational assets 4.1) Self- knowledge 4.2) Diverse networks 5) Financial assets	Route optimization Warehouse management system market App based management Use of resilience pallets Use of reusable containers and transport equipment Use of a vehicle with alternative (renewable) fuel
2	Real time inventory management				
3	ERP systems				
4	Big data manipulation				
5	Cloud computing online				
6	Data processing				

		information platforms (C5)	packaging and real	5.1) Salary and benefits	sources (energy)
7	Predictive hardware and software including mindset ware maintenance	6) Smart intelligent transformation systems (C6)	packaging optimization (for secondary tertiary, and ecological friendly	5.2) Savings 5.3) Pension 5.4) Warehouse equity	Introduction of alternative energy sources in refrigerated vehicles
		7) Smart information	packaging)	5.5) Storehouse equity	
8	State-of-the-art computer and digital systems infrastructure	security (C7) 8) Smart real time locating system (C8)	5) The warehouse as packaging and real packaging design to	6) Vitality assets 6.1) Health 6.2) Work-life balance	Increasing the usability of space in height within the vehicle
		9) Smart autonomous	facilitate separation and	6.3) Regenerative	
9	Flexible and modular hardware solutions	vehicle (C9) 10) Smart warehouses (C10)	sorting of different types of materials 6) Use of	relationships 7) Monitoring intangibles	Transport and containers pallative management
10	Use of predictive analytics methods	11) Smart logistic center alliances (C11)	environmentally friendly paints on the	8) Supporting employees transformational skills	Reducing downtown
		12) Smart digital	warehouse and the real		
11	Collection of data into databases in real time	connectivity (C12) All rank of elements, especially of three smarts	packaging 7) Use of ROI system	9) Bringing variety to employment	Reduction of unused space in the vehicle
12	Data archive	Smart digital information platforms (C5) Smart intelligent transportation,			Shutting down computers when not in use
13	Connectivity to external database	and including inventory			Toner and ink recycling
14	High network and data security				Keeping track of stock levels
15	Less risk				
16	Less complication				

Relative to the results of logistics 5.0 elements bridging three disruption intelligence goals to establish logistics 5.0 in terms smart transformation strategy applied to disruption intelligence inventory management trends. It was bridging to served 5 most crucial important inventory management trends for 2022 to the post COVID-19 recovery are as follows:

1) Bridging the benefits of shorter return on investment (ROI) for return on time (ROT) to growth SMEs revealed that the volume of stock, risen sharply, without overall SMEs activity rising in step of logistics 5.0.

2) Bridging the Benefits of SMEs are More Willing to Invest in the Digital Data Processing:

2.1) Inventory management the cloud is key of SMEs benefits tracking inventory location and levels in real time, even for green warehousing, assessing organization and human resource system and infrastructure of data transformation to create SMEs willing to invest in the digital processing way.

2.2) Bridging Internet of Things (IoT) technology help "return to growth" (ROG) revealed that connect IoT tech to SMEs cloud software to input critical real-time data to analytics of logistics 5.0 consisted of smart transformation strategy elements-infrastructure, organization and human resource and green logistics consisted of green packaging, green warehousing and green transport.

3) Bridging the benefits of smart transformation strategy for ecological multiple warehousing revealed that faster, by smart transformation strategy of transport times and low costs. Reduced carbon footprint: it lowers inventory management impact on the environment. Easier to scale and grow; it's relatively easy, to add a new location the system that open the potential for further SMEs logistics 5.0 growth.

4) Bridging the benefits of 3PL (third-party logistics) for blue ocean strategy as transformation strategy of SMEs revealed that;

4.1) take advantage of opportunities: to implementation of AHP elements with less rink complexity of organization and human resources, moving, into a new AHP alternatives in terms blue ocean strategy as transformative strategy (based on academic authority Kim & Mauborgne, 2015)

4.2) Cut costs; as specialist providers, 3 PL SMEs often have good relationships and can find ways to make deals or trim costs of AHP alternatives such as green logistics, infrastructure, and organization and human resource.

4.3) Access expertise; partnering with logistics experts mean accessing their expertise and experience without having to generate AHP alternatives.

5) Bridging Sustainable Inventory Chains: integrated inventory chains-inventory analytics according to smart transformation strategy for data analytics generally requires the use of cloud technology-inventory forecasting in use; forecasting is a mixture of math and experience, being able to look at the data to guess what is going to happen next. Warehouse automation-warehouse management software system for helping keep warehouse cost down and-fulfilment times low and revealed that:

5.1) Connected omni channel services; this requires the coordination of factors such as inventory reconciliation, supplier management, demand planning. Sustainable ideas to consider, green logistics is a key concern to consider.

5.2) Switching to digital transformation is a key concern to consider green logistics and fleet.

5.3) Using multi smaller warehouses to get stock closer to customers as sustainability is a key concern for customers.

5.4) Using 3PL provider that specialize in green logistics.

5.5) Switching to circular sustainable inventory chains, including logistics chains, such as recycling back into the infrastructure process or manufacturing process-cutting costs, trimming waste, and reducing a SMEs carbon footprint etc.

Conclusion and Discussion

The Delphi consensus method of analysis was used for the purpose of this study. It clearly creates in the AHP alternative (the AHP method) and disruption intelligence goals analysis, but it also creates an opportunity to blue ocean strategy as transformation strategy to bridging model of the implementation of logistics 5.0 in SMEs. The results of the logistics 5.0 element are used to cross-check theoretical data and to determine goals' priorities (Canco et al., 2021). In detailed overview of logistics 5.0 by 5 groups elements was shown in Table 1 of this article's literature review section, which was adapted from Trstenjak et al. (2022), El-Berishy et al. (2013), Opetuk (2016), Jafari et al. (2022), Winkelhaus & Grosse (2020), Bhargava et al. (2022), and Figueiras et al. (2021). Concerning to these details about this method that could findings new result from AHP alternatives that are divided into new or adapted from the general five groups. This research's findings revealed AHP alternatives in terms of smart transformation strategy-new rank of logistics 5.0 elements as new or adapted 5 groups of AHP alternatives, as follows: from the general 5 groups consisted of 1) green transport 2) green warehousing 3) green packaging 4) infrastructure and 5) organization and human resources. The previous five AHP alternative groups were transformed into three new groups: 1) infrastructure, 2) organization and human resources, and 3) green logistics, which revealed green packaging, green warehousing, and green transport. This new or adapted from 3 groups of AHP alternatives (logistics) 5.0 element is essential to create a model for SMEs that incorporates the development of logistics 5.0 elements and spans three disruption intelligence goals to create smart logistics 5.0 in terms of smart transformation strategy. It may be connected to trends in disruption intelligence inventory management that concerned to blue ocean strategy as smart transformation strategy (Brzezinski & Wyrwicka, 2022; Klein et al., 2022; Becerra et al., 2022; Kim & Mauborgne, 2015). Additionally, these earlier concepts were examined, and new guidelines were developed for developing the research's original idea in the VUCA world of 2020 and the turbulent year of 2021, including reviving the post-COVID-19 recovery (Ozkanlisoy, 2021; Craighead et al., 2020; Gultekin et al., 2022; Brzezinski & Wyrwicka, 2022). In relation to the original idea of this study, based on the survival objectives that SMEs hope to accomplish in the post-COVID-19 recovery. Clearly, applied to the future-ready for the revival of future-ready trends and a logistics 2050 scenario study. In terms of disruption intelligence strategy, this perspective on logistics for the future aimed to bridge both best practice inventory management trends and the larger world of logistics 5.0 transformation (Deutsche Post DHL, 2012; Accenture, 2021). The findings, which can serve as a useful tool for the analysis of earlier concepts of this research according to Trstenjak et al. (2022), Craighead et al. (2020), Gultekin et al. (2022), and Brzezinski & Wyrwicka (2022). Their concepts led to these influenced concepts from Accenture (2021), Deutsche Post DHL (2012), Sasananan et al. (2016), Klein et al. (2022), and Roughan (2021). They agreed to indicate that bridging to served 5 most crucial inventory management trends for 2022 to the post-COVID-19 recovery applied to this research results are as follows: 1) bridging the benefits of shorter ROI for ROT to growth SMEs, 2) bridging the benefits of SMEs are more willing to invest in the digital data processing, 3) bridging the benefits of smart transformation strategy for multiple ecological warehousing, 4) bridging the benefits of 3 PL (third-party logistics) for blue ocean strategy as transformation strategy as mindset for SMEs of SMEs revealed that: 4.1) take advantage of opportunities, 4.2) cut costs; as specialists providers, 4.3) access expertise, and 5) bridging sustainable inventory chains revealed that: 5.1) connected omni channel services, 5.2) switching to an digital transformation is a key concern to consider green logistics and fleet, 5.3) using multi smaller warehouse as sustainability is a key concern for customers to get stock and using the benefits of digital data processing, 5.4) using 3PL provider that specialize in green logistics as

mindsoft for SMEs, 5.5) switching to a circular sustainable inventory chains (Accenture, 2021).

From this highlighted point, this research can be related to establish smart logistics 5.0 implementation model is useful and simple tool for the smart management of every SMEs with an aspiration to transition their logistics transformation strategy and inventory management trends toward an advanced state-of-art bridging the AHP process linked disruption intelligence goals as follows (see Figure 1).

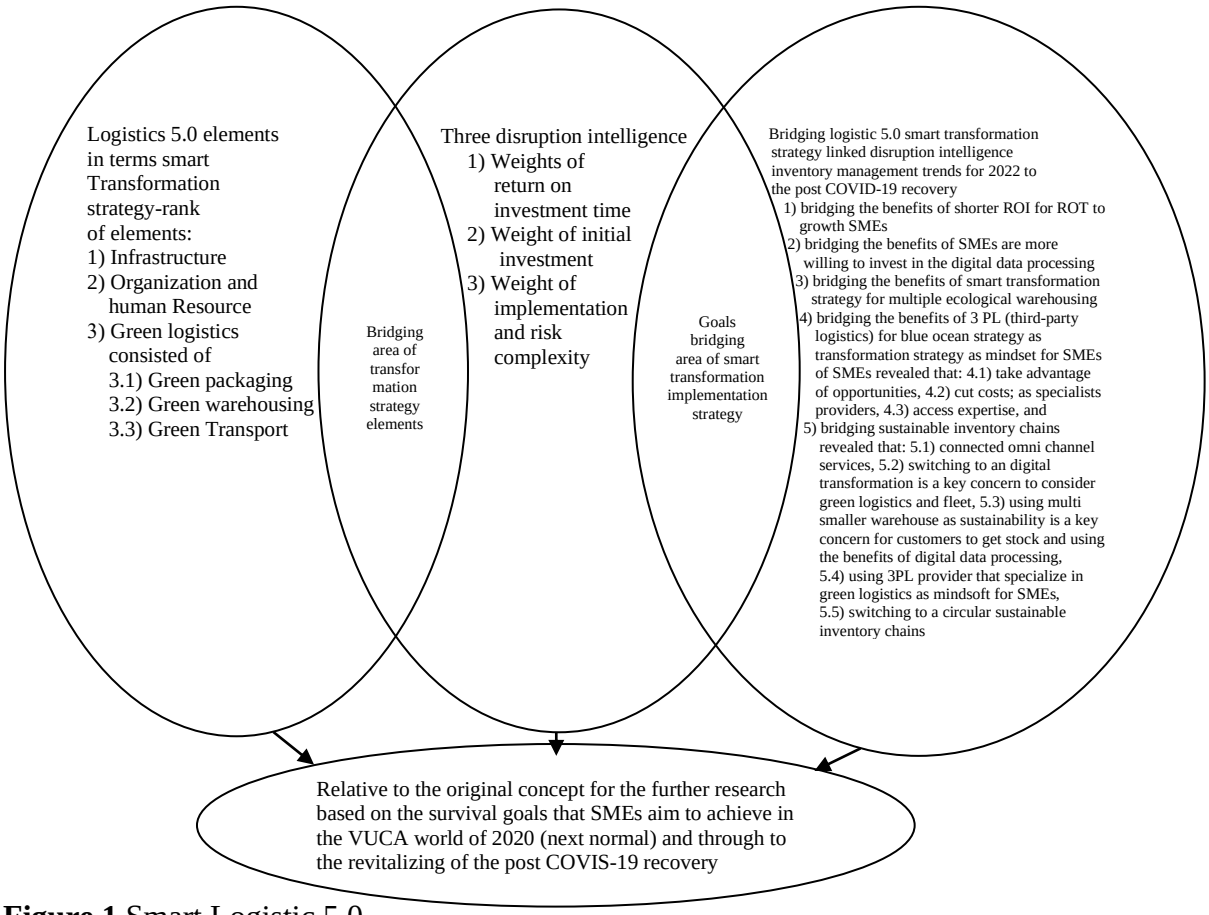

Figure 1 Smart Logistic 5.0

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