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Thriving information system through business intelligence knowledge management excellence framework

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ABSTRACT

In the current digitalization dilemma of an organization, there is a need for the business intelligence and knowledge management element for enhancing a perspective of learning and strategic management. These elements will comprise a significant evolution of learning, insight gained, experiences and knowledge through compelling theoretical impact for practitioners, academicians, and scholars in the pertinent field of interest. This phenomenon occurs due to digitalization transformation towards industry revolution 5.0 and organizational excellence in the information system area. This research focuses on the characteristic of a comprehensive performance measure perspective in an organization that conceives information assessment and key challenges of Business Intelligence and Knowledge Management in perceiving a relevant organizational excellence framework. The dynamic research focusing on the decision-making process and leveraging better knowledge creation. The future of organization excellence seemed to be convergent in determining the holistic performance measure perspective and its factors towards industry revolution 5.0. The research ends up with a typical basic excellence framework that will mash up some characteristics in designing an organizational strategic performance framework. The output is a conceptual performance measure framework for a typical decision-making application for organizational strategic performance management dashboarding.

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1. INTRODUCTION

The fundamental capability or component of an organization is about the ability of its members at all levels to communicate effectively [1]. The history and discipline of information system (IS) had introduced several vital roles in knowledge and perspective sciences of information for dramatically changing the spectrum of the information disciplines into information sciences, informatics and knowledge management (KM) [2]. Unfortunately, divergent disciplines utilize contradictory phases for the equivalent standards, such as the research of software is known as computer sciences (CS) or software engineering (SE). The human level of computing is even more complex, where engineers manipulate the term information technology (IT) to introduce to real user applications, organizations or businesses propose using IS, whereby academic or education exploit information and communication technology (ICT) and health professionals

contrive the term of informatics to meet their needs. The above scenarios have their significant roles, all are referring to the human level of computing and digitalization transformation towards Industry Revolution 5.0. The disciplines of emergence often have a remarkable impact on the characteristic of the information disciplines that commence from them, however, various kinds of perspectives and knowledge called for are dramatically divergent from the perspectives of the home disciplines. Therefore, the relationship between a specific information discipline and its home academic discipline may be much more complex than is typical for conventional modern disciplines. Today's organizations are so eager to aspire in prospecting their organization in a digital world [3]. Thus, most organizations are stuck in the automation stage [4]. Many organizations still have a legacy of isolated automated systems based on outdated technologies [5]. They have made no real changes in the way they work or are organized. Much of the new sophisticated hardware is used to automate more of the existing procedures to speed up outdated tasks rather than to rethink them from scratch [6]. Only a few organizations had a coherent understanding of how to realize the potential of the data collected by their automated systems for industry revolution 5.0 [7]. Whereby these data can be combined or integrated to produce knowledge that can be utilized to enhance not only the process of production but also business coordination and control. The challenge was primarily managerial, that is more valuable ways of evaluating and measuring white-collar productivity, IT, and quality was needed [8]. There is no influence from IT is yet tangible in the macro-economic data present [9]. A few individual firms are evident better off and there is a massive group of isolated examples of successful IT exploitation in precise individual function or business units. Nevertheless, on average the predicted interest is not yet visible. Making the transition will be difficult without major changes in the way IT is managed, in employee competencies, and in management processes [10]. The research had stressed that IT cannot be considered in isolation, its potential for business transformation can only be understood if IT was viewed within its organizational context. The stages of IT development are not advanced enough to exploit the potential of transformation [11]. It was clear that soft thinking of the IT benefits could be highlighted by integrating business intelligence (BI), data analytics, and operational system that leads towards KM excellence for organizational performance. Therefore, this study identified these IT-related problem-solving mechanism elements and discovering the adoption of soft thinking characteristic of an integrated framework towards developing a conceptual framework for strategic performance through observing several available excellence frameworks, data analytics, and business intelligence approach. Proposing the relevant key performance indicator (KPI) reporting model using data analytic and business intelligence and designing an online real-time organizational executive dashboard. Thus, the research focuses on a heuristic view of an organization's approach to problem-solving management issues with an integrated framework towards developing a performance monitoring framework and assessment model.

2. THE PROPOSED FRAMEWORK

IS in organizations are interconnected structures, where improving one part can influence many others [12]. Therefore, to execute changes successfully, the organization must adopt an integrated strategy by analyzing the impact of the propound interchange and employ the results of changes within the organization's performance strategy [13]. Knowledge sharing in IS that included a part of the knowledge base of an organization has to be used from the learner's point of view [14]. Furthermore, it contributes to enhancing the assimilation of the relation between the information, changes and risk concept and the Data-Information-Knowledge-Wisdom (DIKW) elements, to strengthen the premise of the meaning and characterization of changes risk and in this way assigning a basis for better understanding, retrieval information, changes and risk management in an organization informatics [15] as shown in Figure 1.

Based on Figure 1, the DIKW model of the hierarchy had emphasized two (2) domains as: i) Theoretical domain focusing on data as collecting, organizing, and naming; information as interpreting and organizing and knowledge as understanding, interpreting, and integrating and ii) Application or practice domain focusing on wisdom as applying with reflection, compassion, judgment, and understanding. The main concerns are about adding value, transforming information into knowledge, and representing properties of the data and information. The taxonomy of KM in DIKW is shown in Table 1. Based on Table 1, the cycle of organizational activities focuses on information management (IM), as an effective operation for storing, archiving, collecting, manipulating, and disseminating data and information in BI and KM. According to Matarneh [16], many IS are viewed as important contemporary sources of KM for working with large amounts of data and allowing the information to be presented with a certain value. Moreover, KM is systematic management in meeting tactical and creating value approaches for the strategic requirements of an organization [17]. Shehabat and Berrish [18] stated that KM is an integrated process of distributing, evaluating, identifying, retrieving, sharing, and capturing knowledge using BI tools effectively. Besides, practitioners need to design a system, which can help a complex organization's strategic decision-making process by the goal and performance function [19]. This is about focusing on knowledge seeking especially upon strategic performance diagnostic variables and relevant indicators that can be generated.

Figure 1. DIKW model of hierarchy

Table 1. Taxonomy of knowledge management in DIKW elements

IS Domain	Elements	Justification	Philosophy	Knowledge Management	IS Perspective	IS Nexus
Application or practical domain	Wisdom	Adding value to the organization's function with strategic judgment.	Know why	Explicability in the wisdom of an organization	Choice of the menu system	Business intelligence system
Theoretical domain	Knowledge	Transformation of information into knowledge.	Know-how	Effectiveness in knowledge	Choice of decisions	Decision support system
	Information	Classify as description answer that inferred from data.	Know what	Efficiency in information	Choice of information	Management information system
	Data	Indicates symbols that represent properties of the environment and objects that need observation.	Know-nothing	Muddling through information	Choice of data	Electronic data processing

2.1. Organizational information system views

The journey of IS also leads towards the development of informatics body of knowledge through software engineering (SE), IM, KM, artificial intelligence (AI), and BI for transforming into meaningful information. Adaption of IS to provide new insights and organizational transformation through IS packaging is a game-changer. IS typically include the following organizational components for i) communication that requires people to communicate rapidly using effective and efficient information, ii) operations emphasize upon the data provides insights into the organization's performance, iii) decisions with regards to delivering all the information needed and modeling results for decisions and iv) records that stores information, documents, and documentation about the organizational data. Ideally, strategic decisions can be more productive in managing information overload by ensuring excellent knowledge sharing and KM of the multi-level management and related departments [20]. Therefore, we need the new IS 5.0 that has merged the two conceptual components: enterprise resource and the information system for the control system for observing certain performances. The data of the transactions, machines activities, components, and facilities are processed and managed at a respective centralized operational location [21]. This empowers such as planning, controls, management, and operation of the value chain in real-time [22]. The IS 5.0 refers to the prerequisite for the systematic implementation of the linked digital world-industrial revolution 5.0. All information about transactions, orders, customers, products, reports, bills, and suppliers are managed by the automated features of IS and visualized or displayed clearly in form of dashboarding. Besides, the IS comprises relevant data of operations, utilities, facilities, machines, and system components in real-time towards optimizing the planning, running, controlling, and monitoring of those critical operations through visualization. Furthermore, conceptualized IT development of IS 5.0 stages can be categorized and implemented in an organization as shown in Table 2.

Based on Table 2, the focus of IS has required an efficient and open software architecture with development perspectives and flexible process control for the future. Therefore, many subsystems like ERP and PCS, which were mere island software products and often only synchronized overnight, must be connected to the integrated information system landscape in providing visualization of all data analytics and performance measures in real-time in managing information and knowledge.

Table 2. IT development of IS 5.0 transition stages

IT Development Stages	Transition Stages	IS 5.0 Transformation
Stage 1: Automation	IT is used for short-term tactical reasons as a reactive business IT strategy. Administrative IT concentrating on efficiency and back-office function, which is the policy-based or account-based systems for static, administrative, and paper-based management information systems.	Creation of data.
Stage 2: Towards Integration	IT as part of a long-term strategic plan to gain a competitive edge as an integrated business IT strategy. Marked-led IT focusing on improved quality of service and flexibility of response on the integration of client administration, POS, marketing, and branch systems and continuously updated quality management information systems.	Active use of information and integration of IM with the business.
Stage 3: Towards Transformation	Digital IT as part of a long-term strategic plan to gain intelligence information as an intelligence business IT strategy. Market-led IT focusing on smart data turning into insights, actions, and resulting outcomes for BDA. Digital transformation of analytics expertise on autonomous learning with intelligence systems and the evolution of intelligent IS.	Adaptation of information and visualization to provide new insights.

2.2. Theoretical background

The research emphasizes two theoretical models as McKinsey 7S's and MIT90's model. Bain [23], stressed that the MIT90 model conceptualizes the organization's efficacy in employing ICT for the management process with six (6) inter-related components: management processes, technology, strategy, external environment, structure, and individual and roles as shown in Figure 2. Besides, McKinsey 7S's framework has recognized seven (7) indicators for the successful performance of organization strategies: structures, systems and strategies, style, skills, shared values, and staff [24], as shown in Figure 3.

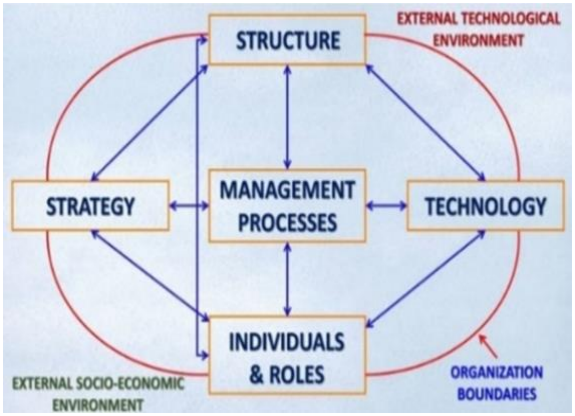

Figure 2. MIT90s model

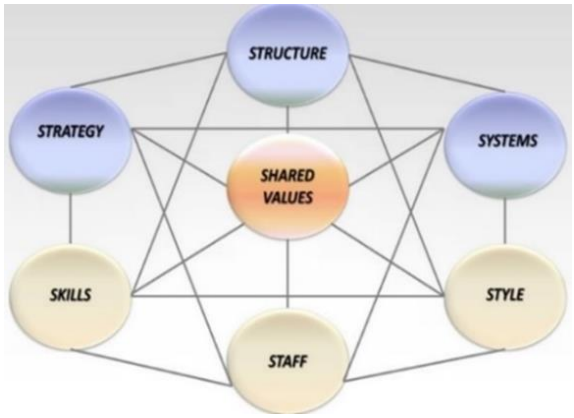

Figure 3. McKinsey 7s model

2.3. Conceptual framework development

Initially, we have observed the general frameworks for excellence. Both models had shared the generic elements that contributed important components for the organizational performance measures. This effort was an important approach to relating many sources of data within an organization that could be critical to the BI-KM excellence framework. Based upon the recent operational activities and processes, we have conceived a typical adaptation of frameworks that had signified six (6) elements as; i) workforce engagement system, ii) customer management system, iii) leadership system, iv) knowledge management system, v) Strategic planning system; and vi) Operations focus system, as shown in Figure 4. This is an integrating the potential KPIs for organizational BI framework of an organization standard as KPIs for measurements indicating that the BI-KM framework for a typical higher learning institution strategic plan.

We have derived the view by having a preliminary study on a few organizational excellence, big data, and BI models.

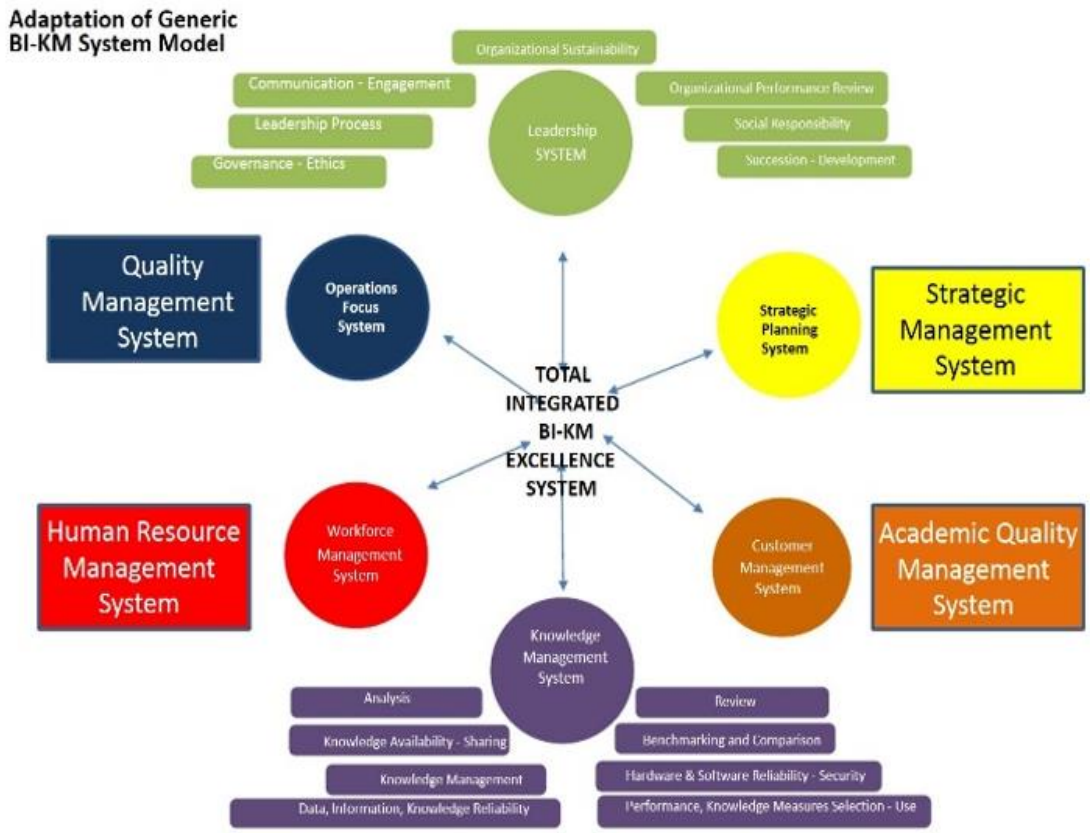

Figure 4. Adaption of generic BI-KM system model

3. RESEARCH METHOD

The philosophy of IS research deals along with the generalized explanation of the component and hinges on the dispense of experience about the organization world in which people's approaches diverge from one another [25]. IS research has perpetually prevailed multi-cultural and multi-perspective in complexion which assists in providing varied content about ways to ideally interpret the organization world. Basic philosophical approaches or underpinnings of IS research paradigms contain the philosophical analysis of epistemology, ontology, and methodology [26]. To elaborate on the synergic phenomena, the domain of knowledge in BI and KM needs to be understood as ideologies. Perhaps relevant, ideologies can be further perceived as the ontological, epistemological, and methodological points of view as shown in the following Table 3.

Table 3 has summarized the strategic research paradigm that influences strategic decision-making especially for the positivism paradigm that emphasized seeking on operation level. The interpretivism paradigm seeks on the tactical level and the critical realism paradigm seeks on the strategic level. The conceptual framework of this study will be focusing on the cause-and-effect relationships on the strategic level. Yet, the outcome will be grouped quantitatively. A survey will be conducted to gain a holistic view of the context. Then the prototype of the project named the organization dashboard will be tested to verify the conceptual framework, especially in the dashboard design. For the validating phase, secondary data from the organization is applied to validate the proposed prototype. The sample size desired for this study is 331 respondents, if the population size given is 2400. Therefore, we perform the data collection from the present academic staff and administration of University X. The questionnaire contains eight (8) sections: section one (1) of Demographic Profile of University X, section two (2) strategy factors, section (3) structure factors, section (4) systems factors, section (5) skills factors, section (6) staff factors, section (7) style factors and section (8) shared values.

Table 3. Strategic research paradigm of IS in organization

Assumption	Positivism (Operational)	Interpretivism (Tactical)	Critical realism (Strategic)
Ontology: The position on the personality of matter	External, independent, and objective. (Process Efficiency)	Philosophically compose, intuitive, may diversity and various. (Enlightenment)	Endure independently of people thinking and information. (Organizational Effectiveness)
Epistemology: The perspective on what comprises sufficient information.	The only noticeable situation can present a rational clue and data. Emphasis on act-like conclusion and causality, compressing the situation to the smooth components.	Personal context and analysis experience. Emphasis the factor of the incident, subjective meanings, motivating actions, and the reality behind these components.	The only evident situation can furnish credible features and data. Emphasis on interpreting within a situation.
Methodology: The design urging the research approach	Quantitative (Organizational Cybernetics)	Qualitative (Hard Systems Thinking)	Quantitative or Qualitative (Soft Systems Thinking)
Outcome	Functionality Architecture (To facilitate the accurate, reliable, efficient processing of data and communication of information)	Systems Capabilities Framework (To assist the productive use of knowledge resources and information)	Data transfer technology framework (To engage in organizational learning, innovation, and adaptation)
Culture or Structure	(Knowledge Infrastructure Building)	(Knowledge Organization)	(Knowledge Creation and Use)

4. RESULTS AND DISCUSSION

The study obtains feedback from 474 respondents of University X. The respondent's characteristics are shown in Table 4. Based on Table 4, University X has 53% (250) administration staff's grades 11-40, 24% (114) academia staffs, and 23% (110) administration staff's grade 41-54. The working duration indicates that 49% (230) of staff has been working more than 8 years, followed by 31% (150) of the staff working period between 4 to 7 years, and 20% (94) working less than 3 years in the University X. The university has 67% (315) permanent staff and 33% (159) contract staff, respectively. Moreover, we have measured the internal consistency for its reliability, as shown in Table 5.

Table 4. Characteristics of the respondents

Characteristics	N = 474	%
Job Perspective		
– Administration (Grade 11-40)	250	53
– Academia	114	24
– Administration (Grade 41-54)	110	23
Working Duration		
– < 3 years	94	20
– 4 – 7 years	150	31
– > 8 years	230	49
Working Status		
– Permanent	315	67
– Contract	159	33

Table 5 indicates that internal consistency 0.705 for strategy factors, 0.705 for structure factors, 0.796 for systems factors, 0.715 for style factors, 0.750 staff factors, 0.709 for skills factors, and 0.811 for shared values. Based upon the Figure 5, the most significant yield is that insufficient effort and commitment (63.5%) was highlighted, followed by the lacking of appreciation among the staff (56.3%). These are critical indicators of excellence system and strategic planning system respectively. Besides, unclear control and monitoring (56.5%) and passive and lack of interest (56.1%) had also been highlighted as critical components for further observations. All the indicators have required a platform in form of visualization that captures and monitors data and information for measuring performances.

Table 5. Internal consistency

Variables	Items	Questionnaire	Cronbach's Alpha	Internal comment
Strategy Factors	3	Q5	0.705	Good (Low-Stakes testing)
Structure Factors	3	Q6	0.705	Good (Low-Stakes testing)
Systems Factors	3	Q7	0.796	Good (Low-Stakes testing)
Style Factors	3	Q8	0.715	Good (Low-Stakes testing)
Staff Factors	3	Q9	0.750	Good (Low-Stakes testing)
Skills Factors	3	Q10	0.709	Good (Low-Stakes testing)
Shared Values	3	Q11	0.811	Excellent (High-Stakes testing)

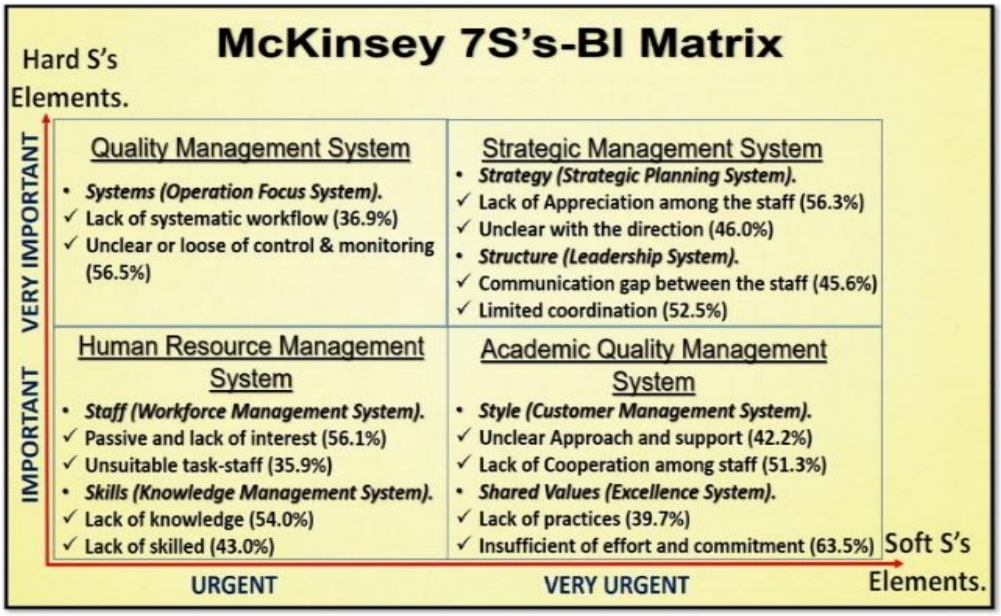

Figure 5. The hard and soft elements in the BI matrix

5. CONCLUSION

In this research, the conceptual framework design emphasizes the models from the behavioral decision and heuristics view in an organization. This work has also emphasized developing BI-KM intelligence. Moreover, we have outlined an enterprise excellence framework based on the philosophy research approach for IS developers and arguing that philosophy can simulate an important character in educating professional practitioners. We aim to employ philosophy to assist inexperienced students and practitioners in becoming more professional. We do not want to make philosophers out of IS developers, but rather to motivate them to philosophies. The challenge ahead is to perceive the knowledge emergence in a form of a BI framework that is suitable for specific assessment needs of an organization such as a university performance diagnostic tool. We had defined the model of its KPIs reporting using BI and big data analytics by proposing a suitable information architecture model of performance management, as a representation of knowledge repository and data architecture in a form of a performance diagnostics dashboard. In the future, the important goal in the strategic approach of decision-making design will be fully addressing the demands and performance monitoring requirements in a complex working environment. Without such an effective strategic decision-making diagnostic model and monitoring design, it may affect the upper management for example the Vice-Chancellor or high-level stakeholders in executing their decision-making tasks efficiently.

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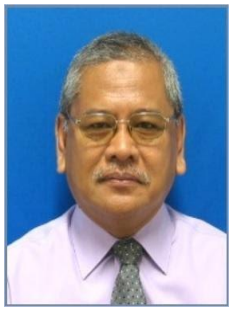

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