DIGITALIZATION APPROACH THROUGH AN ENTERPRISE ARCHITECTURE FOR MALAYSIA TRANSPORTATION INDUSTRY

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ABSTRACT

We initiated a research study that investigates the digitalization approach through an Enterprise Architecture (EA) for Malaysia Transportation Industry (MTI) as a crucial strategy to regulate the industry transformation. This research paper indicates the Industry Revolution 4.0 (IR 4.0) and Big Data Analytics (BDA) as the new wave of digital technology that impacted Malaysia economic cycle, resulting in a robust transformation of the industry landscape. We are focusing on digital transformation to improve decision making and enable the intention crosswise disciplines and stakeholders that desire boost the MTI as emulated in the 11th Malaysia Plan 2016-2020 (11th MP).

Key words: Big Data Analytics, Digitalization, Enterprise Architecture, Industry Revolution 4.0, Information System and Malaysia Transportation Industry

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1. INTRODUCTION

Malaysia Transportation Industry (MTI) realizes that there is no shortcut to attaining excellence and gaining global industry prominence [1]. Hence, Big Data Analytics (BDA) and Industrial Revolution 4.0 (IR 4.0) were considered as important shifts it must address [2]. In order to achieve this, MTI must continue to put great efforts at maintaining High Technology High Value (HTHV) and benchmarked itself against the best in the industry world [3]. MTI are inevitably being transformed by the IR 4.0 induced by the BDA and the digital revolution in edge along the present industrial modernism [4]. To assure Malaysia remains aggressive in the industrial field, the Ministry of International Trade and Industry (MITI) is promoting and encouraging acceptance of the current automation over IR 4.0 [5]. Malaysia has invested heavily in transportation industry [6]. Malaysia is now more determined to be productive and competitive as an international hub for transportation industry [7].

Therefore, we are focusing on strategic digitalization which aims at addressing the current and future challenges and affect changes in the MTI landscapes. The general objectives of this research paper are to philosophically move beside automation that fast converging and evolving, there is active importance for MTI via advantage modern improvement to augment adaptability and surge capacity to improved grow and compete persuasive ahead the county to achieve the national vision and missions for the transportation industry. With integrated digital and physical technologies, it promises to improve industry operation, productivity, growth and innovation [8]. Furthermore, we are drawing a clearer roadmap towards smart transportation industry and digitalization by mapping the potential impact of IR 4.0 transition into an HTHV drive for engineers, scientists and researchers to meet the technology developments for MTI.

2. LITERATURE REVIEW

The aspect of Information Systems (IS) derives from supporting key industries actions to multiple integrated technology revolution platforms and digitalization [9]. As a result, industries progressively embrace Enterprise Architecture (EA) to regulate multiplicity and guide the capacity to transition into digitalization [10]. EA typically focus as a strategic response to a strategized need to lay the foundation of digitalization technology standards that will allow industries concerns to improve and strategized Information Management (IM) context [11]. The cycle of industries activities focus on IM, as an effective operation for storing, archiving, collection, destruction, and dissemination, wherein IS and Knowledge Management (KM) and using EA framework for strategic performance management for stakeholders to view the performance and make strategic decisions [12]. The domain of knowledge, focus on the generic concepts of management of information activities emphasizing the relationship of IS and KM to industries performance and competitiveness [13]. According to [14], IS are viewed as important contemporary source working with large amounts of data and allow the information to be presented with value for decision making in industry. Moreover, KM plays the systematic management by meeting tactical and creating digital value approach for strategic requirements of MTI [15]. [16] stated that KM is an integrated process of distributing, evaluating, identifying, retrieving, sharing effectively and capturing using digitalization tools. Furthermore, EA plays a key role in the strategic planning process within MTI to gain insight into critical BDA through a single coherent framework for real-time reporting digitalization application tools for strategic decision [4]. Yet we need to look into the strategic level ideologies, to elaborate the synergic phenomena, the domain of knowledge in EA and BDA needs to be understood as ideologies. Perhaps this, ideologies can be further perceived as the ontological point of view in the context of EA, ontology is categorized as the theory of being complexity and to organize information process by.

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identifying sources relevant properties, concepts, and relationships expressed in the domain of application and captured domain experts knowledge [17]. According to [18], to developed a strategic and adaptable technology for the extraction of semantic ontology information need in EA processes by identification and mapping critical areas of BDA, epistemological point of views [19] stated that epistemology is the theory of knowledge on its methods, validity, and scope by providing depth understanding of the fundamentals of BDA elements of EA central process.

Moreover, EA and BDA must be analyzed based on the strategic context of knowledge derived from epistemology point of information; analytic frameworks and models [20] and methodological point of views according to [21], EA and BDA methodological approaches can be categorized as industry as a systems, industrial cybernetics, hard system thinking and soft system thinking as a systematic literature review to foster an integrated model for data and KM system. Besides that, we need to understand the holistic view and complexities in BDA and EA, due to the growing demand for big data thinking has challenged industries to change their data analytics operation [6]. According to [7], existing strategic performance structure alone could not solve the rapid growth of big data scenario and changing data analytics in an industry. These phenomena occurred due to human errors especially lacking knowledge has led to data errors, poor communication and lack of practice brought up unclear communications to all levels in the industry [16]. The growth in socio-technical perspective and human behavior dimension had challenged an industry to struggle on operating BDA [13].

Furthermore, the socio-technical perspective approach leads to the complex industrial environment and competing with each other instead of working together, had created information overload [22]. Ideally, strategic actions and human behavior dimension can be significant and more productive in helping the industry in managing information overload by ensuring excellence knowledge sharing and KM of these departments [23]. A glance of BDA and digitalization EA is needed for analyzing voluminous data sets to discover hidden patterns, unknown correlations, situations and trends, preferences and other useful information. Meanwhile, EA is now eloquent into a further predictive framework by showing what desire arise in the industry [24].

3. DIGITALIZATION ANALYSIS

New digitalization EA structure is inception to display how perfect the diverse elements of the industry performance stable to crop a conclusion and industry managers can permanently view the massive figure and generate quick, improved-knowledgeable outcome [17]. According to [19], EA systems functioned to merge data storage, data gathering and KM plus diagnostic device to prompt competitive and complex data to decision makers and planners. [3] stated that EA represents the taxonomy, technologies, and action needed to shift data into information and information into knowledge and intention that advance industry behavior. Yet, we need to look into the digitalization analysis of requirements engineering as innovative engineering on industry to information or software systems. We have tabulated three (3) role models of requirements digitalization analysts according to the three layers of requirements in Table 1.
Table 1 The Three Role Models of Digitalization Requirements Analysts

<table>
<thead>
<tr>
<th>Requirement</th>
<th>Role Models</th>
<th>Elicitation</th>
<th>Digitalization</th>
</tr>
</thead>
<tbody>
<tr>
<td>Environment (Engage and Manage Actively)</td>
<td>Stakeholder (Key Player-High Influence)</td>
<td>Stakeholder Analysis (Identification and structural analysis of stakeholder)</td>
<td>Expectation</td>
</tr>
<tr>
<td>Industry (Understand and Satisfy their needs)</td>
<td>Industry Analyst (Meet Their Need-High Influence)</td>
<td>Industry Analysis (Holistic view to the Enterprise Architecture and industry process)</td>
<td>Execution</td>
</tr>
<tr>
<td>Information System (Consider and Keep Informed)</td>
<td>System Analyst (Important-High Interest)</td>
<td>Scenario Analysis (Usage of a system from the stakeholder view)</td>
<td>Rationale of necessity</td>
</tr>
<tr>
<td>Software System (Monitor and Inform Occasionally)</td>
<td>Software Analyst or Software Engineer (Consideration-High Interest)</td>
<td>Goal Analysis (Identification and structuring goals)</td>
<td>Value</td>
</tr>
</tbody>
</table>

Based on Table 1, the three role models of digitalization requirements analysts focus on requirements elicitation as the key to whole requirements engineering on stakeholder analysis, goal analysis, industry analysis, and scenario analysis. We need improvement and innovative requirements to improve MTI performance. As we measure from an industry-adapt community facing automation, an EA immense-expectation ability can regulate its structure a higher information-driven ground with extra importance from elite executive designate facing digitalization partner. Yet, automation is viewed to nudging Malaysia towards becoming a high-income nation in the transportation industry and it can be achieved by adopting new digitalization technology [25]. Although industries are generally aware that they need to automate to deal with the hardware is software driven [26]. While different industries require different solutions when it comes to automation, even within the same industry, there are varying challenges to automation [27]. As we investigate the below expectation automation desire act passive to embrace digital assistant since they are employing the conventional guideline of the workforce about data discipline and chain of command. Expectation hugely influences consignment its intention comfort expedites the unity with a digital assistant and curtail the obligation of observing. Therefore, we need to embrace digitalization, so it comes as observing the MTI now and, in the future, to attract stakeholders, create the right ecosystem and transform industry capabilities for HTHV.

4. CONCLUSIONS

We understand that we need to be prepared but how confident are we to lead its revolution implementation towards adopting IR 4.0 technologies to increase the level of automation, BDA and connectivity requirement for smart transportation industry environment. Therefore, we need industrial transformation drive that covers every aspect of industries and economic activities by architecture on our active digitalization infrastructure, where we are persuasive extra up in the HTHV and it is our desire to spot Malaysia as a radar of modernization permissive the automation of tomorrow. This research paper has to outline relevant recommendations for action for digitalization application need on how MTI can be digitally transformed. Leaders can think, and act ahead, thereby leverage the disruptive force and put forth a positive thrust in their industries technology revolution.
ACKNOWLEDGEMENT

The authors would like to thank the editor and the anonymous reviewers for their encouragement, constructive, invaluable reviews and recommendation to enhance the quality excellence of this research paper. The authors also would like to thank Universiti Teknikal Malaysia Melaka (UTeM) for the UTeM Zamalah Scheme for sponsorship and supporting this research work.

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