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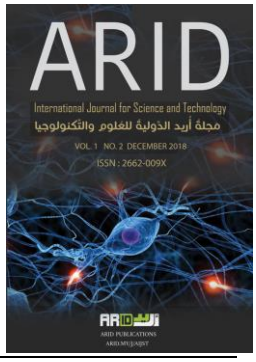

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IDENTIFY DRIVERS AND BARRIERS FOR ADOPTING GREEN BUILDINGS IN IRAQ AND DISCUSSION FOR THE TOP RANKS

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تحديد الدوافع والحواجز لاعتماد المباني الخضراء في العراق ومناقشة الرتب العليا

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ABSTRACT

The impact of modernization and urbanization has encouraged positive improvement in the construction industry of Iraq, particularly in the development of the infrastructure. The slower rate progression of the construction in the past has given a great deal of potential for integrating the green concept simultaneously with the development of the country. The insufficient amount of evidence concerning the progress of green construction in Iraq implies that this idea isn't at the top of the agenda of the construction industry, yet. Proactive behavior of the government, private sector and professional boards are highly important for bringing "greener" changes to the construction industry. Green building (GB) is considered as a sufficient way for the implementation of sustainability in terms of environment, economy, and society in the construction industry. To adopt green buildings continue succeeding and gaining popularity, it is, therefore, crucial to gain a clearer comprehension of the main problems that influence its progress. This research aims to investigate the main aspects of adopting the green building in the following fields: (1) major drivers for adopting GB and (2) the fundamental barriers that inhibit adopting GB. For achieving those goals, a questionnaire study has been performed for 100 experts from the Iraqi universities. Ranking analysis has been utilized for identifying the significant problems that are associated with adopting green building, conserving energy, environmental protection, water conservation and developing the government legislation were the most significant drivers. The main barriers for the adoption of green building are lack of its promotion by government, lack of government incentives and rules, Lack of information of the

green product, and unavailability of approved green materials and technologies. The results provide a significant reference for practitioners and researchers of industry for deepening their understanding of the main problems influencing the decision-making of the green building, and for policy makers that aim to promote adopting green building in the construction industry for developing proper policies and incentives.

Keywords: Green buildings, Drivers, Barriers, Sustainable

الملخص

قد شجع تأثير التحديث والتحضر تحسن إيجابي في صناعة البناء في العراق ، ولا سيما في تطوير البنية التحتية. وقد أعطى البطء في معدل التقدم في البناء في الماضي قدرا كبيرا من الإمكانات لدمج المفهوم الأخضر في وقت واحد مع تطور البلاد. تشير كمية الأدلة غير الكافية المتعلقة بتقدم البناء الأخضر في العراق إلى أن هذه الفكرة ليست في صدارة جدول أعمال صناعة البناء والتشييد حتى الآن. إن السلوك الاستباقي للحكومة ، والقطاع الخاص والمجالس المهنية مهم للغاية لإحداث تغييرات "صديقة للبيئة" في صناعة البناء. يعتبر المبنى الأخضر وسيلة كافية لتنفيذ الاستدامة من حيث البيئة والاقتصاد والمجتمع في صناعة البناء. من أجل تبني المباني الخضراء وليستمر النجاح ويكتسب شعبية ، لذا من الضروري اكتساب فهم أكثر وضوحا للمشكلات الرئيسية التي تؤثر على تقدمه. يهدف هذا البحث إلى التحقق من الجوانب الرئيسية لاعتماد المبنى الأخضر في المجالات التالية: (1) الدوافع الرئيسية لتبني المباني الخضراء و (2) الحواجز الأساسية التي تمنع تبني المباني الخضراء، لتحقيق هذه الأهداف ، تم إجراء دراسة استبيان لـ 100 خبير من الجامعات العراقية. وقد تم استخدام تحليل التصنيف لتحديد المشاكل الهامة المرتبطة بتبني المباني الخضراء ، الحفاظ على الطاقة وحماية البيئة والحفاظ على المياه وتطوير التشريعات الحكومية التي كانت أهم الدوافع التي تشجع على اعتماد البناء الاخضر. تتمثل العوائق الرئيسية أمام اعتماد المباني الخضراء في عدم التشجيع من قبل الحكومة ، وعدم وجود حوافز وقواعد حكومية ، ونقص المعلومات عن المنتجات الخضراء ، وعدم توافر المواد والتقنيات الخضراء المعتمدة. توفر النتائج مرجعاً مهماً للممارسين والباحثين في الصناعة لتعميق فهمهم للمشاكل الرئيسية التي تؤثر على صنع القرار في المباني الخضراء ، ولصناع السياسة التي تهدف إلى تشجيع اعتماد المباني الخضراء في صناع البناء لتطوير السياسات والحوافز المناسبة.

1. Introduction:

The main issues that face the Middle East are water shortage and high temperatures during summer. Many argue that those conditions place specific issues in incorporating green elements in constructions [1]. Having huge reserves of oil, no much attention is given for the topic of needing to preserve energy. Middle East countries are at the top of the list of largest per capita ecological footprint, with Qatar being the maximal at 44 metric tons per person annually [2].

The greatly improving sector of constructions resulted in escalating the consumption per capita of the domestic energy, putting those countries amongst the highest contributors to the emission of CO2 per capita [3]. Going green is the way of developing the industry's long-term sustainability. An example of that is Al-Qasim University is a specialized university in the agricultural and veterinary sciences and the supporting sciences for the Ministry of Higher Education and Scientific Research in Iraq, the objectives of the project owner were to achieve a high degree of quality and using innovative sources and technologies and Get LEED certification [4]. Iraq has also admitted the need for improving its buildings and infrastructures, with the government continuously investing in the development of infrastructures all over Iraq. In the past five years, the country has witnessed fast development in the sector of constructions. Nevertheless, Iraq is still behind concerning the movement of the green development, due to the fact that in contrast to other countries which have faced pollution problems and rise in costs of energy, Iraq keeps enjoying inexpensive energy and is well acclimatized to arid weather. Green construction gives an opportunity for leaving a lighter footprint on the environment via several advantages to the society and their surroundings, in addition to offering a sound business case. It is usually associated with using green technology specially for the reduction of energy consumptions, green materials, indoor cooling, water saving, and so on. The construction industry has a considerable influence on public health, environment and economy. Based on the

findings of [5], all over the world, buildings are responsible for over 40% of all global emission of CO2, specifically due to the fact that they're one of the main contributors to the consumption of energy [6]. Moreover, buildings in the majority of the developed countries, like the USA, consume about 68% of electricity, 40% of raw materials, 88% of portable supplies of water, 12% of the supplies of the fresh water, and account for 20% of the steams of solid waste, ("US Green Building Council") [7,8]. It has been projected that the global emission of carbon of buildings will be nearly 42.4 B. tons by the year of 2035, an increase of about 43% in the 2007 level ("US Energy Information Administration") [9]. With implementing of possible green innovations, negative environmental, social, and economic influences of the construction industry may be reduced. The following sections include a description of the methods of the study, data analysis and the final one describes the study.

2. Literature Review:

2-1 Drivers for green buildings

A clearer understanding about the motivators of green building is important for encouraging or leading possible adopters towards accepting and continuing using green innovations. The current section includes a review about the motivators of green building that are supported by earlier researches. For instance, Low et al (2014), [10] investigated the drivers of success for the implementation of green concept in new and existing constructions in Singapore. The significant motivators that have been found included investment returns; corporate social responsibility; competitions, both locally and internationally; rising bills on energy; and motives of marketing/branding motive. Ahn et al (2013), [11] stated that conserving energy; reducing waste; enhanced the quality of indoors environment; conserving environment/resources; and conserving water are the most important six drivers for design sustaining. Love et al (2012), [12] characterized 6 main factors or reasons behind the decision of clients of the Western Australia's

energy-rated commercial office building for using new green technologies. Those have enhanced the health of tenants; strategies marketing; developing of marketing and landmarks; reduced the influence of buildings on the environment; reduced the costs of whole-life cycle; and attracted best clients and high rental returns. A cited study on the motivators of sustainable constructions in Greece was written by Manoliadis et al (2006), [13] who concluded that reduction of energy consumptions; resource conservation; and reducing the amounts of waste as the most significant change motivators. Yudelson (2008), [14] has listed 14 advantages building a business case for green building, some of them are: reduced cost for operating and maintaining, productivity benefits, benefits for marketing, and increased building value.

2-1-1 External drivers

Those motivators may be characterized as ones that fundamentally determined by external sides, like the government, the UN, clients/ customers, the EU, and trade unions, to firms or organizations that build green. Simply stated, those motivators indicate the events that occur happen the company developing Green Buildings, Adopting the incentive approaches of green building has proved to be encouraging for the green building growth. Via a survey of 436 green accredited experts, demonstrated that incentives of markets could encourage stakeholders adopting and promoting green building in Japan, and some of the most wanted kinds of incentives are rates of preferential interest and financial incentives [14]. In the United States, incentives like direct monetary payments, state income tax credits, and density bonus were adopted by a number of states (New York, for example) for driving stakeholders towards GB [15]. A wide range of earlier researchers have discovered strong proofs of the fact that governmental legislations and policies are significant drivers compelling stakeholders on acting sustainably. When Green Building turns into a regulation, stakeholders have no choice but to agree. The survey which studied the motivators for going green in new buildings and in existing

ones in Singapore showed that all of the respondents (i.e. 100 percent) have agreed on the necessity of governmental regulations and rules in the promotion of Green Building, “Low, Gao, and Tay (2014a)” [10] reached conclusion that coincided with the results that have been obtained by “Bernstein and Russo (2013)” [16] that indicated the fact that government actions, particularly the regulations, considerably influenced the level of adopting GB innovations. Increased training and education have become important motivators behind developing Green Building, insights through more efficient flow of information and communication significantly impact the knowledge levels of the clients and the public in general [17]. and there are more External drivers in this study like: development knowledge and awareness and information [18], promotion and communication [19], demand from clients/tenants [20] and the last one green building rating systems available [11].

2-1-2 property-level drivers

Green building property-level drivers may be depicted by seven distinct drivers including: the reduction of resource consumption in green buildings is less than other non-green buildings because it uses an integrated design method which minimizes the waste of resources so the potential of saving limited resources has increased the popularity of Green Building [13]. The contributions of the industry of constructions in the world's environmental woes is typically discussed according to source consuming and emission. The possibilities of green building implementations in guaranteeing that constructions that are added by stakeholders to their inventory are efficiently designed and have more energy-efficiency, thereby, helps reducing the influence of buildings on the environment. Abidin and Powmya (2013) [21] have stated that minimized influence of the environment provide motivations for stakeholders to implement Green Building. The industry of constructions is considered as one of the main contributors to the emissions of CO2, mainly due to its important impact in consuming energy. “Low, Gao, and

Tay (2014a)" [10] energy conserving may be achieved via the implementation of energy efficiency approaches and methods and producing energy from natural and renewable sources, such as sun, wind, and geo-thermal. This conclusion proves the significance to boost diffusing research and innovation attempts for energy-related policies, strategies and technologies for advancing the existing practices in sustainable constructions [11]. and there are more property drivers in this study like: water conservation [22], reduced whole lifecycle costs [23,24], Increased property values [25] and achieve high quality building [26].

2-2 Barriers for green building

Numerous barriers prevent sustainable construction in developed countries; most of the contractors attribute those limitation as causes of the political situation whereas others believe that even though insecurity and instability have great impact on the prevention of sustainable growth. Whereas the characteristics of green innovations greatly satisfy the needs of people's health and the environmentally sustainable enhancement. those innovations keep facing issues in the market penetration; there are numerous concerns concerning implementing them. What are the problems preventing the market of green building from growth and expansion? Better understanding of the limitations to implementing green innovations are necessary for helping to come up with ways for overcoming those barriers. many researchers have been investigating the barriers that hinder using green innovations in constructions.

2-2-1 Steering Barriers

One of the main characteristics of the industry of constructions it involves many people that range from Contractors and clients to the builder, thereby, a sufficient strategy will be needed for the implementation of sustainable constructions. This is why, lack in strategy could instead damage the sustainable constructions, whereas otherwise, measures of steering could promote it.

Limitations of steering are lack of governmental rules and incentives, results of the researches have shown that lack of governmental promoting and rules and increasing in expenses of maintaining are characterized as the main limitations that encounter implementing GB [27]. There are many steering barriers like: Lack of GB promotion by government [28,29] and insufficiency of the available GB rating systems and labeling programs [30].

2-2-2 Capacity Barriers

Sustainable constructions may be negatively affected by ignorance or lack in understanding concerning the subject of sustainability. As designers exhibit confidence in the general capability of accessing and using knowledge, they fall when the matters of sustainable constructions are raised. In constructions, expenses and duration are tightly correlated, due to the fact that each of them is highly important in the measurement of how successful the project is, and how it performs. As one of the barriers to adopting green innovations, more time for implementing is ranked as one of the major barriers by Hwang and Ng (2013) [31], A research amongst managers of projects in Singapore demonstrated that more time is needed throughout the procedure of preconstruction ranked as number one issue that is encountered in executing green building. There are more capacity barriers like: Unavailability of green buildings suppliers [32], Absence of local facilities and institutes for of green buildings [33], Lack of green building technological training for project [30], unavailability of approved green materials and technologies [29], Uneven benefit distribution and absence of information related to green products [14].

2-2-3 Cultural Barriers

The processes of construction industry have been utilized through the past years as it has presented itself as a sector typically hard to change, particularly according to approaches of construction that are practiced and the substances of construction that are utilized. This illustrates

a typical resisting to change from using conventional methods. Resisting the sustainable construction happens due to need for process variations, entailing perceiving potential hazards and unexpected events [20]. The aim of maintaining current processes and resisting changes in the industry of constructions is one more limitation for the sustainable constructions and design [11]. This resisting to changes produces Absence of demand via stakeholders and clients [34]. another Cultural Barriers like: Absence of alertness and knowledge of GBs [35], the lack of expressed interest from clients [36].

3- Research Methodology:

The current research has adopted the literature review and a questionnaire as its fundamental approach of gathering data. The research method is depicted in(Figure 1). For achieving its objectives, the study work has adopted the following methodology:

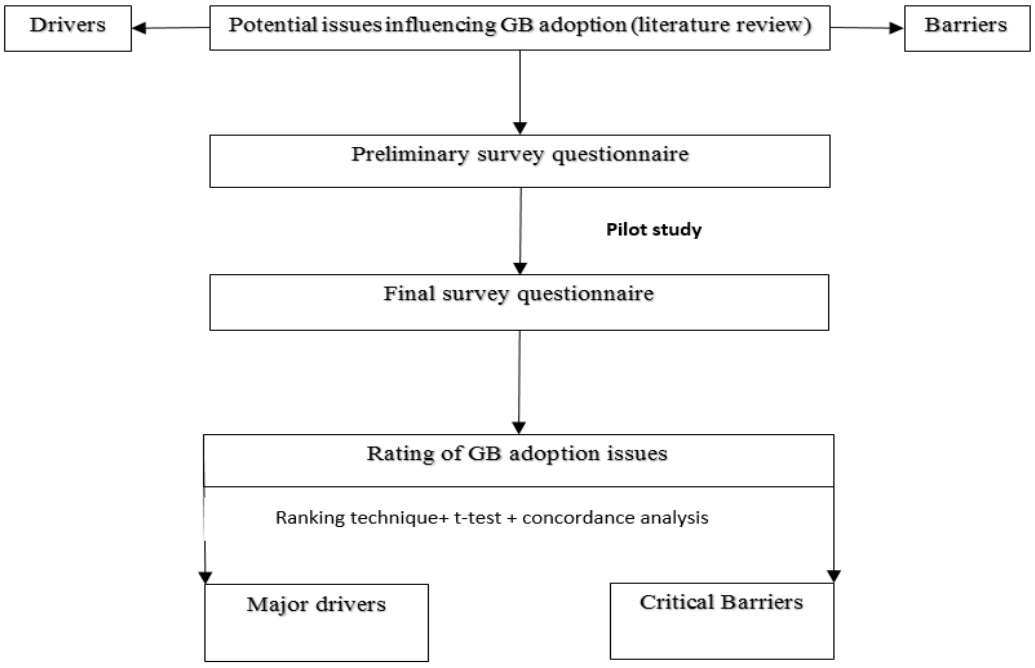

Figure 1. Research framework

3-1 **Theoretical Study**: It includes reviewing of references, theses, papers published inside and outside the country, and international journals relating to drivers and barriers for sustainable green building concept to provide theoretical background and context of the research.

3-2 **Field survey**: It includes preparing closed questionnaire forms in the light of results obtained from previous studies, distributing these forms among two steps the first step among a group of five experts to examined the questionnaire and corrected the errors while at the same time answering the questionnaire and the second step among individuals of the research sample to answer the questions based on 1-5 Likert scale, collecting these forms, analyzing the results statically, and then discussing the results obtained from the statistical analysis, and deriving the relative conclusions. The aim of this questionnaire is to determine the most important drivers & barriers and suggest solutions.

3-2-1 ***Designing the Questionnaire***

As a systematic approach of gathering data, the survey approach of the questionnaire is a common method in soliciting professional opinions on the problems that influence adopting different innovations in the researches of construction managing [3]. Particularly, in the sustainable green buildings sources also, survey is a popular approach for examining the problems that influence adopting sustainable innovations [25,32]. a questionnaire has been constructed for soliciting professional opinions from the Iraqi professionals in civil, architectural and environmental engineering. The questionnaire was made up of 3 parts. The first one is concerned with the information of the respondents include five questions (1&2 are Optional). The second part is about the drivers divided into two categories about sustainable green buildings in Iraq. The third part is about barriers divided into three categories that prevent adopting green building guidelines in Iraq. the experts have been requested for rating the value of drivers and barriers with the use of 1-5 Likert scale (1- very low, 2- low, 3- medium, 4- high, 5- very high).

The 5-point Likert scale has been chosen, due to the fact that it provides unambiguous outcomes, which are easily interpreted [37]. Before conducting the survey, an initial study has been held for testing the relevance and comprehensiveness the survey. It has been finalized according to feedbacks from this initial study.

3-2-2 ***Collecting Data and analysis***

The questionnaire has been sent out by e-mail and by hand for University professors and specialists in this field on three department (civil, architecture, Environmental Engineering). All of the questionnaires have been sent to specialists, attaching a Word document and a weblink (for allowing on-line answers), and requesting them to forward this questionnaire to their co-workers or other specialists that they may know. more than 150 questionnaires have been sent out and I received 100 questionnaires from the exports,55% respondents from Civil Engineering,28% Respondents from architecture Engineering and 17% from Environmental Engineering. The English-Arabic version of the questionnaire was used to facilitate and speed up the process of answering questions. The ranking method of mean score was commonly utilized in earlier researches on GB for ranking and determining the main drivers among numerous individual drivers [13,38]. There are studies expounding certain details concerning the approach and its mathematical background [37,39]. In the present research, the approach of the mean score is utilized for prioritizing barriers and drivers, as viewed by specialists. In which more than one factor happen to be of identical mean scores, the factor with the lowest standard deviation (SD) was assigned the higher rank [40]. The one-sample t-test was used to ascertain whether the mean score of each factor was significant or not [41,42]. The nonparametric test, Kendall's coefficient of concordance (also known as Kendall's W) is a coefficient index for ascertaining the overall agreement amongst sets of rankings [38]. Before the statistical analyses, Kendall's concordance analysis was performed to check whether the experts were consistent or not in ranking the

various factors in the survey questionnaire [43]. The value of Kendall's W ranges from 0 to +1, where a value of 0indicates "no agreement" within the group on the ranking of a particular set of factors, and +1 indicates "complete agreement". In this study, Kendall's W, W drivers, W barriers, were 0.327 and 0.358, respectively (see Tables 1,2). It is recommended that, since the number of factors ranked in all cases were more than 7 (N > 7) and with large sample size (>20), the significance of an observed W should be determined by referring to the approximate distribution of Chi-square (X2) with N − 1 degrees of freedom (df) [43]. In the present study, X2 drivers= 452.070, df=13; X2barriers= 0.501.503, df = 14.all of which have probability of occurrence under $p < 0.001$, indicating that there exists a good agreement among the experts regarding the rankings of the barriers to, drivers for promoting the adoption of GB.

Table 1: Ranks of factors for the adoption of GB, t-test, and concordance tests.

code	Driver factors	Mean	SD	Rank	Significance(b)
D10	energy conservation	4.19	.84918	1	0.000
D9	Environmental protection	4.18	.84543	2	0.000
D11	Water conservation	4.11	1.06263	3	0.000
D2	Development Government legislation	4.02	1.05390	4	0.000
D4	increase Knowledge and awareness, and information	3.92	.93937	5	0.034
D1	Incentive schemes	3.8	.82878	6	0.000
D8	Resource conservation	3.74	1.01125	7	0.001
D6	Demand from clients/tenants	3.41	.97540	8	0.004
D14	achieve high quality building	3.24	1.06477	9	0.000
D3	increase education and training	3.04	.99412	10	0.006
D12	reduced whole lifecycle costs	3.01	1.01995	11	0.000
D7	Green building rating systems available (LEED, CASBEE…etc.)	2.67	1.02548	12	0.028
D13	Increased property values	2.58	1.05582	13	0.000
D5	Promotion and communication	2.41	2.41	14	0.000
Kendall's W 0.327(a) Chi-square 452.070 df 13 Level of significance 0.000 a-Kendall's Coefficient of Concordance test on the barriers amongst the specialists. b- Data with important outcomes of one-sample t-test (p > 0.05) (2-tailed).					

Table 2: Ranks of barriers that inhibit adopting GB, t-test, and concordance tests.

code	Barriers factors	Mean	SD	Rank	Significance(b)
B8	Lack of GB promotion by government	4.32	.91982	1	0.000
B6	lack in governmental incentives and rules	4.09	.80522	2	0.000
B14	Absence of information related to green products	4.07	1.09411	3	0.000
B12	unavailability of approved green materials and technologies	4.02	1.18918	4	0.000
B3	Resisting change from the usage of old-style technologies	3.92	1.02863	5	0.000
B1	Absence of alertness and knowledge of GBs	3.66	.97670	6	0.000
B10	Absence of local facilities and institutes for green buildings	3.44	1.02809	7	0.001
B5	the lack of interests from clients	3.4	1.09175	8	0.000
B2	Absence of demand via stakeholders and clients	3.35	.96792	9	0.005
B4	Hazards and doubts that are involved with the adoption of innovative technologies	3.2	1.18918	10	0.000
B7	Insufficiency of the available GB rating systems and labeling programs	3.02	1.13689	11	0.036
B9	Unavailability of GBTs suppliers	2.49	.99995	12	0.000
B11	Lack of green building technological training for project	2.3	1.05887	13	0.002
B13	Uneven benefit distribution	2.24	.75371	14	0.000
B15	longer implementation time	2.21	1.05692	15	0.000
Kendall's W 0.358(a) Chi-square 501.503 df 14 Level of significance 0.000 a- Kendall's Coefficient of Concordance tests on the barriers amongst specialists. b- Data with important results of 1-sample t-test (p > 0.05) (2-tailed).					

4- **Results and Discussion:**

Because of the limitations in space/word, the discussions below give priority to the top-ranked agents in the results that are highlighted above.

4-1 ***Drivers***

In spite of the fact that there are some barriers in implementing GB, there are still many reasons for stakeholders to implement GB. One of those reasons is (energy conserving) it was the highest

ranked agents to apply GB. This finding coincides with results of earlier researches concerning the drivers of sustainable construction by Augenbroe and Pearce (2009), [44] and Ahn et al (2013), [11] in the United States, and Manoliadis et al (2006), [20] in Greece. The results also agree with other researcher [45], who discovered that the continuously rising costs of energy is one of the most significant drivers for implementing green innovations, Energy efficiency is required as one of the high priorities in several developed countries. stakeholders are trying to find means for reducing their energy-related consumption, admitting that new solutions are capable of reducing energy consumption for up to 25%–40% [46]. after energy conservation, (Environmental protection) has taken second place by ranking from experts as the main drivers to implement GB, the possibilities of practicing GB in guaranteeing that buildings added by stakeholders the inventory are efficiently designed and less energy-consuming, thereby, helping in reduction the impacts of buildings on the environment. That protect the environment is one of the important issues that promote the implementation of GB. It has been stated that reduced influence on the environment provides a motivation for stakeholders to implement GB [21]. The findings of this research give evidence concerning the fact that the 3rd main driver behind adopting GB is (Water conservation), which coincided with the findings of "Zhang (2011)" [27], GB like the technology of permeable surface, water reusing and water-saving appliances decrease the impact on the quality of water for gaining water efficiency. As ranked by specialists, other motivations on the top of the ranking to engage in implementing of GB include (Development Government legislation),(Development Knowledge and awareness, and information), (Incentive schemes), (Resource conservation),(Demand from clients/tenants),(achieve high quality building),(increase education and training),(reduced whole lifecycle costs),(Green building rating systems available),Increased property values), all that are typically common benefits that are associated with the implementation of GB and it's comforting to consider that the industry appreciates the fact that they may be helpful drives adopting GB.

Advocates need to take time in order to find strategies for widely promoting those agents in society for the sake of influencing people's interest in GB. (Promotion and communication), the bottom place in the ranking as one of the least important drivers in the adoption of GB. This could be due to the fact that adopting GB may not instantly enhance the Promotions and communications other methods of management could be needed for efficiency of the process.

4-2 **Barriers**

There still are limitations that face the success and popularity of adopting GB in Iraq. The results of the study conclude that (the governmental lack of promoting GB) and (lack of their incentives and rules) are main barriers that have been perceived as the most critical, also, in other researches [12, 27]. Stakeholders want to see the direct intervention of the policy makers and advocates in the market of the GB as more efficient incentives for supporting implementing GB. Efficient incentives can encourage market stakeholders in pursuing GB. On the other hand, in the case where stakeholders are not capable of receiving efficient support of the government, it would be hard to bear the more expenses of GB. As one of the most significant barriers for the implementation of GB in Iraq (Lack of Information of Green Products) is the third, was considered as the most critical drawback, this high rank coincides with the results of a previous study by "Hwang and Tan" [33], There is still no sufficient amount of information about green product and sustainable systems of constructions, which may be implemented in GB.The fourth barrier by ranking was (the unavailability of approved green technologies and materials) that gives a proof that this limitation was under the focus of the researchers, due to the fact that they face the unavailability of green technologies and materials (like solar panels, turbines, and so on) for developing GB in Iraq. The 5th barrier is (Resisting to change from using conventional approaches). This finding coincides with an older research conducted by "Du et al." [47], about adopting technologies that save energy in construction industry in China. Resistance by

stakeholders sometimes negatively affects the potential GB implementing success. Naturally, humans resist changes, which is true in the industry of constructions in which liability is a significant issue [48]. The construction industry in Iraq is usually known as not being supportive to an innovation. Because of its diversity, size, fragmentation, and low amount of investment in study and application, this industry is identified by rather slow innovation rate. Those problems can be explanatory of the reason for resisting change, and it is considered to be one of the critical barriers that inhibit adopting GB in Iraq. One of the interesting findings is that specialists perceived no (longer duration of implementation) (ranking as 15), as one of the very critical barriers in the implementation of GB that didn't coincide with earlier researches. It was projected that duration would get a higher rank in being critical among other barriers of adopting GB, the reason for that is that, for instance, it is common knowledge that as the majority of the existing GB haven't been entirely perfected yet, implementing them often results in issues leading to delays in the projects. In addition to that, considering GB could result in delays in the project.

5- **Conclusions:**

It has been expected that adopting GB in constructions will keep growing. This paper researches the main issues that influence adopting GB from the point of view of the Iraqi GB experts. Therefore, taking under consideration the small number of empirical researches on problems that influence adopting GB, this research adds a contribution to the literature by pointing out the main problems for Iraqi GB market stakeholders. It has been concluded that numerous problems impact and determine implementing GB. Many different agents and limitation of adopting GB have been determined and detected with the use of a set of research approaches, such as literature reviews and a questionnaire survey. The problems that influence adopting GB have been analyzed in detail with the use of ranking approach, thereby ensuring a clear comprehension about the main problems that should pay more attention to in adopting GB promotion efforts.

This research has studied 14 drivers and 15 barriers from the point of view of experts in GB. Concerning GB adoption drivers, the top four drivers, energy conservation, environmental protection, water conservation and development Government legislation. With the most critical barrier being Lack of GB promotion by government, lack of governmental incentives and regulations, Lack of green product Information and unavailability of approved green materials and technologies. The findings of this research show a consensus in rankings among the experts of GB, as it has been verified by the Kendall's concordance coefficient. Whereas the identified limitations have been highlighted in this research as limitations inhibiting GB implementing, the majority of those limitations could be offset or otherwise overcome via benefitting from the identified drivers. The results of this study are expected to be contributing in information that is useful for policy-making in the industry of constructions and in future implementations of GB. The results play a role in deepening the understanding concerning the main problems influencing implementations of GB. The findings are relevant for the Iraqi GB market, and could as well be applied for policy makers in some of the other countries. In addition to that, foreign parties attempt developing GB and therefore utilize GB in Iraq could gain experience from the opinions of local experts on GB that had experience in adopting GB. There are some issues of this research warranting the attention of future researches. Firstly, even though the size of the sample size sufficient for conducting statistical analyzing, it's taken under consideration that it's still a rather small sample. Future research is required for employing a bigger sample, in order to see if the findings would be different from the results that were reported in this study. Secondly, future research could utilize more advanced approaches of statistical analysis, for example, structural equation modeling, for the verification of the particular impacts of the particular agents on adoptingGB.

List of Abbreviation and Symbols

GBs	Green buildings
UN	United Nations
EU	European union
SD	Standard deviation
N	Number of factors ranked
X2	Distribution of Chi-square
Df	Degrees of freedom
B	Barriers

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