

## The Role of Green Intellectual Capital on Business Sustainability

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**Abstract:** Recently, Green Intellectual Capital (GIC) and Business Sustainability (BS) have been growing attention among academic researchers and practitioners and become an emerging topic in emerging economic. In Malaysian organizations, interest in these new concepts is low. Thus, in this study, we develop a model to examine the relationship between GIC (green human capital, green structural capital and green relational capital) and BS (economic, social and environmental). SMEs manufacturing organizations in Malaysia is chosen as our target respondents.

**Key words:** Green human capital • Green structural capital • Green relational capital • Sustainability • Malaysia

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### INTRODUCTION

As a result of growing awareness of environmental sustainability and associated organizational green responsibilities has brought outstanding changes to managerial agendas of the organizations across the globe [1]. Instead of being costly, environmental (green) initiatives will improve their competitive advantage [2-5]. In business literature, the phrases sustainability refers to organizations enhancing their long-term economic, social and environmental performance [6].

It is clear that manufacturing impacts the environment; this is true on a global basis [7]. In fact, the use of fossil fuels in manufacturing accounts for 15.4% of the total emission, when looking at greenhouse gases of anthropogenic origin [7, 8]. Furthermore, the consumption of energy used in manufacturing represents 22.2% of the entire plant's fuel [7, 8]. More than mining, oil and gas, agriculture, or other such activities, manufacturing is accountable for more than 50% of solid waste produced all over the world [9]. Manufacturing companies are also responsible for 20.2% of water removal from land; clearly, there are many environmental dangers due to manufacturing [7].

Malaysia is known as biologically diverse countries in the world as has shifted from material production to manufacturing [10]. Manufacturing sector is the major

contributor in Malaysia's economy. However, the rapid economic growth due to the manufacturing industries has impacts the environment [11].

Facing the strict international environmental regulations and high environmental awareness among consumers, actively engaging in environmental management is required for manufacturing organisations nowadays to achieve sustainability [12]. However, the regulations alone is not enough to achieve sustainable development, but it is related others organisation's factors. Environmental knowledge is a root for organizations to understanding of environmental issues.

Thus, intellectual capital (IC) is the new approach in solving the environmental problems in this present knowledge economy. Moreover, incorporates both tangible and intangible assets especially green intellectual capital (GIC) play a key roles in managing environmental problems and to attain sustainability through knowledge transfer, best practices, technology and other initiatives [13].

Chen (2008) has inserted the values of environmental management into IC and produced a set of measurements called as Green Intellectual Capital (GIC) where all the items in the assessment has embedded environmental aspects [14]. This study is based on Chen's framework (2008) stated that managing IC that link to competitive advantage of firms required aspect of green [14]. Further,

currently, according to Akhtar (2015), IC is important to achieve business sustainability (BS) [16]. However, no integrated model is done to show the relationship between GIC and BS. Hence, this study wants to investigate the relationship of the GIC with BS in Malaysian SMEs Manufacturing. This study refers to the classification of IC adopted by [14] Chen (2008) to classify GIC into green human capital (GHC), green structural capital (GSC) and green relational capital (GRC).

### **Literature Review**

**Business Sustainability (BS):** The definition from the Brundtland Report commissioned by the World Commission on Environment and Development (1987) is the most popular and accepted definition [17]. They defined sustainability as meeting the needs of people today without compromising the ability of future generations to meet their own needs [17]. Various phrases of sustainability can be found in the literature, for example, corporate social responsibility, corporate social performance, going green and the “triple bottom line” [18]. It has been generally accepted that core mainstream sustainability thinking has become an idea in three dimensions: environmental, social and economic sustainability.

In business literature, businesses under sustainable development have the responsibility to the environment and the society, aside from its own organizational interests. Sustainable development issues present huge challenges but also huge opportunities for businesses. For instance, companies that operate in a sustainable manner have a better chance of enhancing their reputation and image, as well as improving their financial and environmental performance, which, in turn, will improve their competitive advantage [3, 4, 5].

**Green Intellectual Capital (GIC):** Intellectual capital (IC) was first introduced by John Kenneth Galbraith in 1969 who described it as an intellect, knowledge, skills and brainpower activity that whenever utilized, will create value. Since then, numerous interpretations have been arisen. Initially, the major contributors to bring the concept to forefronts are [19, 20, 21, 22, 23]. IC has been defined as packaged useful knowledge [21] convertible into profit [24] and value [25].

It has been recognized that IC is critical intangible assets to knowledge for future competitiveness. It is also represents a combination of intangible assets such as knowledge, experience, technology and the innovation to

achieve desired outcomes [21, 14]. Moreover in this knowledge economy, IC is the main source of profitability [2, 26, 27]. Many studies have proven that IC contributes to performance of organization [28].

In this study, introduce a novel concept that very little research done on intellectual capital that related to environmental protection or environmental innovation. This is called green intellectual capital (GIC). The definition of GIC proposed by Chen (2008) incorporates environmental concepts into intellectual capital to compensate for previous insufficiencies on environmental issues [14]. GIC represents the intangible assets of a company including its knowledge, wisdom, capabilities, experience and innovation in the field of environmental protection [14]. GIC enables companies to comply with strict international environmental regulations and satisfy ever-increasing environmental awareness among consumers and also creates value for the firm.

This study drew references from the Chen (2008) classifications of intellectual capital to divide the concept of GIC into three parts: green human capital (GHC), green structural capital (GSC) and green relational capital (GRC) [14].

**Green Human Capital (GHC):** Human capital (HC) refers to experts or employees skills, knowledge and experience shared with their organization in order to add value [29]. HC is one of the important components of the intellectual capital (IC) in the organisation’s competitive advantage which includes competencies, attitudes and intellectual agility [23, 30, 31]. Further, IC is the most valuable assets and also believed that the most assets ignored by the organisations [28].

Although many previous studies had paid attention to explore human capital, very few studies discussed human capital that engaging with environmental management. In fact, the organisations that actively engaging in green innovation can increase their productivity, improve organisation’s images and charge higher prices for green products [32, 33, 34,35].

**Green Structural Capital (GSC):** Structural capital (SC) consist of explicit knowledge that embedded in databases, programs and system of the organisations [20] that supports productivity and performance of the employees in organisations [23, 36]. Bontis (1998) highlighted that without SC, intellectual capital would just be human capital [23]. Furthermore, organisation with good structure and skill employees can provide quality service and consequently improve organisation’s performance [37].

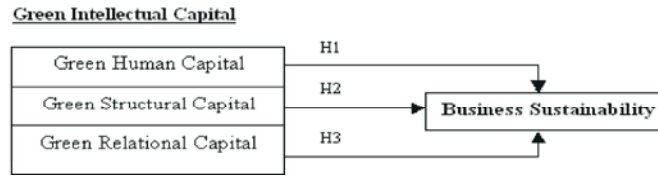


Fig. 2.1: Research Framework

Although many previous studies had paid attention to explore structural capital, very few studies discussed structural capital that engaging with environmental management.

**Green Relational Capital (GRC):** Relational capital (RC) consists of organisation’s relationships and mobilization of knowledge in customer preferences [41]. It is broaden concept of customer capital where customer capital as a subset of relational capital [30, 40, 42]. RC is also consider as good relationships with employees, customer and stakeholders that contribute to high performance and organisational competitiveness [38, 30].

Although many previous studies had paid attention to explore relational capital, very few studies discussed relational capital that engaging with environmental management.

**Green Intellectual Capital (GIC) and Business Sustainability (BS):** Many previous studies highlighted that intellectual capital (IC) contribute to organisation’s competitiveness [20, 38]. Recently, organisations have limited reason to sustain in a business without competitive advantage [39]. Furthermore, most of the studies were focusing on the impact of IC on the business performance [40].

Facing the strict international environmental regulations and high environmental awareness among consumers, given many changes and rules in business sustainability (BS). Therefore, the new approach has needed to find out the solutions. Thus, engaging business with environmental management and green innovation has positive effects to BS.

Although previous scholars had paid great attention to explore intellectual capital(IC), there was no research exploring IC about green innovation or environmental management [14]. It is supported by Akhtar (2015) argued that IC is important to achieve sustainability [16]. However, no integrated model have been applied to green intellectual capital (GIC) and BS. Hence, this study wanted to fill this research gap to examine the role of GIC on BS.

**Research Framework:** The framework is presented in Figure 2.1. The independent variable consists of green intellectual capital (GIC) and dependent variable is business sustainability (BS).

**Hypothesis Development:** Based on the above literature review and research framework, this study implied the following hypotheses:

**Hypothesis 1:** There is a relationship between green human capital (GHC) and business sustainability (BS).

**Hypothesis 2:** There is a relationship between green structural capital (GSC) and business sustainability (BS).

**Hypothesis 3:** There is a relationship between green relational capital (GRC) and business sustainability (BS).

**Methodology**

**Study Sample and Procedure:** The study population are the most knowledgeable individuals includes CEO, environmental managers, manufacturing and production managers, human resource managers and research and development managers, assistant manager from SMEs manufacturing organisations in Malaysia. List of SMEs manufacturing will take from Federation of Malaysian manufacturers (FMM) 2017 as sampling frame. Probability sampling and stratified random sampling method will be used to select the sample of the study. The samples will be stratified by their sub-sector. The questionnaires will sent out via online survey.

**Measures:** In this study, they were four measures used in the questionnaires. A five-point Likert scale will used for all items ranging from ‘1’ ‘strongly disagree to ‘7’ “strongly agree”. Green intellectual capital (GIC) will adopt from Cheng-Li Huang & Fan-Hua Kung (2011) [43]. There are total 32 items. Meanwhile, business sustainability (BS) will adopt from Chow and Chen (2012) [44]. There are total 22 items in the measure. Summary of key construct as per Table 3.1.

Table 3.1: Summary of Key Constructs, Sources of Questions and the Number of Items

Variable	Dimension	No of Items	Source
Green Intellectual Capital (GIC)	Green Human Capital (GHC)	5	(Cheng-Li Huang & Fan-Hua Kung 2011)
	Green Structural Capital (GSC)	12	(Cheng-Li Huang & Fan-Hua Kung 2011)
	Green Relational Capital (GRC)	5	(Cheng-Li Huang & Fan-Hua Kung 2011)
Business Sustainability (BS)	Economic	6	Chow & Chen (2012)
	Social	6	
	Environmental	10	

## CONCLUSION

As the increase of environmental awareness and strict international environmental regulations give an impact to the business sustainability. A business is sustainable when considering not only economic and social aspects but to protect the natural resources. This has led an organisation to invest on green innovation to sustain in their business. In this knowledge economy era, intellectual capital (IC) has become more important to organisation. Many of past studies majorly focused on the relationship between intellectual capital (IC) and performance, not specifically in green intellectual capital (GIC) and business sustainability (BS). Environmentalism and sustainability is becoming more concern recently. Thus, this study suggests that GIC as the key element for BS. This study will make a useful contribution to management research related to green innovation. Meanwhile for practitioners, this study believe will help them more understand the importance of GIC can effect to BS, which will be applies in their decision making process in green management.

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