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A REVIEW OF CONSTRUCTION WASTE MANAGEMENT AND INITIATIVES IN MALAYSIA

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Abstract: Construction industry is one of the important industries that generate wealth and the development of social and economic of the country. The insufficient implementation of waste management practices in the construction projects has led to the unsuccessful result in reducing environmental impacts and illegal dumping. This paper presents a review of existing literature on construction waste management in Malaysia and initiatives that have been implemented in the Malaysian construction industry. The pattern of literature indicates that the existing construction waste management initiatives provided by the Malaysian government are insufficient in terms of the inert landfill to meet the increase in construction waste. In addition, the initiatives implemented are seemingly inefficient due to lack of enforcement and implementation. Thus, it is essential to fill in the gaps by way of more effective initiatives and improvement to the existing practices in order to achieve effective construction waste management.

Keywords: Construction waste, construction industry, waste management, initiatives, Malaysia.

Introduction

There have been increasing construction wastes attributable from insufficient waste management practices in the construction projects since the last two decades (Nagapan *et al.*, 2012). Apart from being a waste contributor, construction waste also contributes to serious environmental issues in Malaysia. However, foreign and local investment in the construction industry has spurred employment opportunities and contributed to the nation economy. In addition, the construction industry in Malaysia plays significant roles in generating wealth through a constant growth in the Gross Domestic Product (GDP) contribution and influences the development of social economic infrastructures and buildings (Said *et al.*, 2012). The construction industry consists of professional consultant firms and organisations which contribute to the infrastructure and all types of development projects (Foo *et al.*, 2013). According to Anuar *et al.*, (2011), the industry that plans and constructs buildings and civil engineering projects are also defined as the construction industry. However, there are numerous authors who have given their own definition for the construction industry depending on their point of view (Osman *et al.*, 2012).

In general, the construction activities refer to many activities such as building works, tunnelling, road works, bridges and airfield (Nagapan *et al.*, 2012). Whereas construction industry is being oblivious as to its impact on the environment and often known as a profit-oriented industry (Nagapan *et al.*, 2013). For the past few decades, the amount of construction waste has gradually increased due to the construction activities (Jaillon *et al.*, 2009) and drastic growth in respond to rapid developments and urbanisation (Papargyropoulou, 2011). Solid Waste and Public Cleansing Management Corporation of Malaysia confirms that approximately 8 million tonnes of construction wastes per year generated from construction projects (Taha, 2015). Even so, construction projects are important in providing the necessary infrastructure towards the development of the country. Furthermore, construction wastes are also associated with serious environmental issues in Malaysia (Papargyropoulou, 2011)

and similar scenario can be found in many other countries. In line with that, Begum *et al.*, (2009) re-affirmed that Malaysia is facing the issue of waste disposal due to the significant increase of construction wastes. The quality and quantity of products that have been produced for the purpose of construction projects are one of the contributing factors of this issue (Papargyropoulou, 2011). Apart from that, Malaysia generates 25,600 tonnes of municipal solid wastes daily. The generation of Municipal Solid Waste (MSW) in one of the districts in the state of Johor, Southern Malaysia has increased up to 3000 tonnes per day (Begum *et al.*, 2009). On that notes, the Malaysian government needs to tackle this problem by revising the existing strategies in implementing construction waste minimisation initiatives. Currently in Asia, the construction waste management policies are minimal (Jain, 2012). There is a need for regional and national policies, laws and regulation for construction waste to overcome these problems. As a result of the 10th Malaysian Plan, the increasing numbers of construction projects in the recent years have led to environmental issues such as negative impacts on the ecosystem which caused water and air pollution (Nagapan *et al.*, 2013). Furthermore, in a recent study on impacts of construction waste, Njoroge (2012) found the environmental degradation, destruction of the ecosystem and risks to public health are caused by poor management of wastes in terms of the disposal and handling of wastes. The increasing production of waste is a global phenomenon that needs to be addressed and tackled by all (Abd Kadir *et al.*, 2013).

The United States of America Environmental Protection Agency (2012) reported that 40% of the wastes are generated from the construction activities. A similar scenario applies in Malaysia whereby more than 25,000 tonnes of waste were generated from the construction projects. Thus, in order to curb these issues, Malaysia is yet to adopt a more rigorous legal instrument for the construction waste management (Johari *et al.*, 2014). Therefore, it is important for the Malaysian government to address this issue by providing comprehensive legal instruments pertaining to construction waste minimisation. This paper presents the analysis of literature review on the construction waste management in Malaysia with regards to identifying the gaps in terms of the existing initiatives and current practices.

Construction Waste Management and Initiatives in Malaysia

Construction Industry

The development of infrastructures is part of the living environment; it is very much affecting the living conditions, social well-being and health (Manaf *et al.*, 2009). Because of the higher demand in new development, a significant amount of waste generated may also increase. For the purpose of this research, the definition of the construction industry can be concluded as all work on civil engineering and building projects (Osman *et al.*, 2012). The authors also added that the construction industries are risky and dangerous. The construction industry is important to the economic growth. However, the increasing development in Malaysia has led to the damage on the environment and disturbed the ecosystem. It becomes a major problem (Nagapan *et al.*, 2013). In conjunction with Nagapan *et al.*,'s statement, Jain (2012) reported that the construction industry produces a large amount of construction waste. On the other hand, it is well accepted that the construction activities such as construction work, renovation or demolition will generate inert and non-inert materials, which are normally being addressed as construction wastes. Moreover, statistical data confirms that 10-30% of wastes originated from construction and demolition works (Jain, 2012).

According to Bal *et al.*, (2013), the most dynamic and challenging business sector is the construction industry. Even so, the industry contributes to the significant amount of wastes. As mentioned earlier, despite being a waste contributor, construction wastes are also linked to serious environmental issues such as destroying the habitat and ecosystem; creating pollution; and generating waste (Papargyropoulou, 2011

& Abd Kadir *et al.*, 2013). In summary, it is well established that the construction industry produces a significant amount of wastes and is also linked to environmental issues.

Concept of Waste

The formulation of waste management strategies and regulations is necessary to abate further negative effects to the environment. Prior to that, the concept of waste needs to be addressed to set as a platform and ensure consistency. Waste is defined as any final product which in the end does not worth for the owner and considered as wastes (Rajendran, 2012). Besides that, Nagapan *et al.*, (2012) also defined waste as unwanted products or materials and the Germany Waste Act states that waste is any products that have been left by the owner or need to be disposed to protect the environment (Ramachandra, 2002). On the other hand, Formoso *et al.* (2003) defined waste as the process and operational concept. The author also added that the definition of waste is the resources used to producing a product but in the end has no value.

Table 1: Definitions of waste

Authors	Definitions
Ramachandra (2002)	The Germany Waste Act states that waste is any products that have been left by the owner (s) or need to be disposed to protect the environment.
Formoso *et al.*, (2003)	Waste is the process and operational concept. The author also added that the definition of waste is resources used to produce a product but at the end has no value.
Rajendran (2012)	Waste can also be defined as any final products which at the end do not worth to the owner and the owner sees it as a waste.
Nagapan *et al.*, (2012)	Waste is unwanted products or materials.

To conclude, three authors seem to agree and conclude that waste is the process of any products but in the end of the process the products have no value and cannot be used (Ramachandra, 2002; Formoso *et al.*, 2003 & Rajendran, 2012). Furthermore, the unwanted products will end up in the landfill. Nevertheless, this can be prevented if the waste could be recycled. Waste can be classified as construction, demolition, domestic, hazardous, and scheduled wastes and E-waste. The construction and demolition wastes will be focused more on this research. Thus, the definition, classification, causes and impacts of the construction waste will be further discussed in this paper.

Construction Waste

The construction waste is regarded as one of the main causes of environmental and health problems such as asbestos which is generated during the demolition works and can be hazardous. Essentially, building materials are the main contributors of the construction waste (Formoso *et al.*, 2003). There are several authors who have defined construction waste as follows:

Table 2: Definitions of construction waste

Authors	Definitions
Shen *et al.* (2004)	Construction wastes are any building materials, concrete, steel, timber and other materials which are arising from various construction activities.
Wrap (2006)	The construction, renovation and demolition activities which generate waste; the excess or damaged products during construction work; and temporarily products used during the activities are called as construction and demolition waste.
Tam *et al.* (2007)	Construction waste is defined as any unwanted products from the construction, renovation and demolition works.

Lu & Yuan (2011)	Any waste or damaged materials generated from construction, renovation and demolition activities.
Rajendran (2012)	Any waste related to design changes, unused materials, packaging waste and errors in designs.
Nagapan *et al.* (2012)	Materials with no remaining value.
Jain (2012)	Activities such as construction, renovation or demolition of structures generate an inert and non-inert material defined as construction wastes.
Muhwezi *et al.* (2012)	Any material that needs to be recycled or reused other than a particular purpose project because of damages, excessive, non-use, or noncompliance with the specifications needed.

In conclusion, eight authors have defined construction waste as listed in Table 2. On a general note, construction waste has not been seriously managed in most of the countries. As a result, the amount of construction waste is growing (Cheng & Ma, 2013). There is a need for more proactive measures to be formulated and participated by all parties concern.

Classification of Construction Waste

In terms of classification, there is the inconsistency of addressing the classification of construction waste as depicted in Table 3.

Table 3: Classifications of construction waste

Authors	Classifications
Formoso *et al.* (2003)	Direct and indirect waste. Direct waste is defined as materials which are completely loss because of damage. On the other hand, indirect waste refers to inaccurate works which are inconsistent with the design, for example, the construction of concrete slab which is inconsistent with the specification.
Yahya & Boussabaine (2006)	Construction waste is divided into three main categories: a) Labour; b) Materials; and c) Machinery waste
Jaillon *et al.* (2009)	Waste from construction activities which are the mixture of inert (soil, earth and slurry) and non-inert materials (metal, timber and packaging waste)
Nagapan *et al.* (2011)	Divided into two which are the physical and non-physical wastes. Non-physical wastes are generated during the construction process such as time and financial. However, physical waste is generated from the construction activities.
Muhwezi *et al.* (2012)	Five categories of construction wastes: 1. Material; 2. Time; 3. Labour; 4. Process; and 5. Equipment
Nagapan *et al.* (2012)	Two categories which are physical and nonphysical waste. Six types of construction wastes: 1. Timber; 2. Metal; 3. Bricks; 4. Concrete; 5. Packaging; and 6. Mortar

Based on a study carried out by Foo *et al.* (2013) for three months on the construction sites, the author found five main types of physical wastes at the sites as follows:

i. Concrete waste: Concrete waste is caused by improper handling of concrete;

ii. Timber waste: Timber waste is generated when timber usually used as formwork;

iii. Steel waste: Steel waste is waste generated due to mistakes while cutting off bars;

iv. Brick waste: Brick waste is generated because of problems in the handling of materials during the construction stage; and

v. Packaging waste: Packaging waste is generated at site during the delivery process.

In conclusion, the construction wastes can be categorised as material, equipment, labour, time, and machinery wastes.

Causes of Construction Waste

Wastes are generated throughout the construction project starting from the design until the final stage. In addition, there are various factors that have led to the generation of construction waste. It is indeed important to identify those causes for the purpose of controlling waste generation at source. Most of the construction waste is generated during the design and construction process. According to Nagapan *et al.* (2012), the generation of construction waste is caused by several factors such as design, workers, management, procurement, site condition, handling and external factors. Previous researchers have identified 63 factors which produce construction waste. Sources of waste have been categorised as design, operation and handling, employees, management, site condition, procurement and external factors (Nagapan *et al.*, 2012). In fact, some of the construction materials use huge amounts of non-renewable sources of energy such as timber, sand, and crushed stone (Formoso *et al.*, 2003). The causes of construction waste are presented in Table 4.

The results of previous studies (Table 4) confirm that there are numerous causes of construction wastes. Indeed, previous studies indicate that these causes of construction waste have led to negative impacts on the environment, social and economy (Nor *et al.*, 2013).

Table 4: Causes of the construction waste

Authors	Causes
Yunpeng (1995)	i. Workers do not apply the waste management measures during construction process; ii. Low performance of building materials and lack of technology; iii. Lack of communication; iv. No irritation of market benefit; and v. Short of supervision.
Jain (2012)	i. Lack of awareness; ii. Lack of interest from clients; iii. Lack of proper training and education; iv. Lack of skilled labour; v. Lack of market competition; vi. Lack of government Interventions; and vii. Lack of waste reduction approaches by architects/designers.
Formoso *et al.* (2003)	i. Steel reinforcement; ii. Premixed concrete; iii. Cement; iv. Sand, lime, and premixed mortar; v. Bricks and blocks; vi. Ceramic tiles; and vii. Pipes and wires.

Nagapan *et al.* (2013)	i. Wrong material storage; ii. Poor materials handling; iii. Poor quality of materials; iv. Ordering errors; v. Mistakes in quantity surveys; vi. Poor attitudes of workers; vii. Poor supervision; and viii. Lack of waste management plans.
Nagapan *et al.* (2012)	i. Design changes; ii. Poor handling and storage; iii. Workers' mistakes; iv. Poor management; v. Poor site condition; vi. Procurement (ordering errors); and vii. External factor.

Impacts of Construction Waste

The generation of construction waste is caused by improper management of building materials in construction projects (Hassan *et al.*, 2012). They have caused impacts on the environment at every stage of the building process (Begum *et al.*, 2009). Environmental pollution that affects the public health has increased global concern over the last three decades (Hossain *et al.*, 2011). The impacts of construction will stretch into the lives of the current and future generations. There is no construction activity which does not have an environmental impact.

One of the major causes of construction waste is improper waste management. Lack of waste regulations and improper disposal facilities are the sources of unsuccessful waste management (Njoroge, 2012). Construction waste management is very important to avoid the negative impacts on the environment, social and economy Nagapan *et al.* (2011). It will become an issue if it is handled poorly. However, construction wastes which create issues such as illegal dumping require greater attention. According to Nor *et al.* (2013) the impacts of construction waste on the environment are:

i. Unbalanced ecology;
ii. Change of living environment;
iii. Potential sewage;
iv. Depletion of natural sources;
v. Energy consumption; and
vi. Generation waste.

Furthermore, a recent study of impacts of construction waste by Njoroge (2012) found that the environmental degradation, destruction of the ecosystem and risks to public health are caused by poor management of waste in terms of disposal and handling of waste. Nagapan *et al.* (2012) regards that the major factors which contribute to an increase of illegal dumping sites are the financial issues and location of the construction project. The distance between the project location and landfill site is too far that has led the contractors to refuse disposing waste to the gazetted landfill. Apart from that, it was reported that the contractors intended to avoid payment for landfill charge and transportation cost in order to maximise profit (Nagapan *et al.*, 2012). The construction industry has an important role in ensuring sustainable development to be achieved. Thus, the Malaysian government agencies should play an active role by introducing new legislation and enforcement regime.

Construction Waste Management

The effectiveness of environmental management is very imperative (Kralj, 2010). The Malaysian government has proposed a variety of construction waste management. Unfortunately, it is yet to achieve the level of effectiveness required in managing the construction waste (Abu Eusuf *et al.*, 2012). Construction waste management is one of the sustainable development approaches to minimise waste and avoid negative impacts on the environment

(Yuan, 2013). Management of waste includes monitoring, collection, transport, processing and waste disposal. However, Nagapan *et al.* (2012) defined construction waste management as tools to identify the suitable waste streams, target rates for waste generated and process to ensure good practices are achieved. Management can be defined as the process cycle in an organisation such as planning, controlling, evaluation and so forth (CIDB, 2007). Furthermore, the construction waste management is important to be carried out on the construction site (Rajendran, 2012).

In conjunction with that, Jaillon *et al.* (2009) stated that the process of sorting out waste to the right location is defined as waste management. In addition, Fauziah and Agamuthu (2012) defined waste management as the discipline that encompasses solid waste generation, storage, collection, transport, processing, and disposal by considering the environmental, economic, aesthetics and public concerns. There are too many efforts that have been carried out by the Malaysian government to minimise the generation of waste by providing landfill area. Nevertheless, the contractor who failed in implementing good waste management led to the mismanagement of construction waste (Sin *et al.*, 2012).

Construction wastes need to go through a pre-treatment process before disposal. There are 3R concepts in waste management that need to be suggested such as reduce, reuse and recycled. According to Giusti (2009), the criteria of waste management hierarchy should begin from waste minimisation, waste re-use, recycling, and lastly, landfill. The process of construction waste management at the end will end up in landfill (Fauziah & Agamuthu, 2012). Hence, it is vital to effectively utilise the construction resources in order to reduce the generation of waste. The most common approach used in the construction waste management is dumping in landfill sites. Unfortunately, limited space for landfill sites has contributed to the increasing of illegal dumping areas (Gentil *et al.*, 2011).

Ismam and Ismail (2014) pointed out that the Malaysian government is responsible to improve the implementation of waste management in the construction industry in terms of regulation, policy, technology, and guideline. The standard of living in Malaysia is increasing due to the urbanisation and population growth and unfortunately, it increases the production of wastes (Oh *et al.*, 2010). Additionally, there are a lot of benefits in implementing good practice on waste management in the construction project such as (Wrap, 2014):

i. Reducing the financial cost for disposal through minimising the use of material;
ii. Reducing the environmental impacts; and
iii. Maximising sustainable design.

In reference to Abolore (2012), the disposal method usually used in Malaysia is the land filling process but it also depends on the availability of land to reduce pollution and environmental impacts. Malaysia is currently facing a big problem when the aspect of landfill management is not emphasised (Fauziah & Agamuthu, 2012).

Nevertheless, there are challenges faced by the waste management practitioner in managing construction waste. Mallak & Ishak (2012) concluded that there are six various factors contributing to the failure of waste management, which are:

i. Lack of awareness;
ii. Information problems;
iii. Technology problems;
iv. Packaging problem;
v. Financial problem; and
vi. Poor cooperation by the government.

Thus, there is a need to recover this problem before it becomes wary. Meanwhile, a research done by Cheng & Ma (2013) stated that the sustainable waste management will become an important practice in the construction industry in the future. With the expansion of urban areas, all stakeholders should ensure that the construction

waste management is fully implemented to steer the construction industry in the right direction.

Previous Research on Construction Waste

Significant numbers of researches in the area have been conducted concerning the construction waste management. Formoso *et al.* (2003) have conducted a survey research on the construction waste. The research was intended to look for possibilities to minimise the amount of waste generated and tackle the problem of limited area for final disposal. This survey research was also concerned with the environmental impact. The research identified lack of control of material usage was the main of sources of waste.

While in Japan, the percentage of illegal waste dumping was found increasing from 20% to 70% in the year 2003 until 2004 (Baldwin *et al.*, 2009). Another study was carried out with respect to the construction waste management in Mainland, China where the construction waste was 30 to 40% as a result of rapid development (Baldwin *et al.*, 2009). In the European Union, 30% of waste is produced by the construction activities (Baldwin *et al.*, 2009).

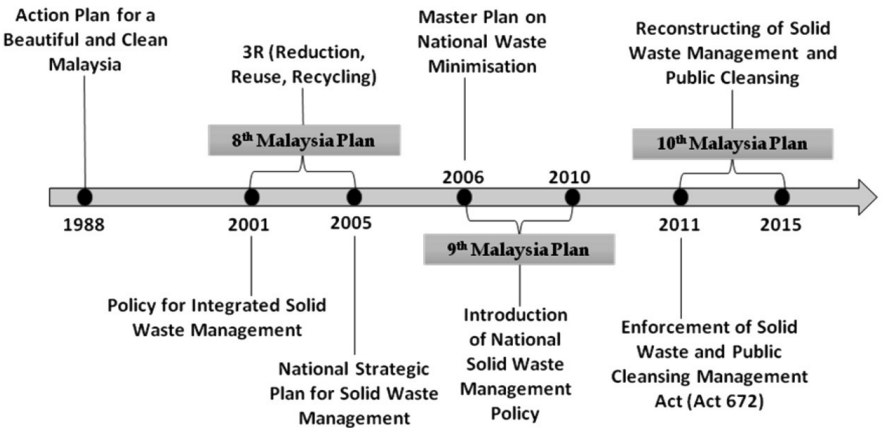
A study conducted in the United Kingdom has concentrated on the waste management. In the UK, the concept of hierarchy was adopted in the waste management strategy namely; reduce, reuse, recovery, and disposal. The level of awareness on the reduction practices and knowledge of the users was enhanced through the introduction of relevant guidelines (Mallak & Ishak 2012).

In Hong Kong, the construction industry is generating construction waste in large quantities. For instance in 2000, 37,690 tonnes of waste was generated per day, whereby 80% of waste was brought for reclamation and the remaining 20% was disposed at landfills. In order to overcome this problem, the Hong Kong government enacted waste disposal charge scheme to minimise construction waste in January 2005 (Yu *et al.,* 2013).

In 2006, the Ministry of Housing and Local Government has carried out a study to formulate the master plan; action plans and guidelines to promote the reduction of solid waste (Ministry of Housing & Local Government Malaysia, 2006). Based on a study that was carried out, the status of waste management faces several obstacles which are divided into more than five which are; the problem of awareness, information problems, a problem of technology, packaging problems and other problems such as poor financial and cooperation by the government (Mallak & Ishak 2012). Therefore, the importance of raising awareness among the stakeholders in the construction industry should be considered. Other than that, the previous common practices should be revised in order to achieve successful construction waste management plan.

Construction Wastes Management Initiatives in Malaysia

Construction waste management is yet to be implemented effectively to address the illegal dumping issue. Approximately 25,600 tonnes of waste are produced in Malaysia daily, in response to the rapid development and urbanisation (Badgie *et al.*, 2012). According to Sreenivasan *et al.* (2012) there are seven types of solid wastes which are; residential, industrial, commercial, institutional, construction and demolition, municipal services and other human processes. According to a study conducted by Md Zain *et al.* (2012), only 76 per cent of solid wastes were successfully collected in Malaysia. However, from the percentage only 5 per cent of solid waste was recycled and 95 per cent of the collected wastes were disposed at the country landfills. Thus, the management of the construction waste is very important to be explained in details by the government in order to explain the goals and priorities of the construction waste management. Thus, there are various initiatives implemented by the government to resolve the issues on construction waste in Malaysia. The concept of initiative applied in this research was defined as varying plans and strategies for improving services or any system required and intended to solve a problem or any issues existed regarding construction waste (Agarwal & Chaudhary, 2015).



Sources: Saadi & Ismail (2015)

Figure 1: Timeline of solid waste management transition in Malaysia

The policy is one of the government initiatives and important for the purpose of protecting the environment. The drafting of relevant legislations and laws need to be added to the general legal framework of the waste management policy (Abu Eusuf *et al.*, 2012). At present, the establishment of policy is important as an effort to introduce clearer goals and priorities in the construction waste management and environmental protection to the government by formulating appropriate laws, legislation, regulations and standards (Din *et al.*, 2007).

The timeline of solid waste management transition in Malaysia is showed in Figure 1. The solid waste management policies in Malaysia are National Strategic Plan on Solid Waste Management (2005), National Solid Waste Management Policy (2006) and Solid Waste and Public Cleansing Management Act (Act 672) (2011) (Solid Waste Management and Public Cleansing Corporation, 2015). A new approach was introduced by the government in the 8th Malaysia Plan (2001-2005) namely the reduction of waste, reuse used material and recycling used material. Moreover, to reduce the use of energy, materials, pollution and to minimise waste, strategic policies were introduced and local authorities have been given responsibilities to ensure a more comprehensive waste management policy.

The National Strategic Plan for Solid Waste Management was introduced in 2005 as the solid waste management policy. The strategic plan is implemented in the Peninsular Malaysia until 2020. A waste management policy becomes more important in Malaysia due to the ineffective management of waste which has caused negative impacts on the environment. An effort by the Malaysian government to address this issue is evident by the enactment of Solid Waste and Public Cleansing Management Act (Act 672). There are two new federal institutions established to implement the solid waste management policy which are; the National Solid Waste Management Department and Solid Waste Management and Public Cleansing Corporation (Papargyropoulou, 2011). According to the Ministry of Housing and Local Government (MHLG), the agency targeted for 22 percent of waste to be recycled by the year 2020. In order to reduce waste, the 9th Malaysia Plan (2006-2010) has integrated the concept of recovering into existing approach. The strategies need to be modified in order to achieve a more systematic waste management. There are three main strategies for enhancing waste minimisation which are (Nizam & Yusoff, 2010):

i. Enhancing the level of awareness on minimising waste;

ii. Strengthening the reduce, recycling and reused activities; and

iii. Strengthening the roles of government agencies to ensure that policies are effectively implemented.

In 2006, the Construction Industry Master Plan (2006-2015) was introduced to improve the performance of the construction industry. The Strategic Thrust No. 3 of the plan was aiming to improve the quality of work, safety and health, and environmental practices. In conjunction with the Construction Industry Master Plan, there were actions taken by the Construction Industry Development Board (CIDB) to achieve the Strategic Thrust No. 3. CIDB has introduced the Guidelines on Construction Waste Management to improve the environmental performance. However, the results have not been translated in the form of legal instruments and enforcement. Consequently, the Malaysian contractors seem to apply their own initiatives to manage construction waste, which does not reflect the existing initiatives implemented by the Malaysian government (Mallak *et al.*, 2014). The failure of the connection between initiatives implemented by the government and practiced is caused by lack of enforcement, lack of implementation and uncertainty over responsibilities among the governing authorities. However, the effective waste management is very much important in order to protect the environment (Jalil, 2010).

In September 2015, the Construction Industry Development Board (CIDB) launched the Construction Industry Transformation Programme 2016-2020 (CITP) as the continuation of the Construction Industry Master Plan (CIMP) 2006-2015 to ensure continuity and consistency with the national agenda in achieving the Eleventh Malaysian Plan thrusts. There are four strategic thrusts being introduced in CITP to lead the transformation of the construction industry which are; Quality, Safety, and Professionalism, Environmental Sustainability, Productivity and Internationalisation (CIDB, 2015). Thus, the strategic thrust No 2 in CITP was developed in order to achieve the sustainable infrastructure. Five strategic initiatives have been carefully designed to tackle the issues holistically which are; drive innovation in sustainable construction; drive compliance to environmental sustainability ratings and requirements; focus on public projects to lead the charge on sustainable practices; facilitate industry adoption of sustainable practices; and reduce irresponsible waste during construction (CIDB, 2015). However, the implementations of such initiatives are essential in order to achieve the environmental sustainability in Malaysian construction industry.

Conclusion

The overview of construction waste and initiatives reveals the current situation of construction waste management and initiatives in Malaysia. Not all the initiatives are implemented by the construction stakeholders. Thus, a more holistic approach is needed to ensure the economic, social, and environment aspects can be protected. In conclusion, a strong support from the Malaysian government is needed in providing a more effective policy in managing construction waste. Otherwise, the sustainability and environmental problems will not be addressed effectively.

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