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## A CONCEPTUAL FRAMEWORK OF CRITICAL SUCCESS FACTORS FOR GREEN CLEANING IMPLEMENTATION AND PERFORMANCE

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### Abstract

The emergent awareness of the adverse hazards associated with conventional cleaning practices as one of the major contributors to poor indoor air quality, environmental pollution and deterioration of ecosystem necessitated the need to embrace green cleaning practice to mitigate this adversity. In spite of the potential benefits of Green Cleaning, it is faced with implementation difficulties due to challenges faced by the various stakeholders. Therefore, the aim of this paper is to identify the Critical Success Factors and performance parameters for green cleaning projects' implementation. Through content analysis, thirteen (13) critical success factors were identified. Five topmost key success factors for green cleaning projects' implementation are green cleaning awareness, training, and education; top management commitment; communication strategies; custodian participation and acceptance and green cleaning team. The identified performance parameters based on the triple bottom line sustainability concept specifically were environmental, economic, and social. Also, it was found out that green cleaning and post implementation evaluation are under-researched. More empirical studies still need to be carried out on green products, process and practices, success factors from stakeholder's perspectives for different workplace settings and post-implementation evaluation. This paper will help stakeholders understands the vital fundamental areas for successful implementation of sustainable green cleaning and competitive organisational performance

**Keywords:** *Green cleaning, implementation difficulties, critical success factors, performance parameters*

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### 1.0 INTRODUCTION

The evolving consciousness on the adverse impacts associated with conventional cleaning practices is a source of concern amongst educators, public health practitioners, and environmentalists (Bello *et al.*, 2009; Markkanen *et al.*, 2009; Quan *et al.*, 2011; Chenven and Copeland, 2013). Apart from the considerable aggregate of energy, raw materials and water that goes into keeping a building clean through its conventional approach, its inadequacies to guarantee adequate cleaning that protects human health and environmental sustainability are convincing reasons to redefine cleaning practice. For example, conventional

cleaning hazards present short-term health effects such as eye, nose, throat, and skin irritation, burns, coughing fatigue, dizziness, headaches, chest, pain, vomiting, cramp and diarrhoea. The practices also result in long-term adverse health impacts like asthma, liver failure, birth defects, reproductive and brain disorders (Arif and Delclos, 2012; Arif *et al.*, 2009; Bello *et al.*, 2009, 2010; Culve *et al.*, 2002; Flyvholm, 1993; Nazaroff and Weschler, 2004; Zock, 2005). Some of the noticeable environmental damages entail harm to the aquatic organisms through the discharge of wastewater to the streams and depletion of the valuable, unrennewable natural resources (Ashkin and Holly, 2008; Corbett-shramo *et al.*, 2011).

Green cleaning (GC) movement was born out of this acknowledgement that cleaning has the potential for both positive and adverse impacts on people and the environment. Hence, the need to transform and improve cleaning services into a safer and sustainable practices which can promote water conservation, energy efficiency, waste reduction and indoor air quality to mitigate adverse impacts while enhancing those factors that delivers benefits. There is no commonly accepted definition of GC (Quan *et al.*, 2011; Quinn *et al.*, 2015), however, different organisations have developed their standards to define it. According to Young *et al.* (2010) GC has been defined as cleaning to protect human health without harming the environment, using processes and benign products while ensuring cleaning is conducted for the health of building occupants, janitorial cleaning staff and the environment. Its goal is to reduce resource consumption such as water, chemical and energy. Eventually, this translates to reduced waste generation and improved indoor air quality while still ensuring efficient and effective facilities cleaning. The benefits of green cleaning include decreased environmental and health impacts, reduced absenteeism and associated healthcare costs, liability, reduce legal cost and insurance, improve indoor air quality and tenant satisfaction, it ensures healthier facility, improve tenant retention, enhance quality of life and moral, its enhances grade and education (Culver, 2008; Corbett-Shramo *et al.*, 2011; Heninger, 2011; Brown *et al.*, 2012). The above benefits substantiate the rationale why users organisations are integrating GC innovations as one of their sustainable goals to lessen their carbon footprints, boost their overall performance and quality of facilities.

In spite of these growing trend and successful adoption and implementation of GC in some organisations, yet it is faced with implementation difficulties in some institutions which thus hinder its widest adoptions, implementation and sustainability (Simcox *et al.*, 2012; Xu, 2012). These constraining factors include inadequate GC awareness, training and education (Senier *et al.*, 2007; Canaan *et al.*, 2010; Simcox *et al.*, 2012; Wakai, 2013); GC law requirements and lack of standardized policy (Kalinowski *et al.*, 2009; Canaan *et al.*,

2010; Atifi, 2012; Arnold and Beardsley, 2015); janitorial resistance (Senier *et al.*, 2007; Simcox *et al.*, 2012); budgetary and perceived upfront costs (Espinoza *et al.*, 2010; Simcox *et al.*, 2012; Arnold and Beardsley, 2015) and limited GC products at the local market (Bhalerao and Singh, 2011; Al-Madani, 2012; Aktas and Ozorhon, 2013).

Consequently, there has been studies focusing on GC legislations and guidelines, barriers and incentives of GC, and GC success story (Canaan *et al.*, 2010; Simcox *et al.*, 2012; US EPA, 1998, 2000; Xu, 2012). However, there appears to be no study providing comprehensive constructs for critical success factors (CSFs) for GC implementation. Resultantly, there also seems to be limited work on elements of green cleaning performance from either perspective or empirical angle. According to Rockart (1979), CSFs were those precisely prominent areas that an organisation must “get right” for the organisation to successfully compete. For GC implementation, the CSFs are those conditions that must be satisfied for the implementation process to occur successfully and also for competitive organisational performance.

Therefore, this paper aims to identify the CSFs for successful sustainable green cleaning implementation and performance.

## **2.0 UNDERSTANDING CRITICAL SUCCESS FACTORS, GREEN CLEANING IMPLEMENTATION AND PERFORMANCE**

### **2.1 Understanding Critical Success Factors**

Several definitions of CSF abounds in literature. Rockart defined CSF as “the few number of areas” in which results if they are satisfactory, will guarantee successful competitive performance for the organisation. Accordingly, Rockart (1979) emphasized these specific areas should receive unceasing and meticulous attention from management. According to Bullen and Rockart (1981), CSF is established to be the most pertinent factors for project success which have to be ascertained earlier before embarking on a project. Similarly Bruno and

Leidecker, (1984), described CSF as those features, conditions or variable that when rightly sustained, maintained or managed, can have a substantial impact on the success of a firm competing in a particular industry. From Pinto and Slevin (1987) perspective, CSF is viewed as factors which if addressed considerably enhance project implementation chances. Sanvido, *et al.* (1992) defined CSFs as those factors that help predict success rather than depending on other factors to do so. In addition, Toor and Ogunlana (2008) depict CFS as certain elements which substantially contributes to and is critically crucial for the success of a project. Numerous studies related to CSFs have been carried out in various sectors such as industrial systems, information technology (IT), process engineering construction, business development, and operations management.

Every project has a particular set of success factors which may not be transferable to another project. Although some features are synonymous in projects – for instance, low budget, schedule, quality, standards and a sequence of complex and related activities (Nguyen *et al.*, 2004), majority differ from project to project. Formation of the project team; restraints of resources; the existence of local technical and managerial expertise; capability of contractors, subcontractors, and suppliers; physical characteristics of the project; its ground and environmental settings; and lastly geographic location are some of the factors that are typically diverse for every project. Moreover, there are different objectives of stakeholders that make it difficult even to agree upon a single comprehensive list of success factors (Phua, 2004). In addition, every project has different objectives which require sets of success factors (Chua *et al.*, 1999; Liu, 1999). This suggest that list of success factors is peculiar to each organisation and is germane for business competitive performance. According to Rockart (1979), CSF approach is beneficial to managers because the process assists managers in determining those factors where management attention should be focused. It helps to insure that those vital elements will receive carefully and constant management monitoring. The process can also aid managers to develop right measures for those factors and pursue feedbacks

on each of the metrics. It also saves cost that is associated with unnecessary data collection. CSF approach admits that while some factors are peculiar to the manager others are temporary.

To understand the role CSFs in project execution, Toor and Ogunlana (2008) categorized project management into three general stages (Input, Process and Outcome) and two major domains (Process and performance). The process domain start with the setting up of project objectives during the input stage, follow by devising an effective management system to actualize the set objectives during the process stage and ends with the delivery of products or services in the outcome stage. Performance domain on the other hand focuses on setting up the performance goals during the input stage. During the process stage, performance domain entails the identification of performance enhancement strategies in the form of CSFs. These performance enhancement strategies can be measured through key performance indicators (KPIs) during the outcome stage.

## **2.2 Green Cleaning Implementation**

Increasingly, green cleaning is being implemented in the developed world though its implementation in the developing countries is slow. Not less than twelve states governments in United States that have embraced preventive regulations and strategies to replace benign cleaners for toxic ones focusing educational facilities and government buildings on achieving their sustainability goal which is to enhance indoor air quality in their facilities for their users and custodian staff (Simcox *et al.*, 2012).

US Study by EPA (1998) described environmental procurement programs in the City of Santa Monica's Environmental Purchasing and incorporating environmentally friendly benign products at Yellowstone and Grand Teton National Parks and attributed the success of the programs to top management support, pilot study implementation, employees commitment, custodial education simplified purchasing program, maintenance of vision, evaluation and planning. Senier *et al.* (2007) investigated the blue-green coalition success story of Boston public schools' transition from traditional cleaning products to green ones. They

observed green cleaners' project team role as bridge builders as critical in garnering stakeholders' buy-in and support for the initiatives and that of the labour union. The custodians of these piloted green cleaning schools' projects identified lack of equipment, inadequate training programs and participation in decision-making processes as significant issues in transitioning to green cleaners (Senier *et al.*, 2007).

A study by Xu (2012) reported janitorial resistance as the first obstacle to green cleaning implementation and sustainability. Other obstacles in his work are the adverse impact of green washing on health and sustainability of the program, lack of funding especially during the fiscal crisis in public schools, and training issues with new equipment. Another work by Simcox *et al.* (2012) noted a lack of cleaning effectiveness with some green cleaners, lack of participatory decision making for a cleaner solution, lack of quality training, and expensive green cleaning products as obstacles to transitioning to green cleaning. Cnaan identified the issues regarding the poor implementation of green cleaning guidelines and specification of Missouri public schools to the problem of awareness and proper education.

Also, Cnaan *et al.* (2010) recommends increasing awareness and knowledge of green cleaning guidelines and specification, provision of incentives or rewards programs to honour districts who exhibit a pre-set level of green cleaning implementation, a bi-annual assessment to document the application and to develop a standardized policy for the district to implement. Arnold examined the perspectives on implementation and effectiveness of green cleaning laws in the United States and found out that mandatory green cleaning laws with training and reporting requirements to be more efficient in green cleaning implementation than voluntary legislations without such requirements in school's districts. Quan *et al.* (2011) established a conceptual framework for green cleaning and conducted case study interviews with representatives from five major healthcare facilities. The success factors of green cleaning implementation common to these facilities are strong facility administration leadership, internal multi-disciplinary sustainability team, staff

training, acceptance and ownership. They identified barriers such as janitorial resistance and inadequate green products availability as implementation challenges. Chalupka (2015) examined the trend of green cleaning execution by building services contractors with respects to incentives for and problems of adoption. The findings suggest that lack of progression in the adoption of green cleaning can be traceable to social and political issues with changing levels of persistence.

According to Chalupka (2015), increase implementation of green cleaning strategies rest on stakeholder's positive attitude towards change policy, greater awareness, promotion of green technologies, as well as full knowledge of the hazards related to the toxic chemicals. Most of the studies on green cleaning projects' implementation are pedagogic, and there is currently no comprehensive set of success factors for green cleaning projects. However, the preceding works provided an insight into the success and failure factors of GC projects because to be able to accomplish success on project; one must start by defining the factors that affect project success and cause project (Toor and Ogunlana, 2009).

### **2.3 Green cleaning Performance**

Nilsen *et al.* (2008) set to identify cleaning systems, benchmarks and metric systems that could guarantee decreased cleaning costs, higher quality of cleaning, reduced environmental load, and improved working environment using questionnaire administered to 800 cleaners to measure cleaning quality of office buildings in Oslo area, Norwegian defence buildings the US. The study revealed outcomes of 27% reduction in cleaning costs, 86% reduction in plastic waste, 46% cutback in the application of janitorial cleaning chemicals, 40% decrease in sick leave among the cleaners, 32% abatement in dust load on surfaces, and satisfied cleaners, users, and customers. The University of Georgia (UGA) applied comprehensive green cleaning program that focused on training and education and seek to pursue CIMS and CIMS-GB certification in 2010. UGA success story is obvious evidence portraying the real-world budgetary and workplace health and safety

benefits that have resulted from the university's commitment to green cleaning and effective management through CIMS. Specifically, annual cost savings of \$414,000 to UGA's implementation of the programs was recorded. UGA's successful pursuit of CIMS and CIMS-GB certification has proven to be beneficial beyond resulting in healthier facilities and documented savings of more than \$400,000 per year. Furthermore, UGA has enjoyed a reduction in lost time due to workplace injuries and recordable workers' compensation claims. In fact, from 2007-2008, lost time decreased from 981.5 to 858 hours, resulting in employees being available for active work for 123.5 more hours than in the year before. (Heninger, 2011)

Garza *et al.* (2015) investigated the associations between traditional and environmentally preferable cleaning products exposure and dermal, respiratory and musculoskeletal symptoms in a population of custodians using a cross-sectional study with a sample size of 329 in Connecticut. The survey revealed fewer positive associations and reduced odds of health symptoms associated with environmentally preferable cleaning products exposure which suggest that these products may represent safer alternatives to conventional cleaning products. Xuan *et al.* (2015) assessed the efficacy of LEED-certified healthcare facilities from the views of both workers and facility managers using mixed-mode methods synthesis of both quantitative (Questionnaire survey to occupant's staff) and qualitative (Literature and semi-telephone interviews with six facility managers) approaches with a sample size of 164. The study found out that LEED-certified facilities outperformed Non-LEED certified buildings within the same healthcare system in different categories including cleanliness. Occupants of LEED-certified Buildings also shown more satisfaction with cleanliness, than residents of non-LEED-certified buildings

### **3.0 RESEARCH METHODS**

#### **3.1 Compilation of CSF for Green Cleaning Projects**

In reviewing literature on green cleaning implementation and its success factors, the conceptual analysis method has been adopted. Articles covering references to green cleaning implementation were meticulously analysed and coded as the construct of this research. The process of analysis is useful to distinguish and combine the gathered data as underscored by (Miles and Huberman, 1994). CSFs on GC implementations were sorted out into categories based on the meaning of the words rather than the actual state of the word as emphasized by Finney and Corbett (2007) in their study.

Moreover, an inductive coding technique was applied in this analysis. As specified by Strauss and Corbin (1990), "open coding" is the part of analysis which allows precisely to the naming and categorizing of phenomena by a thorough examination of data. During open coding, the data is split into distinct parts, carefully scrutinized, similarities and differences are identified, and questions related to the phenomena as reflected in the data are asked.

Also, as a part of the method, Strauss and Corbin (1990) recommended preparation of qualitative data category cards technique. In this study, Medley 1.16.1, a bibliographic software program was employed and the constructs coded were noted as they appeared in individual journal articles. Additional, each indicated construct was entered in a Microsoft Excel worksheet file that specified the frequencies of each CSF. To have a greater understanding of the different existing literature on CSFs for GC implementation, content analysis approach was a suitable analysis technique in analysing written texts (Silverman, 2013). For particular coding which may not be recognized directly, Silverman (2013) suggested that individual can execute an excellent coding work which reflected a search for 'unclassified activities' and add them to the coding scheme as there are certain coding which may not be easily identified.

### 3.2 Data Collection Procedures

Eight actual stages which are involved in data collection procedures for CSF compilation were applied in this study.

Stage 1: Ascertain the level of analysis: This initial step entailed determining whether to search for a single word, a set of words or phrases. The first step for performing the content analysis is to ascertain the level of the selected sample and items of analysis to be counted.

The data collection stage of literature review has entailed a thorough examination for hundreds of the choice journals but not limited to ones listed below:

- Journal of Environmental and Occupational Health Policy
- Indoor Built Environ

- Organization and Environment
- The Journal of School Nursing
- American Journal of Industrial Medicine
- Journal of Facilities Management
- American Journal of infectious
- Biomed Central
- Facilities

Besides the above articles, databases such as Sage Journals, Wiley Online Library, Science Direct, Taylor and Francis, ProQuest, Google Scholars, EBSCHost and other grey sources such as government reports were also searched. These produced hundreds of articles related to CSF and green cleaning implementation. The criteria and the search terms used for the articles selection process are as indicated in Table 1.

Table 1: Search terms: journals and databases

<b>Searched: citation, abstract and title</b>	
<b>Individual journal searches</b>	<b>Database searches</b>
Critical success factors GC implementation	Critical success factors "AND" GC implementation
Critical success factors GC	Critical success factors "AND" GC
Success factors GC	GC implementation "AND" success
Critical Success factors sustainable cleaning	Sustainable cleaning "AND" success
Success factors sustainable cleaning	Sustainable cleaning "AND" implementation
GC implementation	GC "AND" success
GC implementation success	GC assimilations
GC	GC adoption
Sustainable cleaning	Sustainable cleaning

The chosen Keywords for this search were the ones provided by the writers of some of the related articles identified in the initial literature review. The journal articles which would be included in the compilation were those having information related to the CSF for GC implementation and this depends upon the author's judgement after reading the article abstract, introduction, title and conclusion.

Stage 2: Define How Many Steps to Code for. This coding process step requires deciding whether to code for a definite pre-determined set of concepts or to agree to a more interactive approach. The inductive perspective was used for this study because of its appropriateness as it would allow for detailed incorporation of all identified CSFs for GC implementation.

Stage 3: Determine either to Code for Existence or Frequency of a Concept. The choice of coding for the frequency of a concept was made for this study rather than its existence so that the comparative significance of the factors can be fully understood.

Stage 4: Choose how to differentiate among concepts. This stage defines the level of generalisation of terms. The researcher needs to decide whether to code by retaining the actual concept form or adopt a different encrypted form. Therefore, any words of similar meanings were classified under the same construct. For example, "Communication plan" and "Communication strategy" have the same interpretation and are placed into the interchangeable class of CSF.

Stage 5: Establish Rules for Coding Your Texts. To maintain uniformity, and internal validity when coding, it was essential to develop a set of translations rules that could be applied all the way through the coding process. The following translations rules were developed and applied:

- All articles related to barriers and CSFs of GC implementation were initially interpreted and focused on extracting all possible references. To confine the compilation to only those factors that have been empirically proven to yield success would be too restrictive. Furthermore, this part of the data collection considers making a note on the chosen methodology, as well as the consideration of GC implementation perspectives regarding CSFs as well as barriers to GC implementation.
- All related articles were re-examined again to identify similarity concepts and concept were placed under the same category.
- Each category and its concept were reviewed to ascertain the likelihood of collapsing or re-dividing and forming any additional class.
- After ascertaining the categories, the concepts were examined to finalise the constructs terms which may spring from one of the coded terms or a new one.

Stage 6: Conclude on what to do with “Unimportant Information”. This action has to do with what to do with the information in the text that was not coded. This need does not arise as the literature included the entire document on the compilation of CSF for GC

Stage 7: Coding the Text. The actual manual technique coding process was used for this action as provided in the translation rules in step 5 above. The real name attached to success factor was maintained as supported by (Strauss and Corbin, 1990) that it is reasonable for retaining the indicated name of the data, and also satisfactorily detailed to describe its term.

Stage 8: Analyse Result. This last step entails reviewing the construct regarding frequency as well as a critical evaluation of CSF methodology.

The outcomes are reviewed in the succeeding sections:

### 3.3 CSF Literature Compilation

#### 3.3.1 Discovering Categories

A total of 60 articles were reviewed and 35 were considered to contain “success factors” to the study at hand. The initial analysis step involved classifying similar concept into the same group. From 30 possible success factor categories 13 were finalised after successive analysis of the concepts resulted.

#### 3.4 Naming Categories

Table 2 shows the final 13 categories of critical success factors of GC implementation.

Table 2: CSFs for GC Implementation

No.	CSFs for GC Implementation
1	Awareness, Training and Education
2	Communication Strategies
3	Custodial Participation and Acceptance
4	Financial Capacity
5	GC Awards and Incentives
6	GC Legislation and Guidelines
7	GC Project Champion
8	GC Project Team
9	GC Service Provider
10	Knowledgeable Environmentally Aware Vendor
11	Pilot Study
12	Review and Improvement
13	Top Management Commitment

### 3.5 Understanding the CSF Categories and Their Concepts

Each identified construct is outlined below with a full description of the concepts it represents.

#### 3.5.1 Awareness, Training and Education

Previous studies have identified awareness, training and education at all levels as success factors for smooth GC implementation (Simcox

*et al.*, 2012; Wakai, 2013). A Poorly trained janitorial staff will use improper techniques to perform cleaning tasks wrongly to an inappropriate standard (Campbell, 1990). Therefore, GC training as provided in (ISSA, 2006) for cleaning personnel, will not only protect human and the environment against chemical hazard's exposure but will to a large extent saves costs due to inadequate training through the inappropriate use of chemicals, injuries. Providing occupants education is vital in securing support and cooperation from building inhabitants as many of them might not understand the why and how of transitioning to greening cleaning (Simcox *et al.*, 2012).

According to Zutshi *et al.* (2008) it is equally important to offer necessary awareness training for top managers to help them in increasing their understanding of implementation process and the required resources to implement successfully and sustain the program.

### **3.5.2 Communication Strategies**

Communication for sustainability or any other field must be approached strategically to ensure it is effective in conveying the creator's message. According to (Day and Monroe, 2000) can be achieved through four steps namely setting a clear goal, selecting the audience, learning the audience's "media diet", and writing the message accordingly. Owens and Halfacre-Hitchcock (2006) subsequently noted that all sustainability communication should seek to increase awareness as well as influence attitudes. Satisfactory information about the organisation's objectives, hopes and development achieved at each phase of execution should be well communicated to the project team and top executives and must be obviously understood by cleaning workers. The building occupants also need to be well informed about the need for green (Simcox *et al.*, 2012; Cintas *et al.*, 2015).

### **3.5.3 Custodial Participation and Acceptance**

Custodial staff are the ones regularly affected by the changes associated with any initiative. They are a critical link of delivering service quality and customers' satisfaction. Because of their

regular close contacts with facilities users, they are strategically positioned as the organisations' spokesmen. Therefore, a collaboration of partnership with cleaning personnel based on ethics of respect, acknowledgement and consensus will increase their participation and acceptance in green cleaning implementation. Their willingness to participate can also be inspired through incentives. Also, all the green products and process must be tested and assent of the custodial staff is vital to GC successful implementation (Xu, 2012).

### **3.5.4 Financial Capacity**

According to Wang *et al.* (2012) financial capacity which is the financial ability of organisations to execute their missions and achieve their aims is a critical factor for implementing sustainability schemes. The cost of implementing green cleaning programs when compare to conventional cleaning had been reported to be cost neutral or slightly higher by 10% (Ashkin and Holly, 2008; Espinoza *et al.*, 2010). Somehow, cost is still been reported as issues in green cleaning with regards to the initial cost of investment for purchasing programs (Simcox *et al.*, 2012; Chalupka, 2015). Therefore, it is important for green cleaning adopters to budget for the initiatives and avail themselves with various funding mechanisms.

### **3.5.5 GC Awards and Incentives**

Motivational green cleaning award and recognition such as GC Award for schools and Universities, APPA's awards for sustainability and Effective and innovative in United States and AFIDAM's Green Clean Award in Europe could spur GC practices among organisations and development of more environmentally friendly cleaning products among companies for the cleaning industry thus generating significant prospects for healthy competition both at global and local spheres.

### **3.5.6 GC Legislation and Guidelines**

Government mediation and green endorsements are inducing inspiring factors that stimulate adoption and implementation of green cleaning



(USGBC, 2010). This intervention could be informed of legislative certification processes for professionals in green building and cleaning industry. The regulative initiatives may often be required (mandatory) or legal requirements which organisations comply with as the rationales to protect the environment. Also, it could take the form of recommendation (voluntary) which are often morally and ethically founded. Although state laws are germane in achieving commitment to green cleaning, however, the requirements in these regulations have weighty impacts on the relative effectiveness of each of the law. According to Arnold and Beardsley (2015) laws recognised to be efficient inclined to incorporate reporting and training requirements and to oblige, rather than to be encouraged, application of green cleaning.

### **3.5.7 GC Champion**

The importance of a GC champion cannot be overemphasized for a successful GC program (Corbett-Shramo *et al.*, 2011). The person appointed to perform this task should possess strong leadership skills as well as business, technical and personal administrative capabilities.

### **3.5.8 GC Project Team**

Therefore, building a balanced, competent, cross-functional groups of relevant disciplines is key to GC implementation. According to Ashkin and Holly (2008) the team should be constituted based on members' knowledge, interest and capacity to contribute to program success and in addition to being dedicated, skilled, helpful, dutiful and dependable and manage conflict well. GC project involves planning and execution teams which could run as a single team or as distinct teams subject to the organisation and its goals (Ashkin and Holly, 2008).

### **3.5.9 GC Service Provider**

Appointment of a qualified service provider is required for GC implementation and such an individual should possess the necessary

professional skills and competency for active management and operation of the project. Certification with Cleaning Industry Management System (CIMS-GB) is a condition for qualification (Ashkin and Holly, 2008; Corbett-Shramo *et al.*, 2011).

### **3.5.10 Knowledgeable Environmentally Aware Vendor**

Identifying and appointing a supplier that have experience on GC roadmap especially with LEED-EB is a great asset for smooth transitioning and successful implementation (Ashkin and Holly, 2008). The individual should be one who can provide actual real product use training for custodial staff and delivers prompt and expert technical advice accurately.

### **3.5.11 Pilot Study**

An effective pilot study provides an opportunity to demonstrate and persuade top executives on the need for broader organisational application of the program. Pilot projects should be well planned and carefully chosen to yield benefits and saves cost to secure management complete project implementation and staff support (Senior *et al.*, 2007). Santa Monica tested benign cleaners for efficacy on a small basis through a pilot study and engaged end-users participatory approach in the decision-making process. Custodian resistance to change to GC products was overcome. The feedback received during these trial studies aided the drafting of the city's tender process operational specifications (US EPA, 1998). This legislative directive allows competition, uniformity, inventiveness and collective concern in all front (USGBC, 2010).

### **3.5.12 Review and Improvement**

Continuous evaluations and improvement are necessary in green cleaning projects in order to ensure, satisfactory and effective management.

### **3.5.13 Top Management Commitment**

For any sustainability program to be implemented successfully in any organisation, management buy-in and support are

indispensable. Without management commitment and support, it will be very challenging to achieve any initiative. Hence, the utmost need to secure top management commitment and support for any sustainability program in existing buildings (Hodges, 2005). The resources required include labour hour, money, and commitment to the program.

According to Hodges (2005), insufficient finance, workforce deficiency and lack of organisational support cause great impediments to making sustainable initiatives in existing buildings to be more efficient, profitable and ecologically responsive. Top management roles in GC implementation include providing direction and motivation to all personnel, choosing green team champion, apportioning time for communication, training, motivation during the implementation phases; and providing sufficient and appropriate resources (money, time, personnel) for implementation.

### 3.6 Analysis of GC Implementation Literature

This paper pursues to presents the various CSFs to address the implementation difficulties in GC projects, the frequencies of each cited category and the likely research gap using content analysis on related articles. Based on the literature reviews, the different class of CSFs construct were identified by various researchers total cited as shown in Table 3.

Table 3: The Frequency of CSFs of GC Implementation Based On Literatures

CSFs For GC Implementation	Total Citation	Ranking
Awareness, Training And Education	9	1
Top Management Commitment	7	2
Communication Strategies	6	3
Custodial Participation And Acceptance	5	4
GC Project Team	5	4
Environmentally Aware Vendor	4	6
GC Legislation And Guidelines	4	6
GC Champion	3	8

Pilot Study	3	8
Review & Improvement	3	8
GC Awards & Incentives	3	8
GC Service Provider	2	12
Financial Capacity	1	13

By referring to Table 3, Awareness, Training and Education; Top Management Commitment; Communication strategies; Custodial Participation and Acceptance and GC Project Team were identified as five most widely cited CSFs by researchers for GC projects' implementation

### 3.7 Review of Existing Literature on Elements of GC Organisational Performance

The positive impacts of green building on energy and water management are well investigated and documented (Washington D.C U.S. General Service Administration, 2011). However, the performance of green cleaning, an aspect of the operational services in green buildings has not been as well researched. It is probably because there is less post-implementation evaluation of green cleaning by organisations after adoption and implementation of the program. Therefore, this review will also cover self-reported studies and reports on green cleaning and performance. Hence, this section is necessary to address our objectives regarding elements of organisational green cleaning performance

Globally, various green building rating systems exists, however, those that of particular reference to green cleaning as noted by Corbett-Shramo *et al.* (2011) are the U.S. Green Building Council Leadership in Energy and Environmental Design (LEED) for Existing Buildings Operations and Maintenance rating system (LEED-EB), Building Research Establishment Environmental Assessment Method (BREEAM), ISSA Cleaning Industry Management Standard for Green Buildings (CIMS-GB), Nordic Ecolabelling of Cleaning Services and Greenguard. However, LEED-EB is indisputably one of the main drivers of green cleaning. This section did not dwell on these building rating systems as it is not the focus of the study.

A literature search was carried out for the study for the purpose of digging out the association between green cleaning and organisational performance from the concept of the triple bottom line sustainability. Articles from peer-reviewed journals, government reports, green cleaning evaluation, information on environmental, social and economic impacts of green cleaning implementation perception and measurement. Furthermore, the database employed in the search process includes Science Direct, Scopus, Emerald Insight, and Google Scholar using the following keywords such as green cleaning and performance, high-performance green cleaning, green cleaning effectiveness and green cleaning and organisational impacts. As a result of the search process, 15 studies on green cleaning and organisational performance were identified

**3.7.1 Overview of Published Studies of Occupant Surveys Comparing Green Buildings and Conventional Buildings in Health Performance**

Studies on occupants’ survey comparing conventional and certified green buildings are

growing. For example Abbaszadeh, *et al.* (2006); Huizenga, Zagreus, and Arens (2003) and Lee and Kim (2008) in their research examined occupant satisfaction with various IEQ parameters in LEED and non-LEED buildings. The results of these studies indicate occupants were more satisfied with green building facilities than their conventional counterpart in different areas which include indoor air quality and building cleanliness/maintenance in their workspaces. Though the indicators for assessing IEQ as provided in LEED covers green cleaning policy, the level of performance of cleaning regarding social, economic and the environment was not specified in the studies.

Effective sustainability evaluation should examine the whole triple bottom line of economic, environmental, and societal performance (Bennett *et al.*, 1999). Therefore, the elements of green cleaning performance based on the literature reviewed are presented from the context of these three sustainability pillars namely social, environmental and economic. Table 4 below provides a brief summary of the literature search.

Table 4: Elements of Cleaning Performance of Organisation

GC Performance of Organisation based on		
Sustainability Goals	Elements	Studies
Environmental Performance	Reduced chemical use effects	US EPA (1994); Kapur <i>et al.</i> (2012)
	Reduced waste generation effect	Kapur <i>et al.</i> (2012); Chenven and Copeland (2013);
	Reduced carbon footprint effects	Chenven and Copeland (2013)
Social performance	Reduced sickness and absenteeism	Ashkin and Holly (2008); RAMP (2010); Corbett-Shramo <i>et al.</i> (2011); Garza <i>et al.</i> (2015)
	Reduced injury rate	Leonard and Krilov (1996); Rockström <i>et al.</i> (2009); Garza <i>et al.</i> (2015)
	Encourage Employees ‘training	US EPA (1998); Heninger (2011); Chenven and Copeland (2013)
	Increased Employees’ retention	Heninger (2011)
Economic Performance	Cost effectiveness	Nilsen <i>et al.</i> (2008); Espinoza <i>et al.</i> (2010)
	Savings from reduced chemical usage	US EPA (1998); Nilsen <i>et al.</i> (2008); Espinoza <i>et al.</i> (2010); Heninger (2011); Corbett-Shramo <i>et al.</i> (2011)
	Savings from reduced energy usage	Ashkin and Holly (2008); Corbett-Shramo <i>et al.</i> (2011)
	Savings from reduced labour hours and sick leave	Ashkin and Holly (2008); Corbett-Shramo <i>et al.</i> (2011); Nilsen (2008), US EPA (1998)
	Gains from improved employees’ productivity	Ashkin and Holly (2008)

Table 4 above provided summaries of studies indicating the elements of green cleaning

performance of organisation under three main categories namely Environmental, Social and

Economic. These were further subdivided into various items under the three sustainability pillars. The identified elements under the environmental performance concept are reduced impact from chemical use, waste and carbon footprint. From the social perspective, the items are reduced sickness and absenteeism, reduced injury rate, improved employees' training and retention. The environmental and social impacts translate into economic values as a result of savings from reduced chemical and energy use, reduced sickness and absenteeism rates. Indirectly, can improves employees' productivity and can make transitioning to green cleaning cost effective

#### 4.0 RESULTS AND DISCUSSION

The existing gap between the need to compile a comprehensive list of CSFs to address implementation problems in GC projects necessitated this study. Different factors affect whether or not a project can achieve successful completion. The CSFs were compiled based on green cleaning implementation reports on the success and barriers factors. The preceding according to Toor and Ogunlana *et al.* (2008) should be examined to have a proper list of CSFs. Among 13 success factors researched via literature review, the five leading factors identified are awareness, training and education; top management commitment; communication strategies; custodial participation and acceptance and project team. These main components are in Figure 1 below;

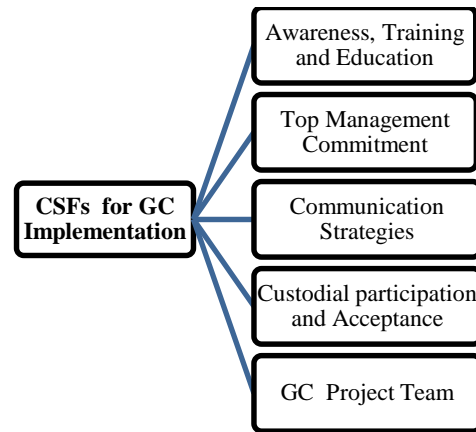


Figure 1: Conceptual framework of Critical Success Factors for Green Cleaning Implementation

A closer look at these components shows that they are all human related. According to Nguyen *et al.* (2004) majority of the CSFs are human-related factors. This suggests that people perform a vital role regarding the success or failure of a scheme. It is not unexpected as they are responsible for generating, handling, operating and utilizing the project and are always affected by it. These components are as discussed below;

#### 4.1 Awareness, Training and Education

As organisations present innovative technologies and tools to meet the need of a “green” economy, adequate awareness, training and education to help staff with the transition is critical. Experts stated that access to “green” products is not sufficient to establish an effective health and safety program. Appropriate awareness, training and education on how to use GC products to increase their effectiveness and reduce the burden especially on cleaning personnel is of crucial importance. This requirement ranked first among the success factors as it is needed at all levels of the organisation. The availability of quality awareness, training and education will affect the commitment of cleaning staff, top management and building occupants. These group of components will influence custodian acceptance to green cleaning change policies, the quality of

custodial green cleaning operation delivery and the commitment of both management and building occupiers.

#### **4.2 Top Management**

The duties of senior management toward the project is essential, and its commitment and support is a vital prerequisite for project success. Nguyen *et al.* (2004) stated that top management should be recognised to mean the top administration of all concerned project parties. Top management support demonstrates visibly how strong the commitment to the project is. Top management support and commitment have a fundamental and strategic role to play in providing both resources and capabilities for effective projects execution.

#### **4.3 Communication Strategies**

This factor has been getting growing attention in this present's information era. According to Laufer *et al.* (1996) an effective communication strategy is a dominant factor in leading and incorporating people and taking decisions to establish a successful project. Thus, there is the need to develop effective communication strategies for green cleaning projects so that every right and a concerned person can access and share ideas. This is because "shared project vision" is difficult when there is ineffective communication among project stakeholders. According to Clarke (1999), as people become better informed and more aware of what is happening in their project, they will be made more involved and committed to project's progress, and as a consequence, become better motivated. Regular progress meetings are, therefore, expected. As updates about awareness, training, implementation and performance of cleanings products, equipment and GC procedures can be communicated to the parties. Then, corrective and preventive actions

can be applied timely to ensure good project performance.

#### **4.4 Custodial Participation and Acceptance.**

The cleaning personnel are directly affected by changed policy in every organisation; as they are the ones that will be engaged in carrying out project execution. Hence, their participation in training programs and acceptance is critical to avoid resistance to change or reverting to old practices. Their willingness to participate and acceptance can also be inspired by good human resource policy such as incentivize training and recognition

#### **4.5 GC Team**

GC teams is another prerequisite for the success of green cleaning projects. The component includes utilization of experience, multidisciplinary/capable project team. Project teams themselves, not project managers, deliver projects (Laufer *et al.*, 1996) and shape the implementation of the project (Munns and Bjeirmi, 1996). A team consisting of all necessary specialists, professionals and experts can make integrative decisions based on seeing the picture as a whole and executes them later on with greater pace (Laufer *et al.*, 1996). Proper project planning and control require project teams to utilize appropriate project management techniques and tools. Therefore, a team with expert, knowledgeable, experienced, and proficient team members is essential for the success accomplishment of project goals.

From Table 3, financial capacity is ranked least in the CSFs. Though green cleaning projects implementation has been said to be low cost sustainable initiatives that any organisation can afford to execute, it has also been observed that the initial cost of investment as issue in transitioning to green cleaning projects. However, this indicates that finance might not

be necessarily obstacles for implementing green cleaning projects especially for large scale organisations. This is not a validated opinion as they are literature based.

Very low ranking of cleaning service contactors is not very clear giving their strategic position in the cleaning industry. This might be also be because the ranking is based on the review of literature

From the foregoing, there is the need to identify the indicators to measure these constructs and to confirm them from the perspectives of experts and measurement models. There is also need for more research in green cleaning implementation and success factors in diverse organisations settings as cleaning is carried out virtually in all sectors.

Organisational performance in green cleaning implementation through examination of case studies indicated the beneficial application of GC innovations in organisations Vis-a vis the sustainability concepts.

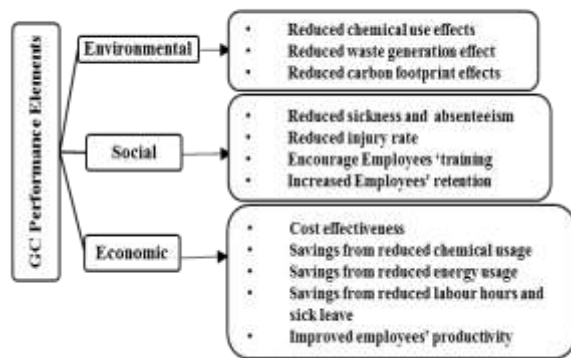


Figure 2: Elements of Green Cleaning Performance

The environmental and social impacts of green cleaning implementation translate to economic benefits through savings from reduced energy, chemical and water usage, reduced sickness and absenteeism. However, this aspect is less researched because green cleaning is still new and some of the organisations have not been carrying out the post-implementation evaluation. This assessment is necessary to

ascertain program effectiveness to know areas necessary improvement are needed. There is need to emperically verify these performance metrics to ascertain which of the measure that is more significantly related to green cleaning implementation.

The conceptual framework for this study will be extended in the future research and critical success factor will then be determined after the data collection. This conceptual framework illustrates the variables for project performance which were applied to capture the relevance data. In the conceptual framework, the relationship between variables for project performance, CSF and the project outcome was used in this study

## 5.0 CONCLUSION

This paper was necessitated owing to a gap in the area of CSFs to address the implementation difficulties in GC projects and to particularly position the organisation for competitive performance. Presently, CSFs studies are not directly addressed in the literature. Therefore, case studies from GC implementation with reports of their success and failure factors form the basis in which CSFs list was compiled. Studies on organisational green cleaning performance were less researched but elements of green cleaning organisation performance were identified based on existing works that were self-reported, interviews and questionnaire survey. Areas of further studies abound in green cleaning implementation especially on the need to establish indicators to measure the list of CSFs identified, identification of critical resources for GC services delivery. However, while interpreting the findings, one should bear in mind CSFs were compiled through review of literature and therefore generalization of results may not be appropriate until empirical study to confirm the factors are carried out. Hence, there

will be the need to confirm this list from the perspective of expert opinions empirically.

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