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Top-down Approach and Good Governance Concept towards Sustainable Construction Waste Management

[1]Seow Ta Wee, [2]Ng Lee Shan, [3]Tan Lai Wai and [4]Goh Kai Chen

[1]Associate Professor, Department of Construction Management, Faculty of Technology Management and Business, University Tun Hussein Onn Malaysia, 86400 Parit Raja, Batu pahat, Johor, Malaysia.
[2]Phd Student, Faculty of Civil and Environmental Engineering, University Tun Hussein Onn Malaysia, 86400 Parit Raja, Batu pahat, Johor, Malaysia.
[3] Associate Professor, Department of Water and Environmental Engineering, Faculty of Civil and Environmental Engineering, University Tun Hussein Onn Malaysia, 86400 Parit Raja, Batu pahat, Johor, Malaysia.
[4] Senior Lecturer, Department of Construction Management, Faculty of Technology Management and Business, University Tun Hussein Onn Malaysia, 86400 Parit Raja, Batu pahat, Johor, Malaysia.

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ABSTRACT

Background: Large amount of construction waste are continually produced by the construction industry with the rapid construction development in Malaysia. Many researchers have found that several types of construction waste can be potentially reused or recycled. However, the implementation of the construction waste management nowadays differs from the actual planning. Majority of contractors do not practice reduction, reuse or recycling at construction sites. It will cause non-sustainable in construction waste management which increase the generation of construction waste in landfills. In order to achieve the goal of sustainable construction waste management, waste reduction through 3R should be implemented among construction contractors. Top-down approach is hierarchical style of decision making and enforced through several tiers of hierarchy from top to down until bottom tier. Good governance concept is to coordinate the collective activities in process of making important decisions and determines who are involved and how they afford in a group. **Objective:** This paper generally aimed to discuss the top-down approach and good governance concept in sustainable construction waste management**. Conclusion:** Adoption of top-down approach and good governance concept is necessary to take consideration in implementation construction waste reduction to achieve sustainable construction waste management.

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INTRODUCTION

Construction industry were consumes a huge amount of natural resources and generates large quantities of construction waste. Construction waste is defined as the waste that arising from the construction, excavation, renovation, demolition, roadwork and other related activities (Poon, 2007). Generally, construction waste is consisting of wood, drywall, masonry (Agamuthu, 2008), dirt, brick, concrete, asphalt, glass, plastic and metal (Huang *et al*., 2011).

Controlled solid waste include commercial solid waste, construction solid waste, household solid waste, industrial solid waste, institutional solid waste, imported solid waste, public solid waste and time to time solid waste (NSWM Department, 2013). Construction waste management is considered a tool to control the cost of construction waste disposal and to facilitate other alternative than disposal method such as reuse and recycling to reduce construction waste disposed at landfills (Minks, 1994).

Disposal is not a sustainable solid waste management solution. Besides that, individual's communities are not willing to accept a new landfill site implement near them. It is because of the concerns about smell, litter, pollution and value reduction of their houses (Ngoc and Schnitzer, 2009). Reducing, reusing and recycling construction waste have been promoted and suggested practice in construction waste management due to the uncontrolled of pollution generation from construction industry (Tam, 2010).

Corresponding Author: Ng Lee Shan, Faculty of Civil and Environmental Engineering, University Tun Hussein Onn Malaysia, 86400 Parit Raja, Batu Pahat, Johor, Malaysia.
Tel: +60165532456; E-mail: leeshan3122@gmail.com

Overview of Solid Waste Management in Malaysia:

National Solid Waste Management (NSWM) Policy aims to establish a holistic, integrated, cost effective, sustainable, and community accepted solid waste management system that emphasizes the conservation of the environment, selection of affordable technology and ensuring public health. In addition, NSWM Policy also seeks to implement solid waste management based on the waste hierarchy which emphasizes waste minimization through 3R, intermediate treatment and final disposal (NSWM Department, 2015a). Solid waste reduction through 3R is one of the thrusts of National Solid Waste Management Policy. 3R represents the concept of reduce, reuse and recycle (NSWM Department, 2012).

National Solid Waste Management (NSWM) Policy is one of the policies under Ministry of Urban Wellbeing, Housing and Local Authority. Malaysia Government introduced the Solid Waste and Public Cleansing Management Act 2007 and established the National Solid Waste Management Department and the Solid Waste and Public Cleansing Management Corporation aiming to implement the country's solid waste management policy (Papargyropoulou *et al*., 2011). Act 672 empowers the Federal Government to take over the management of solid waste and public cleansing from the Local Authorities (SWPCM Corporation, 2015).

Solid Waste and Public Cleansing Management Act 2007 had been enforced on 1 September 2011 in order to enable the implementation of full privatization (Ministry of HLG, 2012). Clause 101 Reduction, Reuse and Recycling of Controlled Solid Waste was directly undertaking the implementation and enforcement 3Rs strategy (Moh and Manaf, 2014) in the Solid Waste and Public Cleansing Management Act 2007 (Act 672) which require all the solid waste generators to reduce the generation of solid waste (Agamuthu *et al*., 2009). Act 672 is not enforced comprehensive because only a few states enforced the Act. States do not enforce the Act including Labuan, Selangor, Perak, Penang, Kelantan and Terengganu (NSWM Department, 2015b) which have their own legal enforcement approaches regarding the solid waste and public cleansing management (Moh and Manaf, 2014).

Exception of enforcement Act 672 provided because some states have not participated in the privatization of solid waste management (Berita Harian, 2011). The state government of Penang will not budge in their decision that not to privatize the solid waste and public cleansing management services. Besides that, the chairman of the Committee Local Government and State Traffic Management have highlighted that the services provided by the State Government is sufficient and good and does not require recommended private services (Vinesh, 2012).

With the privatization, the authority governing solid waste and public cleansing is shifted from state governments and Local Authorities to the federal government (Agamuthu *et al*., 2009). The privatization of solid waste management services only involved household solid waste. Services for solid waste such as construction waste, industrial and commercial waste open to parties or contractors those interesting (NSWM Department, 2015b).

Current Construction Waste Management in Malaysia:

Malaysia is a country that is facing an increase in waste generation and the negative impacts of disposal (Begum *et al.*, 2007a). Construction waste sent to landfills without reused or recycle caused its anaerobic degradation leads to air pollution and contamination of the ground water and soil (Lu *et al*., 2015). Minimizing the amount of waste disposal at landfills can lead to less demand for landfill and reduction of negative environmental effects (Hwang and Yeo, 2011). Besides that, it also adversely affect human (Omran, 2008) and gives negative impact on the health and ecological risks (Chuen and Jamal, 2011).

Translation of policy into actual practice is a challenging and legitimate concern in developing countries (Saetren, 2005). Implementation of solid waste management policy is not an easy task to practice in Malaysia (Marshall and Farahbakhsh, 2013). Malaysian government is facing challenge in the solid waste management nowadays because the implementation of the policy differs from the actual planning. Recycling is still at an infant stage in Malaysia (Manaf *et al*., 2009). The currently recycling rate of Malaysia is only 5% where the recycling rate in Japan is about 40% (Moh and Manaf, 2014). The implementation solid waste reduction through 3R is currently ineffective and has limited in the construction industry in Penang (Ng *et al*., 2015).

The major constraint to implement the solid waste reduction through 3R is lack of place, contractor's attitude and less recyclable and reusable construction waste (Ng and Seow, 2014). The perception and awareness of recycling among the public is not high and low public concern is the cause for limited recycling implementation (Agamuthu *et al*., 2011). Delay in the formal adoption and implementation of 3R policies is the significant key gaps between the theory and practice in 3R policies which the actual practice without the formal enforcement of the policies (Agamuthu *et al*., 2011). Most construction contractors only focus on short term economic benefits and are unwilling to increase inputs on construction waste management (Hu, 2011). Besides that, the Municipal Council is involved in providing landfill and disposal services but does not interfere in the process of construction waste management at site (Ng *et al*., 2013). This is

because contractors are responsible for the task of managing the construction waste before the disposal activity (Seow and Mohamad, 2007).

Sustainable Construction Waste Management:

Construction waste generation has been identified as one of the major issues in the construction industry due to its brought directly impacts (Udawatta *et al*., 2015) in serious environmental pollution, which has created great negative impacts on the sustainable development of environment (Hu, 2011). The sustainability is a popular word today and it is not a new topic nowadays (Kaosol, 2009). Sustainability is generally defined as a steady state. In terms of natural resources, it implies a near constancy in their balances (Reijnders, 2000). Meanwhile, sustainable waste management strategies are explicitly set on the reduction, recycling and reuse (Chung and Lo, 2003).

Reduction of construction waste as a appropriate approach towards sustainable construction waste management (Ngoc and Schnitzer, 2009). Reduction of construction waste has been focused on improving the performance in effort to lead the goal of sustainable industry (Kulatunga *et al*., 2006). The use of top-down approach with the legislation and policies may be also required towards sustainable waste management (Xun *et al*., 2008). Good governance lead different beneficial to reach a policy and procedures (Graham, 2003) and it is necessary to achieve sustainable recycling industry (Atienza, 2011). This paper generally aimed to discuss the adoption of the top-down approach and good governance concept in sustainable construction waste management.

Top-down Approach:

A top-down approach presented as going through a series of stages or process with the arrow are pointing forward or sideways and it is not go back to the policy (Van Meter and Van Horn, 1975). A top-down approach also defined as a hierarchical style of decision making where the decisions are made by the top executives on the basis of current policies. Then, the decision is spread further down the organizational structure. These decisions or policies are then enforced through several tiers of hierarchy until reach the bottom tier (MBA Brief, 2015). Top-down analysts normally reveal that support with a representative regime and the consistent execution of decisions made by political leaders (O'Toole, 2001).

The top-down perspective largely restricts its attention to actors who are formally involved in the implementation of a specific program or policy (Winter, 1990) and focus on a specific political decision normally is a law (Winter, 2003). The Singapore government was adopting a top-down approach which prefers using the law and regulations to enforce the policies under the Ministry of Environment (Ho, 2002). The use of top-down approach with the legislation and policies may be also required towards sustainable waste management (Xun *et al*., 2008).

A top-down approach is suggested applying to facilitate implementation waste reduction through 3R practice in construction industry. Therefore, government is responsible for implementing a top-down approach to enforce the laws and policies related to 3R practice in the construction waste management by making it mandatory for contractors to manage construction waste through 3R (Ng *et al*., 2015).

Good Governance Concept:

McGregor (1993) define the governance is apply the power and authority in the commitment relevant political actors to managerial decisions. Government role can be labeled as a Chief Executive Officer (CEO) (Hupe and Klaassen, 2000) or one of the regulator and inspector (Hill and Hupe, 2002). Governance is a tool to facilitate the coordination of the collective activities of individuals in a group (Ivanova, 2005). In concept of governance, normally the government is a main actor among many different actors (Pumptre and Graham, 1999). Governance also is a process whereby societies or organizations make their important decisions and determine whom are involved in the process and how they afford (Graham, 2003).

Concept of governance can identifies the blurring of boundaries and responsibilities to tackle the social and economic issues; and determinate the power dependence involved in the relationship between the institutions involved in collective action (Stoker, 1998). Good governance concept lead different beneficial to reach a broad consensus on policies and the following procedures (Graham, 2003). A framework encompassing the principles of good governance is necessary in order the policy to protect, conserve and improve the environment can be developed; and legislation is respected. Good governance concept requires that decisions are implemented within a clear and legitimate process to achieve consistent and effective policies (Harman, 2005).

Good governance concept also defined that the decisions are made in order to promote sustainable development which includes environmental protection (Harman, 2005). Application of good governance is necessary to achieve sound waste management and sustainable recycling industry (Atienza, 2011). **Table 1** shows the summary elements of good governance among some authors. Although a state is rarely prepared to include norms or values in the element of good governance, it is necessary for all to consider this aspect (Licht *et al*., 2007) such as accountability or responsibility, coherence, transparency or open, the rule of law or legal, and participation.

Table 1: Summary of the element of good governance.

Element of good governance	Author
Accountability or Responsibility	Atienza (2011), Caluser and Salagean (2007), IFAD (1999)
Coherence	Harman (2005)
Transparency or Open	Atienza (2011), Graham (2003), IFAD (1999), Caluser and Salagean (2007)
The Rule of Law or Legal	IFAD (1999), Graham (2003), Caluser and Salagean (2007)
Participation	Atienza (2011), Caluser and Salagean (2007), IFAD (1999)

- ***Accountability or Responsibility:***

Accountability and responsibility of the institutions and civil society or community are key requirements of good governance concept. All the participants will being accountable for the decisions to each other (Caluser and Salagean, 2007). Accountability and responsibility is the element in effort to contribute in effectiveness, sustainability and reliability solid waste management (Atienza, 2011). Government and their regarding department should be held responsible for their actions. Moreover, public officials or local authority also should responsible to the matters which derive authority (IFAD, 1999).

- ***Coherence:***

In concept of good governance, coherent will be focus and emphasize. It is because, element coherent is refers to the good communications between all the groups or parties involve (Harman, 2005).

- ***Transparency or Open:***

Transparency is refers to the availability and free access of information such as the ordinances, rules and regulations (Atienza, 2011) including the decision-making process to ensure the information is freely available and accessible for those involved (Caluser and Salagean, 2007). Transparency makes sure the processes, institutions and information are directly accessible to those concerned and in understandable and monitor able (Graham, 2003). The government policies and relevant information should be made available to the general public and clarity as to rules and regulations. The themes of transparency and open were pervading good governance which reinforces the accountability and access to information among various players (IFAD, 1999).

- ***The Rule of Law or Legal:***

Legal frameworks should be structured in fairly and enforced impartially (Graham, 2003). The rule of law should be maintained through an effective legal system which involves with a variety of conditions that strongly relevant to good administration of justice; good legal framework; and verified and equal access to justice (Caluser and Salagean, 2007). A legal system should be also created in clear and are uniformly applied through an objective. Therefore, the rules are requires to be know in advance in order to consistently and fairly force in actually, and amending and repealing the existing rules are publicly known (IFAD, 1999).

- ***Participation:***

Participation of all members of society is required as the key element of good governance concept which everyone having their role in the process of decision-making (Caluser and Salagean, 2007). Good governance concept requires communities and groups has the opportunity and should be able to participate and implementation of programs and policy. Structures of government must be flexible enough in order to offer beneficiaries and promote to improve the implementation of public programs and policy that released by government. Participation is a crucial element to secure the commitment, supporting and enhancing their quality of implementation on policy (IFAD, 1999). Participation of the various stakeholders and community is an effort to contribute and achieve the effectiveness and sustainability solid waste management (Atienza, 2011).

Top-down Approach and Good Governance Concept towards Sustainable Construction Waste Management:

Top-down approach is initiatives to minimize wastes disposal and enhance the waste stabilization at landfills (Kurian and Nagendran, 2007). Besides, a framework encompassing the principles of good governance is necessary in order the policy and legislation to protect, conserve and improve the environment and promote environmental protection and sustainable development (Harman, 2005). The norms or values element of good governance is necessary to consider for all aspect even though a state is rarely prepared to involve (Licht *et al*., 2007). Implementation of top-down approach and good governance concept is help to enhance reduce construction waste through 3R towards sustainability waste management in construction industry.

The use of top-down approach with the legislation and policies may be also required towards sustainable waste management. The reasonable regulation requirement is considered effective and justifiable shows by the experience from other countries. A mandatory regulation requires in Japan in order to promote the use of recycled construction waste (Xun *et al*., 2008). Besides that, the Singapore government was adopting a top-down approach which prefers using the law and regulations to

enforce the policies under the Ministry of Environment (Ho, 2002). Legislative instruments that have proven to be successful in reducing construction waste generation (Agamuthu, 2008). The legal frameworks should be structured in fairly and enforced impartially (Graham, 2003) and created in clear and are uniformly applied through an objective (IFAD, 1999). Thus, a clear policy and legislation on waste management is needed to realize that policy is vital (Agamuthu *et al*., 2009). Therefore, Malaysian government should consider establish a series of effective laws and regulation on construction waste management (Papargyropoulou *et al*., 2011).

There are often blurring roles of the various national agencies defined in relation to solid waste management. Lack of the coordination body among the local governments will lead to non-sustainable solid waste management (Kurian and Nagendran, 2007). Accountability and responsibility is the element in effort to contribute in effectiveness, sustainability and reliability solid waste management (Atienza, 2011). Stakeholder participation should be taken into consideration of construction waste reduction by efficiently adopting waste minimization strategies to reach the goal of sustainability (Nitavattananon and Borongan, 2008). Participation is a crucial element to secure the commitment, supporting and enhancing the quality of implementation on policy (IFAD, 1999) and achieve the effectiveness and sustainability solid waste management (Atienza, 2011).

In addition, lack of cooperation of the waste generators has led to a delay in the implementation (Chung and Lo, 2003). Coherent refers to that with good communications between all parties (Harman, 2005). Effective communication amongst all actors those involved was identified as one of the ways to enhance their commitment towards construction waste minimization (Udawatta *et al*., 2015) which provided proper waste management practices training and establish allowances and incentives would help to improve performance in construction waste management (Kulatunga *et al*., 2006). Besides that, it is necessary to communicate the environmental benefits of construction waste management which helps to reduce waste by giving positive feedback rather than punishment. Therefore, governments may also implement incentives to promote construction waste reduction (Poon, 2007). Usually, contractors will consider economic viability and they need incentives motivation (Udawatta *et al*., 2015).

Moreover, construction contractors still lack of the knowledge and awareness on encouraging sustainable practices in construction waste management (Papargyropoulou *et al*., 2011). Therefore, some matter such as public institutions, public awareness, accessibility and availability of services should be taken into consideration in order to successful in policy implementation in a developing country (Paudel, 2009). Thus, the government should provide some guidelines regarding the implementation of construction waste reduction with governmental ordinances for contractors (Begum *et al*., 2007b). Meanwhile, currently there was no systematic documentation and detailed data and information on the volume construction waste generated, type of waste, amount of raisings generated and disposed in Malaysia (Moh and Manaf, 2014; Begum *et al*., 2006). Data on waste minimization and recycling provided by local authorities is even more widely varied, not standardized, uniformity, and inconsistent in accuracy (Moh and Manaf, 2014).

Transparency refers to the availability and free access of information such as the ordinances, rules and regulations (Atienza, 2011) to reinforce the accountability (IFAD, 1999). Therefore, environmental education and protection and training course suggested should be given for construction employees at sites before beginning construction work (Wei and Rotter, 2008). Construction Industry Development Board (CIDB) is playing a role to educate the industry's key players with training courses, workshops and awareness events (Papargyropoulou *et al*., 2011). Some technology should introduce and encourage use to reduce construction waste generate. For example, prefabrication components (Industrial Building System) are a sustainable and environmentally friendly approach to reduce the construction wastes generated on site (Ho, 2001; Papargyropoulou *et al*., 2011). Besides that, waste minimization also can carry out through the accurate measurements by using Computer-Aided Design (CAD) (Wang *et al*., 2015) and Building Information Modeling (BIM) (Udawatta *et al*., 2015).

Furthermore, lack of participation is the problem of construction waste management (Shen and Tam, 2002). The construction industry players should be committed to reduce construction waste in order to reach the goal of sustainability (Nitavattananon and Borongan, 2008). Construction organizations normally only consider to meet the requirements are mandatory (Tam *et al*., 2007). The behavior of construction workforce in the actual indicates a lack of effort to practice positive attitudes and perceptions to improve the waste minimization (Kulatunga *et al*., 2006). Participation is a crucial element to secure the commitment, supporting, and enhancing their quality of implementation on policy (IFAD, 1999). Participation is key effort to contribute and achieve the effectiveness and sustainability waste management (Atienza, 2011).

Conclusion:

Weakness of implementation construction waste reduction will increase the quantity waste dispose at landfill or illegal dump. Disposal is easy and cheap method to manage construction waste compare to the sustainable approaches. But, it led to negative impact

to environmental, human health, dissipation of natural resources and reduces the lifetime of landfill. Therefore, it needs to implement waste reduction through 3R to overcome the problems as it is sustainable practice. In addition, adoption of top-down approach and good governance concept is necessary to improve the effectiveness of implementation construction waste reduction towards sustainable waste management in construction industry.

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