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Extended Abstract

Water Risk Indicator (WaRisk)

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Abstract/Highlight:
Water Risk Indicator (WaRisk) is a computerized system interface entails eight elements: (1) water withdrawal, (2) significance of water withdrawal, (3) water recycled and reused, (4) water risks, (5) facility level water accounting, (6) governance and strategy, (7) compliance, complaints and senses; and (8) targets and initiatives. This study explains the water risk profile for industries after considering the 8-elements. The aims of this paper comprise of: (1) illustrating the WaRisk interface design, explanation and theoretical justification, (2) proposing a suggested tool for water risk indicator specifically for regulators and industries and (3) providing optional ways of activities after identifying the disputes in water management. A sample of 30 companies are employed from public listed companies to originate the proposed interface for this system of water risk indicator. Hence, this paper provides suggestion of interface design for WaRisk system based on the eight indicators.

Keywords: Water Risk, Water Industries, Water Governance, Water Footprint, User Interface Design.

Introduction

Water issues is the water governance challenge. Water insecurity poses one of the greatest risks and leadership challenges of our generation and it has started to undermine food, energy and industrial production and damage economic growth prospects in many countries (World Economic Forum, 2018). Considering water security as a possible restraint on economic growth, it reflects social and environmental involvements to generate a sense of pressure among the stakeholders.

Our previous work (Mohd Remali, Mat Husin, Mohd Ali, & Alrazi, 2016), determined the water risk performance into three water risks profile: low, moderate and high. The risks were measured according to the proposed matrix, referred to as Water Governance Matrix (WaGM). In this paper, we further develop the work to introduce a web-based application system to categorise the risks. Hence, this paper classifies the key categories of water risk indicator system components namely: (1) water performance summary; (2) lists of company water-profile; (3) company water level data; and (4) recommended actions. Water related information from the audited annual report was acquired for the sample of public listed companies. Reports on water commitment and the information on company's water risk level are the minimal requirement of the system. Our initial water audit system (WAS) that we proposed in our previous work for industry uses has yet to be observed by any government agency or any industrial company. We developed this WaRisk and presented this study after a discussion with the state government agency related to environmental protection.

Therefore, the purpose of this paper is to fill the gap of prior studies by proposing the water risk indicator system for industrial companies and regulators. To the best of our information, WaRisk's uniqueness lies on the 8-elements for water risks indicator.

Innovation Content

This following parts of the paper is organised to explain an overall idea for WaRisk, then deliberates the justification on theoretical basis and the system interface design. The methodology and findings were explained in the two sections later and also the option for suggested actions.

Description

WaRisk is intended for commercial uses particularly the industries with water intensity either high, moderate or low. The regulators or any professional bodies may use the proposed system to award the best practices of water governance and water management from the industrial companies. As suggested by the incentive theory of motivation, behaviour is motivated because of reinforcement and incentive which implies that with such awards and recognition from regulators, the industrial companies may place greater effort on water governance and initiatives.

Background of innovation

The companies are listed under three modules of water intensity comprising low intensity industry, moderate intensity industry, and high intensity industry. Referring to the water disclosure item (Table 1), this study used a dichotomous system, the information in the annual report is decoded 0 and 1. We employed the sample as in our previous work with 302 of high

risks companies; 381 of medium risk companies; 131 of low risk which total up to 814 companies. For the three profile categories, the sample chosen was the top ten companies for each risk profile. Thus, the 30 companies is the final sample of this study.

Table 1: The 8-elements of Water Disclosure Item

No	Item and Sources	Elements
1	Water withdrawal (total) by source (GRI - G4 EN8)	***Water withdrawal*** • the surface water/ground water withdrawal and usage • inside and outside waste water of the organisation • rainwater collected in the organisation (including total volume)
2	Withdrawal of water significantly affect the water sources. (GRI - G4 EN9)	***Significance of water withdrawal*** • withdrawal of water that affect number of water sources • designated protected area for water source (size) • benefit or water sources for communities • biodiversity value of the water sources
3	Water recycled and reused (percentage and total volume) (GRI - G4 EN10)	***Water recycled and reused*** • water recycled in organisation (total volume) • water recycled (volume) and the source • water reused in organisation (total volume) • water reused (volume) and the source • percentage water recycled (total volume) of water withdrawal • percentage water reused (total volume) of water withdrawal
4		***Water risks*** • the risk related to water that could create substantial changes in expenditure, revenue and operations of the organisation
5		***Facility level water accounting*** • water discharge (total volume) by the organisation
6	Water information request	***Governance & strategy*** • involvement of the management in water responsibilities
7	(CDP 2015)	***Compliance, complaints and senses*** • civil penalties or any fines related to water or environmental regulations
8		***Targets and initiatives*** • Water target and goals of the organisation

Source: Mohd Remali et al, 2016

Figure 1 below indicates suggested Water Governance Matrix (WAGM) (Mohd Remali et al. 2016) to recognise the water risk performance of industrial companies. The water risk of the companies either low (green boxes), moderate (yellow boxes) or high risk (red boxes) is map using the WAGM. The above panel of the matrix indicate the three modules of water intensity referring to The Ceres Aqua Gauge (2011). The level of water commitment generated is based on the water index (Table 1). WaRisk diplays the panel for the three modules and the index of water disclosures to indicate the water commitment of the company (see Figure 2). The higher scores of disclosure suggest the higher commitment towards achieving a sound water governance by the industrial companies.

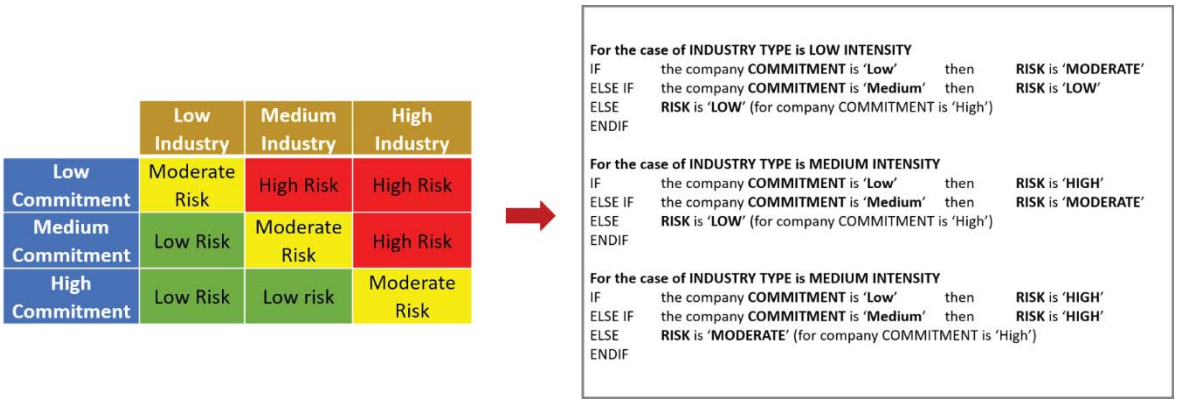

Figure 1: Water Governance Matrix

WaRisk also offers action checklist as in the Figure 3 in the bottom panel of the menu page. The page provides the options for the company and also for the team unit to have controlling actions for water commitment. Actions may be different from the unit (for example, changing the limit of waste water) and the company (for example, proceed to water performance check). The decision of the design are consistent with the rational choice theory by communication two types of suggested actions.

Contribution

Assessing the water performance in digital era of technology could be easier for regulators to evaluate the Public Listed Companies in Malaysia despite recognising their water management and governance in practice. Industrial companies may eventually experience in governing water sustainability issues in their company specifically regarding water commitment to mitigate water scarcity. In the light of stakeholders and investors perspectives, they may employ the information on water risk indicator for companies in their decision making processes.

Commercial Value

The potential local market for WaRisk is the Department of Environment under the Ministry of Energy, Science, Technology, Environment and Climate Change, professional bodies and industrial companies.

Preliminary Findings

The WaRisk version 1 is built using HTML5. WaRisk is a developed tool to promote water commitment through the lens of corporate water governance. This system is anticipated for use by business sustainable committee which concern for the water sustainability and thus seizing necessary actions at departmental or unit level.

Water Risk Performance

WaRisk organises quality indicators into eight elements: (1) water withdrawal, (2) significance of water withdrawal, (3) water recycled and reused, (4) water risks, (5) facility level water accounting, (6) governance and strategy, (7) compliance, complaints and senses; and (8) targets and initiatives. In Figure 2, WaRisk organised the separate three modules which can be chosen from the top of the page. Each module with different types of water intensity, the system provides the 8-element of scoring page. The water risk of a company also displayed in the same panel of the interface design stating the risk type respectively. The red cell indicates the company is a high risk type and hence it may increase the level of water commitment by attaining the scores from the 8-elements. The 8-elements are regarded as the quality indicator or signal to improve ways and actions for future water initiatives by setting the tone from the top. The effectiveness of leadership and governance system on water footprint may lead to positive impact on environment.

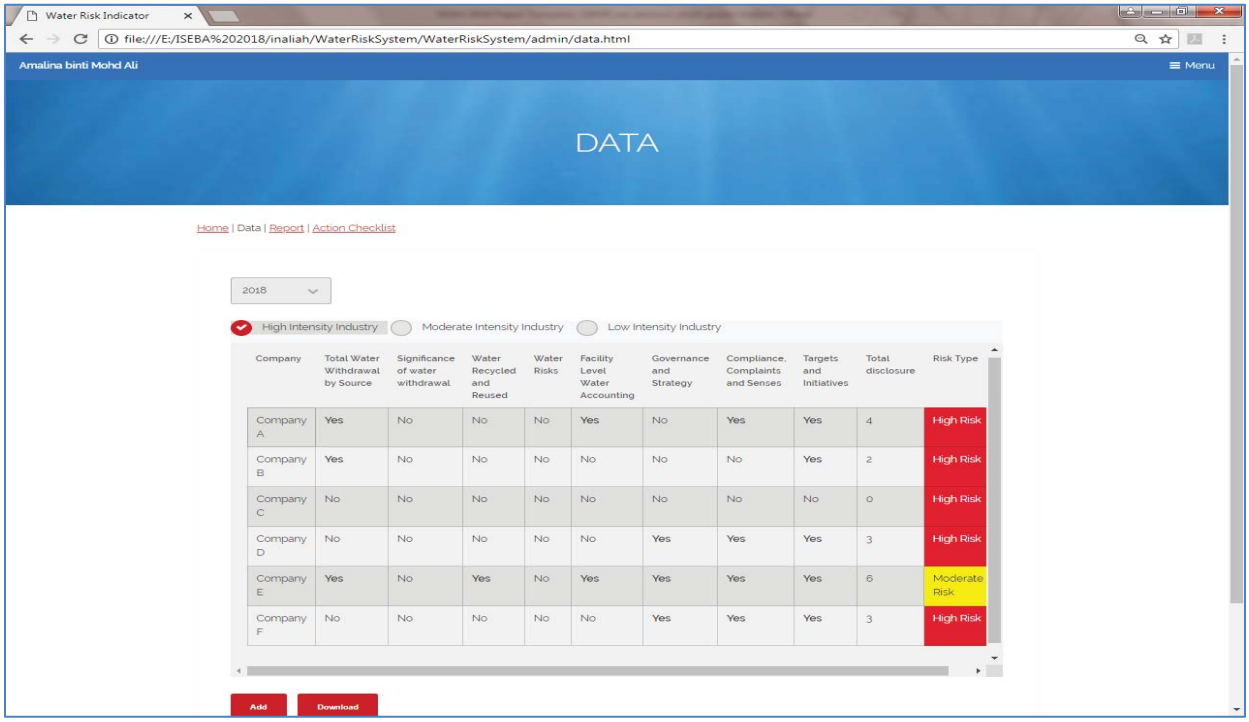

Figure 2 Three modules of water industry intensity and water risk

In addition, WaRisk exhibits the basic core elements organised as different panels on particular screen as to offer the users with a signal of the company's water performance and water commitment. Basic core elements include (1) analyse – panel indicates the published annual report for companies based on the water risk profile by industry; (2) monitoring – the disclosures also measured from previous years for the companies; (3) benchmarking – the present water commitment for the companies are computed and ensuring the practice is within the recommended standard of practice. Based on the cognitive theory, the information in the WaRisk are also exhibited by graphs, for example, the analysing and monitoring panels, to foresee the water information efficiency.

Additional information regarding the water performance and commitment of the companies required by the users may be obtained by clicking the specific icon in the menu page (Figure 3) and the water performance report (Figure 4).

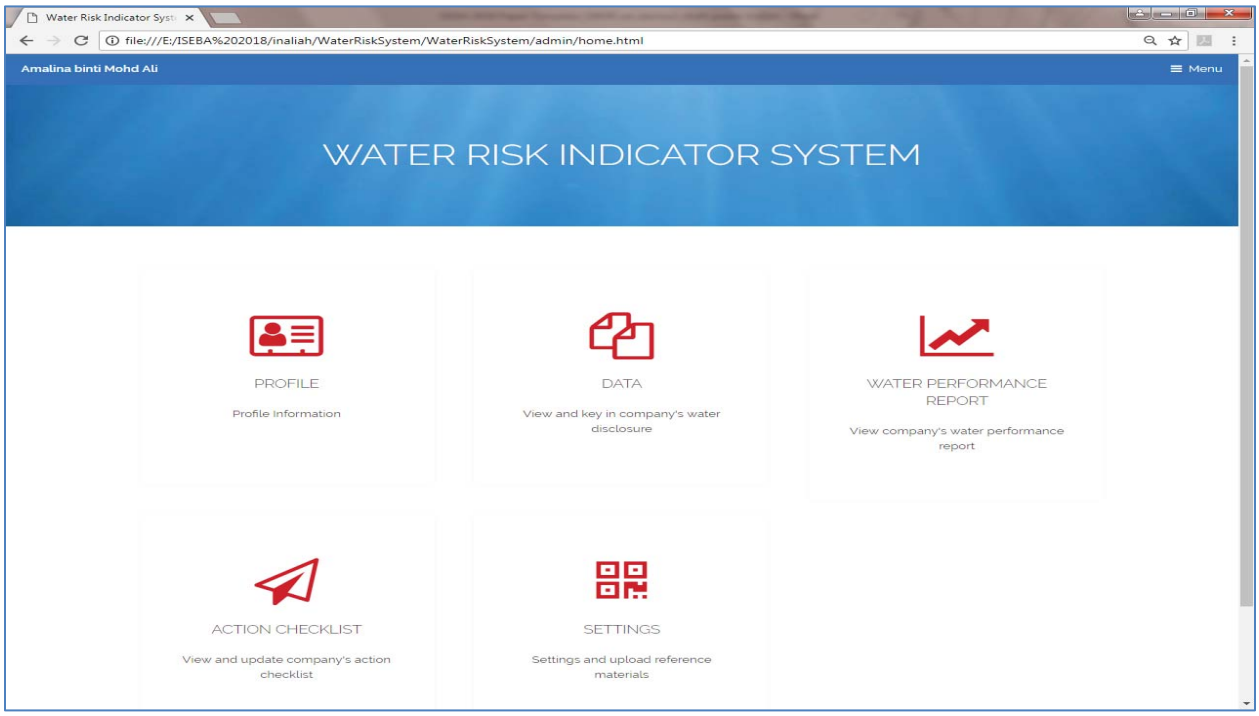

Figure 3 Menu Page

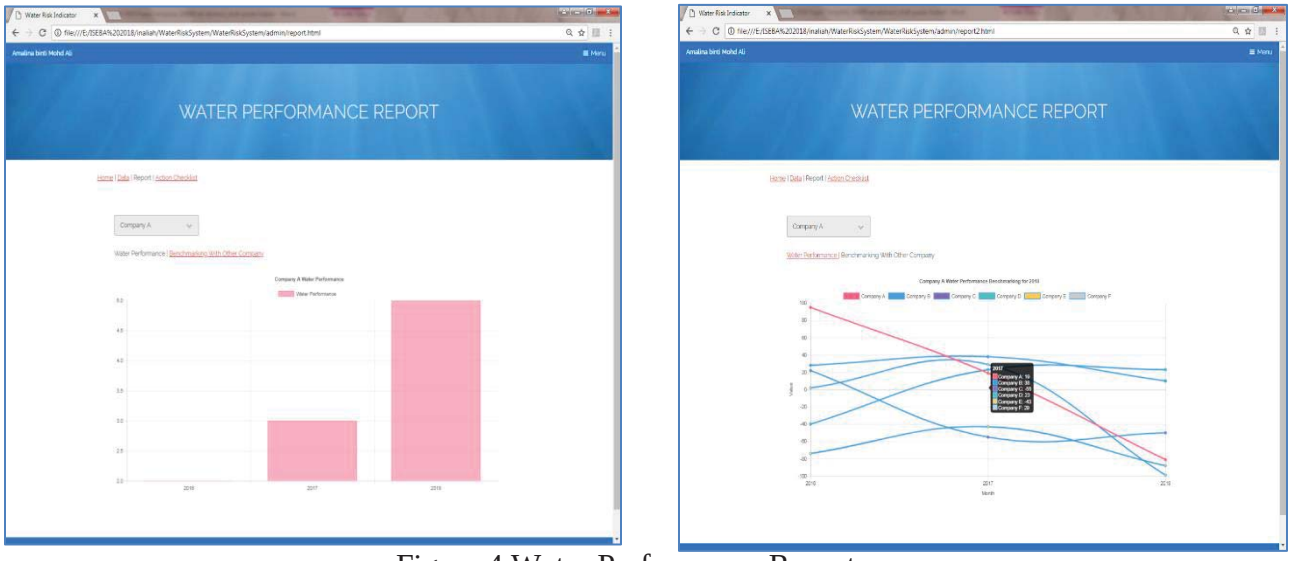

Figure 4 Water Performance Report

WaRisk generally reviews level of governance and commitment towards water sustainability considering the water profile of the industry and thus determining the water risk performance. In the annual report of the public listed companies that publicly available through company's or stock exchange's website, the contents comprise of the programmes, efforts, objectives and governance which reported and published annually. A user-friendly system was created to transform into measurable method of water commitment in WaRisk. The system is displayed and presented in graphical image, colour coding indicating the water risk type and comparison between the industrial companies. The characteristics are based on the water governance matrix. The water performance reports also indicate the measurement employed to emphasis on the growth of water sustainability and efficiency.

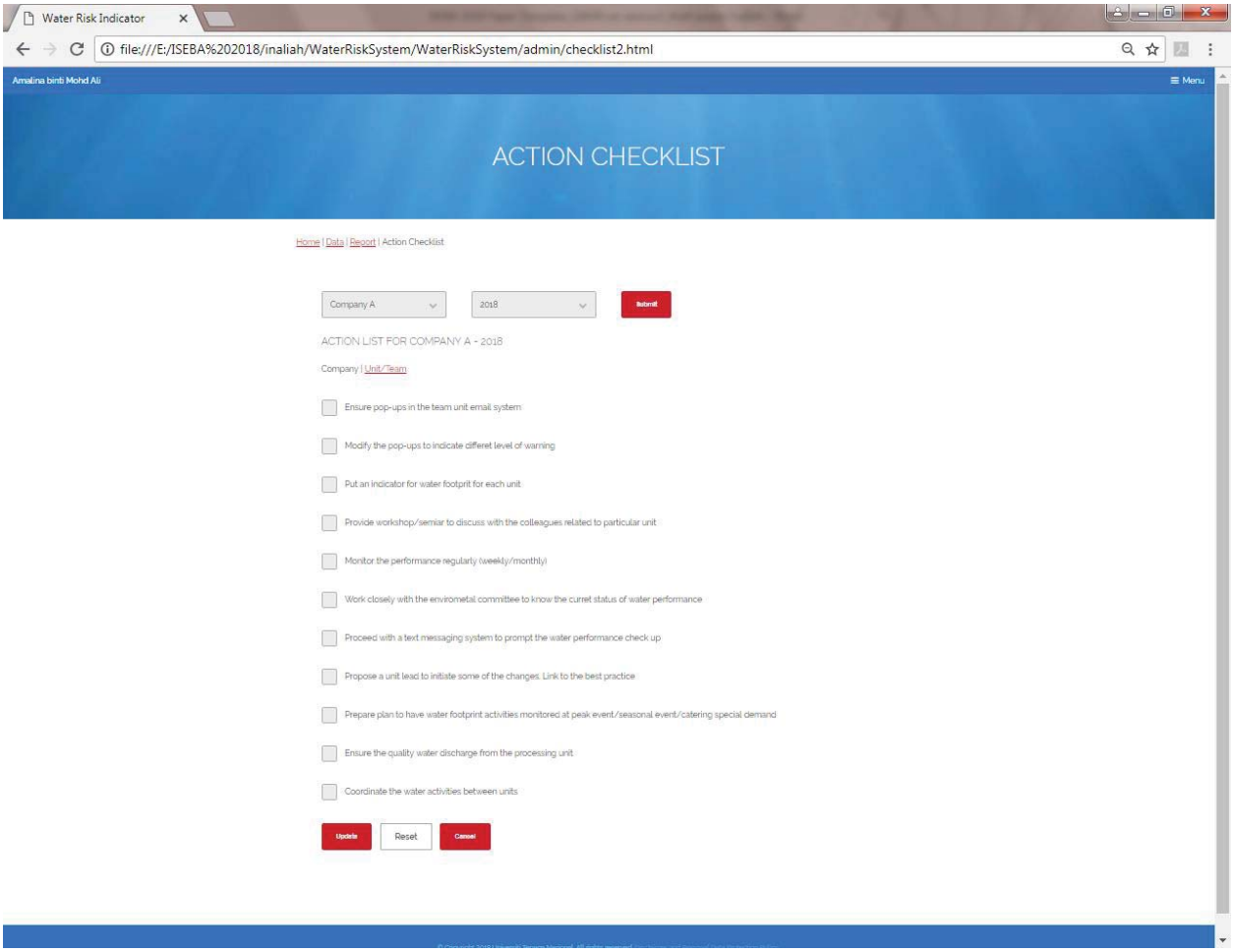

Figure 5 Suggested Actions

Companies are listed in the WaRisk including the companies with water initiatives and also companies lacking of practicing such activities. This may be treated as the proxy and can be used to supplement the benchmarking of the companies with other industrial companies and thus taking remedial actions. The direct link of the annual report of the companies also available to ease the users comparing such initiatives. Based on the annual reports, users may discover the best framework for water governance such as the setting tone from the top of management. Establishment of sustainable committee or environmental committee may improve the initiatives of the companies related to water sustainability. The sustainability reports and other stand-alone reports also obtainable for some companies and may be employed as the company-feature as an additional information during the process of determining the water commitment.

The historical data on water performance from preceding years for each company are accessible in WaRisk with other information related to water management and sustainability control for water risk. Such initiatives and water programmes can be implemented for the future years as suggested by the companies' sustainability committee to further enhance the water performance of the industrial company. Nevertheless, the extent of the data availability is full and overloaded to the users throughout the data analysis and process are yet to be identified.

Figure 5 indicates the action checklist aiming to offer a few actions or arrangements to be implemented for enhancing the initiatives for water sustainability. WaRisk proposes such a system for users to establish their own potential plans regarding water issues. Hence, companies are able to organise their programmes for water governance. Nonetheless, as the validity of the system is yet to be evaluated in the industrial companies, thus it is uncertain as how the recommended action offers the best possible means. In addition, we have lack of knowledge related to the technological error of the system, difficulties during the interaction and overburden of information during data processing.

Discussion and Conclusion

This paper explains the water risk indicator system and considers the applicability for industrial companies. The study clarifies the interface design of WaRisk, supported theories and justification for such design which offers a proposed tool for water governance, and identifying the problems related to water issues in industries into a user-friendly options for future plans. The outcomes indicate a few concern to certify the water disclosure items to plan for the company water performance and efficiency. As such, the system may be developed to improve the user friendliness for industrial use. Future studies may increase the number of sample as the sample size is also one of the limitations in this paper. The companies in the sample may include the companies undergo or yet to have completed quality standard of water governance. WaRisk proposes suggestion for actions to be implemented to alleviate the water scarcity issues. Users could add other suggested actions that match the companies' nature and environmental characteristics comprising the water risk profile of the industrial company. A well-designed water system may further highlight the water footprint and water issues in companies with high water-intensive. The future system may emphasises on department or team unit such as processing raw material department to plan for their water initiatives and water commitment to be in line companies' target on sustainability issues related to water. The water targets and goals could be specific and varies depending on the type of water intensive industries.

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