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**Paper Title: LEADERSHIP IN CONSTRUCTION:  
IDENTIFYING CORE COMPETENCES OF PROJECT  
MANAGER OF SUSTAINABLE BUILDINGS.**

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**Abstract:**

In general, Leadership in construction is considered key factor for the success of any project. Leadership competences in sustainable construction projects, in particular have proved to be among the catalysts of achieving efficiency in the delivery of such project (Tabassi A., 2016). Although there are a number of researches that are concerned with the role of project manager in achieving success of sustainable project delivery, the key competences and skills of managers in sustainable projects is still an area of abundance in researches that discuss sustainable construction.

Therefore, this study is concerned with identifying the core competences of project managers for sustainable projects through defining their roles and responsibilities, also showing the importance of the role of project manager in Egypt vision 2030, Especially in the environmental pillar ,since it have been stated that on the future sustainable buildings will be required not an option. In this regard, the contribution of the previous papers was highlighted, in addition to qualitatively analyzing a number of sustainable construction projects, where the roles of project leaders in such project have been elaborated.

Findings of this paper summarized the core competences of project manager leading to sustainable projects. This value is provided to project managers to develop the sequences of the environmental analysis in 2030.

**Keywords:**

Leadership, Competences, Construction, Sustainable.

**1. Introduction**

Nowadays, sustainable construction became the dominant target needed to be reached in the developed countries. Lately, it was found out that Egypt is aiming to achieve a vision that targeting the same issue, it is vision 2030. This vision is aiming to increase the value of environment, rate of economy, enhance the social aspects.

Therefore, focusing in the environmental aspects in vision 2030 to increase the rate of water with 5%, higher quality of air, enhancing the energy efficient usage, using an efficient resources needed in the construction.

Sustainable Construction is a development that meets the needs of the present without compromising the ability of future generations to meet their own needs by: (Krizmane M., Slihte S., Borodinecs A., 2016).

- Minimizing the total energy over its life cycle.
- Reducing the waste over its life cycle.
- Integrating with the natural environment.
- Using renewable resources.

According to some recent research papers it was proved that the project manager is the main internal stakeholder. Therefore, sustainable construction requires sustainable project manager who manager requires certain leadership styles that the project manager should choose from day one.( Tabassi A., 2016).

**1.1. Research problem:**

There is a gap between sustainable buildings and managers due to their lack in qualifications and leadership competences. There is about 85% of project managers claiming that there is a lack in having authorized info for SB even though it was approved that 89% of the project managers are having bachelor degree. Therefore the purpose of this study is to solve the problem of un-qualified project managers, to be more familiar with sustainable construction in terms of leadership competences (Häkkinen T, 2010), (Tabassi A., 2016).

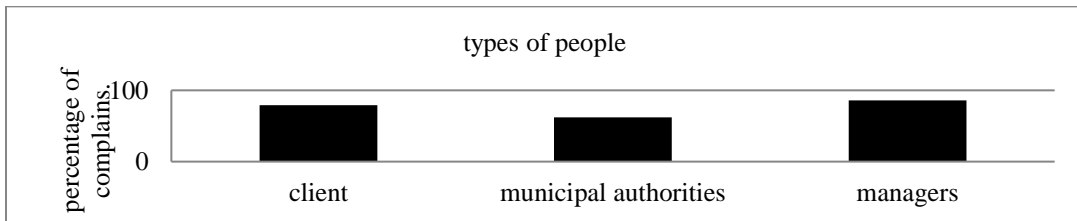


Figure 1. 1 complains of people. (Sara marcelino-sadaba. ,2015).

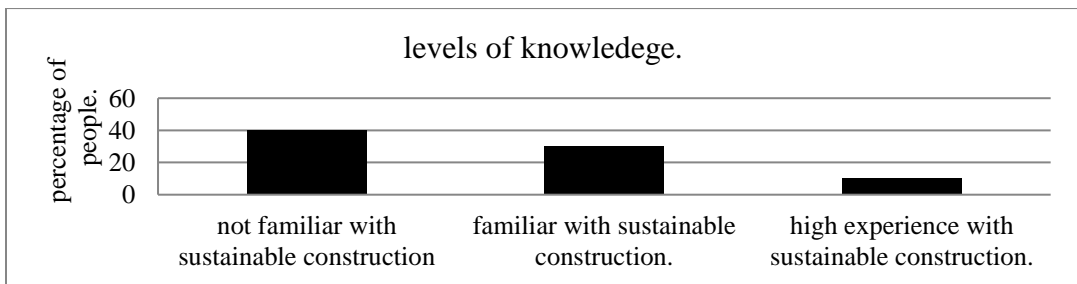


Fig.(1). percentage of knowledge of people. (Sara marcelino-sadaba. ,2015).

## **1.2. Main aim:**

The main aim of this paper is to enhance the environmental construction to summarized the core competences of project manager leading to sustainable projects. This value is provided to project managers to develop the sequences of the environmental analysis in 2030, serve the environmental aspect of 2030 to enhance the environmental pillar in construction.

## **2. Methodology**

The research procedures were to gather data for the latest information provided to the project manager through analyzing literature review and case studies. it's to monitor the change and the sequence of the problem from 2012 till 2017 to see the last solutions and actions provided to solve the problem of project manager through achieving their roles in sustainable construction.

Also its to discuss the gap between the project managers and sustainable construction and show how researchers are trying to solve it by variable alternatives. Therefore the research paper is focusing on discussing the leadership competences within sustainable project managers. ( Häkkinen T, 2010), (Tabassi A., 2016), ( DELNAVAZ M., 2012), (Martens M., 2016).

## **3. Literature review**

This literature review based on reviewing a number of qualitative literature analysis, it shall explain the principles of sustainable and leadership competences. The objective of this chapter is to show the different aspects of importance of the role of project manager in sustainable construction and how it is affected by principles of sustainability and its relation with the leadership among the years from 2005 till 2016, especially in Europe and its relation with the environmental objectives of the environmental aspect of vision 2030. (Nihal El-Megharbel,2015).

### **3.2. Emergence Sustainable construction**

Sustainable construction has been known since 1987 and defined as “to meet the needs of the present without compromising the ability of future generations to meet their own needs”. (WCED, 1987). The below timeline briefly show how this definition helped in progressing this term among the past years starting from1987 till 2016 that is extracted from literature review.

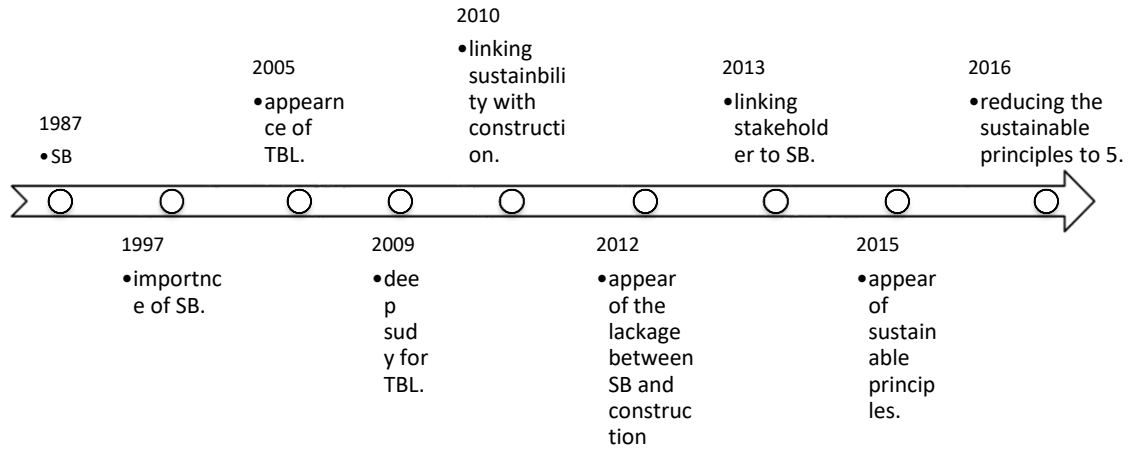


Fig.(2). timeline of the literature according their dates( source: authors, after extant literature)

It was proved by MAHVIN DELNAVAZ in his paper in 2012 that project manager have a great impact upon the success of the project from the side of communications but through introducing a road map:

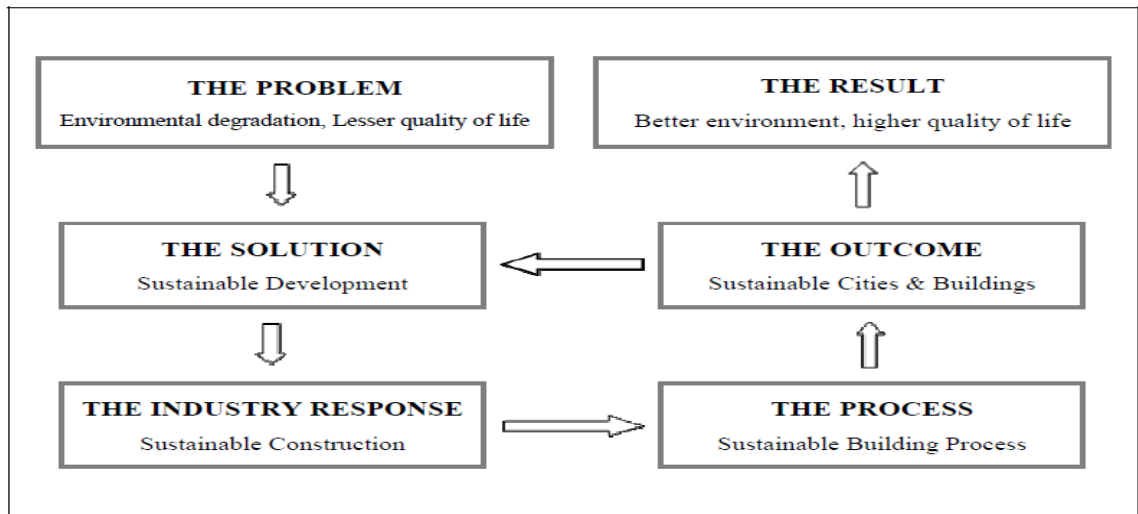


Fig.(3). Road map for sustainable construction (Huovila & Koskela, 1998).

Then came A. J. Gilbert Silvius in his paper in 2014 to support that but by focusing more on the role of project managers but from a different perspective from MAHVIN DELNAVAZ , his saw the importance of communications for sustainable manager from the strategic management, and how does it affect the goal setting from the perspective of the project manager as a permanent and temporary goals (Silvius A. 2014):

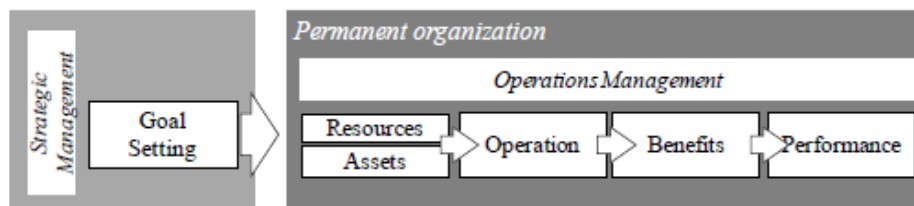


Fig.(4). permanent organization (Silvius A. 2014).

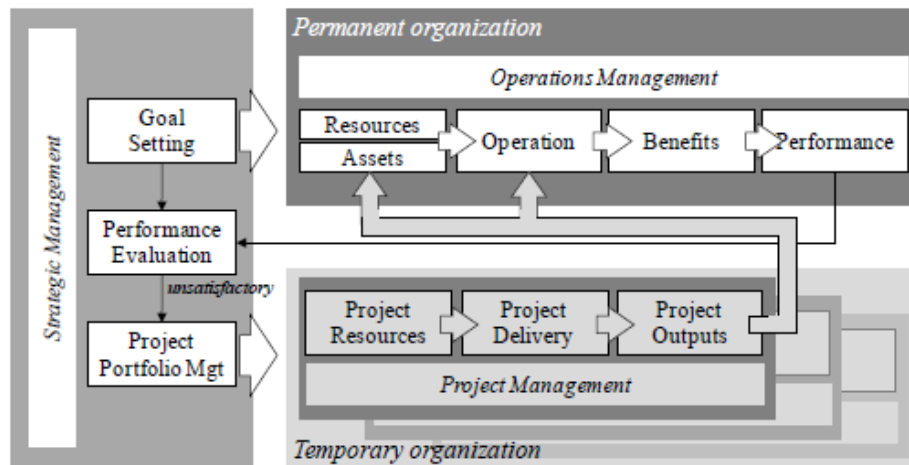


Fig.(5). temporary organization (Silvius A. 2014).

In 2015 came sudha rani and made integration between the perspectives of MAHVIN DELNAVAZ and A. J. Gilbert Silvius through making case studies that made integration between management and sustainability that formed " sustainability 8 principles ". Then came and Hosein Daneshpour in 2015 to summarize the 8 principles in to 5 to make them more specified:

- 1) Short-term and Long-term orientation.
- 2) Interest of both current and future generation.
- 3) Life cycle orientation.
- 4) TBL balance.
- 5) Increasing complicity.

At the end of 2016 came Mauro L. Tabassi and continue the same path of A. J. Gilbert Silvius by developing the importance of the sustainable management role from the perspective of leadership styles. he made a highlight on his research to focus on the three leadership styles are:

A. Intellectual leadership style :

it is based on identifying three extracted attributes, which are:

- 1- Critical analysis.
- 2- Strategic perspective.
- 3- Vision and imagination.

B. Transformational leadership: since that 55% of the managers have the capability to understand such skills; it is basically focusing on shifting from follower to leader, also ranking the leaders who were followers according to their performance,

- 1- Develop followers in to leaders.
- 2- Inspire followers to go beyond their interests.

- C. Managerial leadership style: it can be determined through evaluating five extracts attributes:
- 1- Resources management.
  - 2- Engaging communication.
  - 3- Empowering.
  - 4- Developing and achieving.
  - 5- Affect achieved success criteria.

Came Nihal El-Megharbel, in 2015 and in her PHD to merge all the previous points of view to make efficient study for research. she mentioned that the Egypt vision of 2030 is willing to adapt the environmental aspect as a basic pillar in each branch of the growth of the vision as seen in the below figure: (Nihal El-Megharbel,2015)



Fig.(6). main three pillars of vision 2030.

Furthermore, the recommended improvements within each of these pillars are in harmony and are no explicit focus areas. These pillars are innovation, environment, transparency & governmental effectiveness and social justice. also it was stated that to reach such target it need to be applied through: (Nihal El-Megharbel,2015)

- 1) Teaching staff and trained faculty managers should also be recruited, so as to achieve the principles of good governance and to increase the quality of higher education institutions, thus facilitating obtaining accreditation.
- 2) Develop a mechanism to accredit centers related to developing the skills of faculty members and managers internationally in order to enhance the efficiency of the faculty members.

#### 4. Findings of literature review:

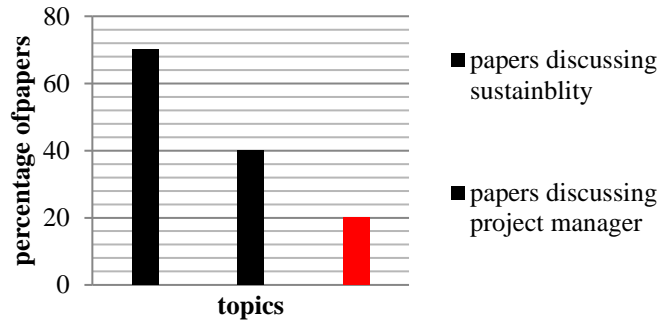


Fig.(7). percentage of paper discussed the problem according to topics ( source: authors, after extant literature)

This graph shows that the main focuses in the research papers have been focusing more on the sustainable aspects (which is 70% of the total types of construction articles) in general and the importance of having sustainable construction without focusing on how to reach it or what are the difficulties that face the stakeholders to reach such mission.

The second column is also showing that the researches are focusing on the project managers responsibilities as whole not particularly the sustainable buildings. The last column is showing that the least percentage of attention given for research is for the leadership competences in sustainable construction.

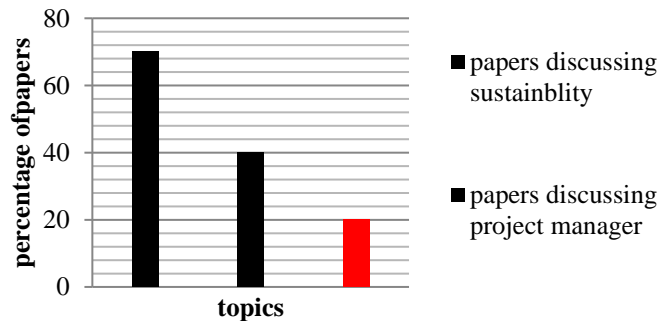


Fig.(8). percentage of problems the literature ( source: authors, after extant literature)

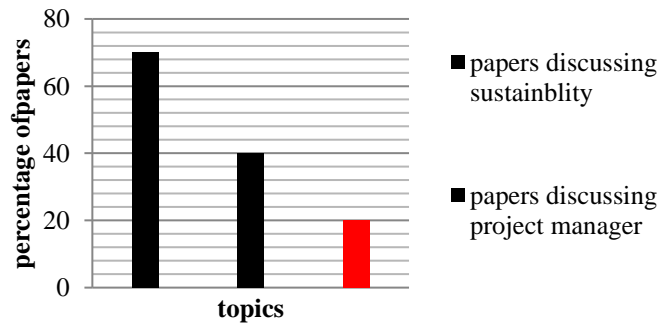


Fig.(9). percentage of problems the literature ( source: authors, after extant literature)



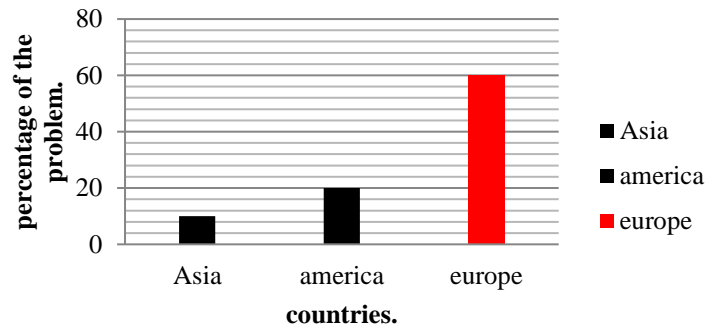


Fig.(10). percentage of problems in continents through literature. the literature according the highest ( source: authors, after extant literature)

This graph (2) shows the percentages all over the world for the continents that have scarcity in having qualified project managers who are capable to make sustainable buildings. As it is shown in the graph, Europe is the most continent that is facing the problem, and trying to find solutions for it. To make it more clear, the next graph is going to show in to details the exact countries that are having such leakage in Europe.

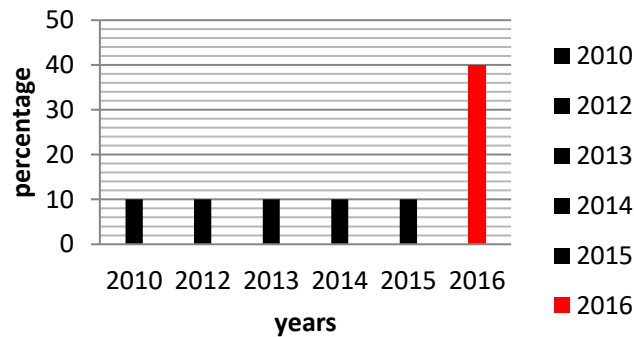


Fig.(11). paper categorization of literature according to their dates( source: authors, after extant literature)

As shown in graph 3, the problem of unqualified managers in sustainable construction has been developed since 2010 till 2016. but the progress in solving such problem have been stable till 2016, starting from 2016 this problem started to increase rapidly and be more clear to the countries, as soon as they start to think about applying sustainability, therefore the percentage of trying to find a solution is in a serious need nowadays more than before.

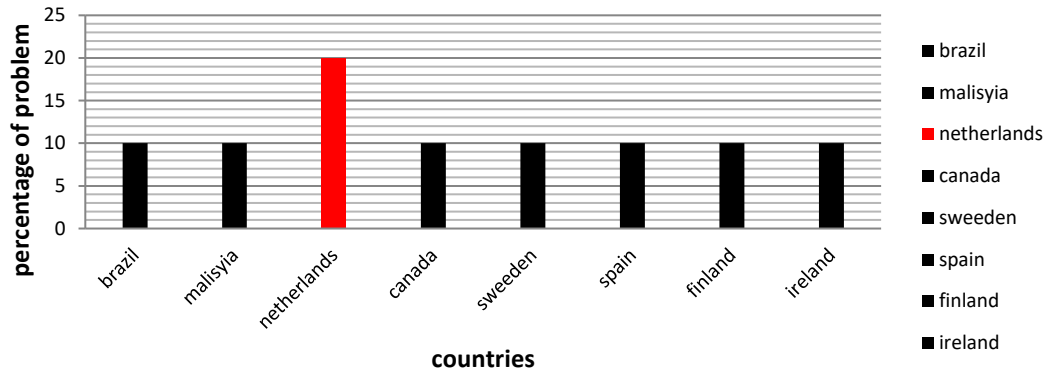


Fig.(12).the percentage of problem all over countries in literature( source: authors, after extant literature)

As it is shown in graph 4, the percentage of the problem all over the countries mentioned is stable except for Netherlands, which is the highest one that stated having a lack in adapting sustainable construction with leadership competences.

It was shown that starting from 2010 till 2016 the developing of the sustainable construction problem stated to be taken in consideration, especially in Europe and Asia. Also within this time, researchers started to monitor the procedures to get the pros and cons of such issue. Especially from 2012 till 2014 the focused was on trying to identify the specific role of project manager in sustainable construction and how his role is important in affected the progress of the project through applying the sustainable principles and leadership competences.

From 2012 till 2016 the performance was going parallel between trying to identify the core competences and the factors that affect the progress of sustainable construction. Also according to the resent researches, it is shown that the outcome of such problem is taking a way of questionnaires or guidelines for the managers to be capable of combining both leadership and sustainable principles to achieve successful sustainable project.

The theoretical approach is to clarify and merge the sequence that a project manager should follow by using leadership competences to identify which one of the three types will be choose which is identified by Amin Akhvan in terms of the findings of Mauro L. Martens who stated that to reach sustainable construction ; analyzing the principles of sustainable construction should be done, provided by sudha rani who made a second edition for these principles. this theoretical approach will be the guide for making the responsibility matrix.

Findings of the literature review have been national and international findings. the international findings have shown that the highest percentage of papers that tackled the topic of lack in leadership competences was in Malaysia as it was shown, while the highest percentage of topic discussed for the past 10 years was sustainable principles and its link with sustainable principles, and Europe was the highest percentage of them.

However Luca Sabini and Dr Tarja Häkkinen were not discussing the problem from the same perspective needed, but Amin Akhvan, sudha rani, and Hosein Daneshpour came to complete the vision to prove the problem of competences of project managers.

These are the preliminary findings reached by the researchers till now that will be based on standard steps that should be followed to reach the best outcome of sustainable building. also it was shown by Nihal El-Megharbel, in 2015 and in her PHD that this issue is highly important and is needed to be discussed, since it is involved as a main pillar of having sustainable construction in Egypt according to the goals of vision 2030 of Egypt to develop more the construction.

Also the literature review have discussed in details the sustainable principles and leadership competences, showing who was with or against this idea and how did the researchers were completing each other from different points of view for the same issue.

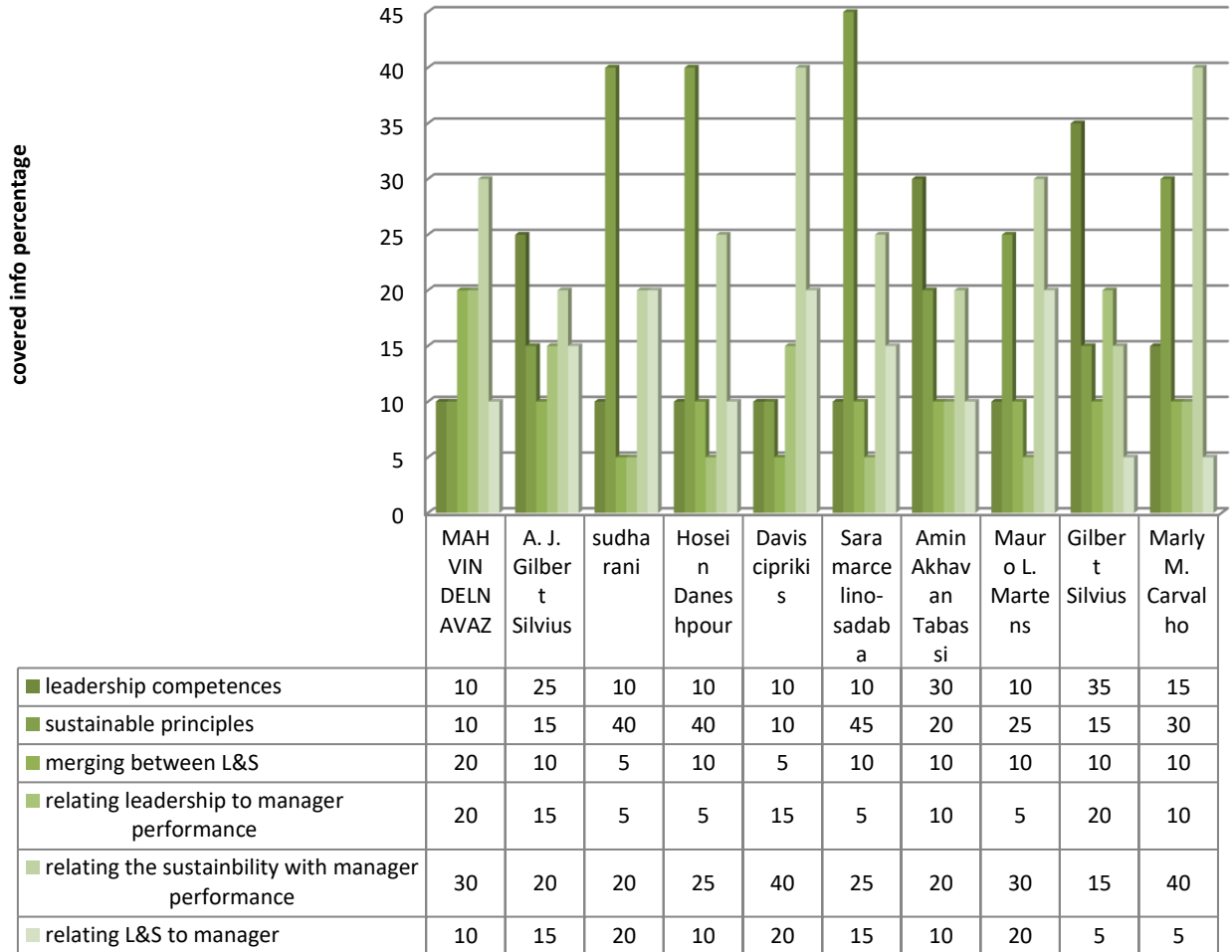


Table.1. case study findings. ( source: authors, after extant literature).

## 5. Case study

These are national and international case studies that have been analyzed to monitor the problem from the practical field not only from theoretical approach, the outcomes of these case study will be playing an important role in the final finings of this paper.

### 5.1. National case study

This case study is still under construction in Egypt, it is menouf hospital called harpour there was having a problem that it need to expand due to the over occupation of people there which leads to crowded, the manager started using the leadership competences . they applied intellectual skills, the critical analysis showed that due to its weak structure , therefore the strategic perspective showed that the expansion will be horizontally by building a new building inform of the old one, the vision was to make a hospital that serves the need for the people for the next 100 years.

The project managers applied some of the sustainable principles in this project, such as: applying the TBL by making it pleasing for people and serving their needs, serving the environments with having no toxics affecting it exhausted from the building.

Also they achieved the interest of both current and future generations in the cut of electricity, they made a design of the building to operate without AC and instead to use natural ventilation, and natural lighting to the spaces. (goshwa, 2017).

#### 5.1.1. Findings of this case study:

**Table.2. case study findings. ( source: authors, after extant literature)**

<b>Sustainable principles:</b>	<b>Availability:</b>	<b>Leadership competences:</b>	<b>Availability:</b>
TBL	✓	Intellectual	✓
Increasing the complicity	✗	Managerial	✓
Interest of both current and future generations	✓	transformational	✗
Life cycle orientation	✗		
Short term and long term orientation	✓		

source: (goshwa, 2017).

The above table is the findings of the national case study, as shown the project managers focused in applying both sustainable principles and leadership competences but to make it more specific, another detailed table was made to see more closely how far the leadership competences and sustainable principles were applied:

**Table.3. case study findings.**

<b>Leadership competences:</b>	
<b>Intellectual</b>	
Critical analysis	✗
Vision and motion	✓
Strategic perspective	✓
<b>Managerial</b>	

Resource management	✓
Engaging communication	✓
Empowering	✗
Developing	✓
Achieving	✓
<b>Transformational</b>	
Develop followers in to leaders	✗
Inspire followers beyond their own interest.	✗

( source: authors, after extant literature)

The above table have shown that there is lack in the critical analysis , and the empowering, developing followers to be leaders, inspire followers beyond their own interest. this scarcity may be due to the lack of focusing in applying the role of the project manager, even though they said that the role of project manager was very important in applying each step. by providing critical analysis, the manager will be able to make better forecasting for the problem avoidance and allocation of resources.

Also by developing followers to be leaders this need a manager who are highly capable to transfer the experience and will make the followers have the motivation to practice and learn the sustainable principles to be able to balance the TBL when they turn to be leaders, this will make them have inner self motivation to increase their interests.

**Table.4. case study findings.**

<b>Sustainable principles:</b>	
<b>TBL</b>	
Sustainable aspects( environmental).	✓
Social aspects	✓
Cost and finance aspect/reduction.	✗
<b>Increasing complicity</b>	✓
<b>Interest of both current and future generations</b>	
Services	✓
Futuristic materials	✓
Applying the function	✓
<b>Life cycle orientation</b>	
Analysis.	✓

Cost.	✓
Assessment.	✓
Impact assessment.	✗
Stakeholder- based life cycle assessment.	✓
Engineering.	✗
Design.	✓
Planning.	✗
Upgrade.	✗
Management.	✓
Project life cycle.	✗
<b>Short term and long term orientation</b>	
Current solving the problem that take short time	✓
Solving future problems that will take long time	✓

( source: authors, after extant literature)

### 5.1.2. Conclusion

The outcome of this case study have discussed in details how was the present of the project manager played an important role in the project progress achievement and in its success, and how a sustainable project manager combined the leadership competences with the sustainable principles. but it may be still affected by the scarcity in Egypt in having lack in project managers who are capable to apply sustainable construction with coordination with the leadership competences. This scarcity may be related to the construction performance of Egypt in 2016.

### 5.2. International case study

This case study was in form of questionnaires made in Ireland made with project managers, the researcher focused in having verity between the interviewed people to monitor the changes of their answers from more than one point of view, the researcher made this questionnaire with people who are fresh graduates, with people who have been working in this field for more than 10 years.

one of the interviews will be including an explanation for a successful case study analysis. they have been asked several questions and their answers were as following: ( Davis Ciprikis, 2016).

**Table.5. case study findings.**

Question: 1	Name:	Answer:
Have you worked before in sustainable construction?	Lorcan	✘
	Brian	✘
	Michael	✓
	Patrick	✘
	Jessika	✓
	amanda	✓
	pat	✓
	susan	✘
Question: 2	Name:	Answer:
Does the project manager have a vital role in this issue?	Lorcan	✓
	Brian	✓
	Michael	✓
	Patrick	✓
	Jessika	✓
	amanda	✓
	pat	✓
	susan	✓

source: ( Davis Ciprikis, 2016).

**Lorcan** have said that he has never worked before in sustainable construction but he has read alot about it and is currently working in one, he is a project manager in engineering. his main aim is to gain the platinum LEED certificate for the first rating system building that is going to take place in Ireland with the coordination with the OCSC company.

He stated in the interview that the hardest 2 approaches in the sustainable construction are the documentation and the lack of enough knowledge to deal with new elements. from the other side, from the project manager perspective it was hard for them to be the major responsible people who are in charge to apply the sustainable construction, since that the project manager should be aware of that 20 to 30% of project manager's role is to smoothly implement the elements for people. therefore they had to get exterior sustainable consultant to be supervising the performance. ( Davis Ciprikis, 2016).

Also lorcan mentioned that the project manager should be in relation with the design consultant in the tendering process for the rating system to be as a team by making further documentations such as the weekly reports and the monthly site check. ( Davis Ciprikis, 2016). he mentioned how does it is very important to have a training sessions for the managers before starting the project according the desired rating certificate need to be gained, this comes after the kick off meeting.

**Brain** is a project manager in engineering, his main role is to monitor the performance of the project life cycle to be a livable building. the challenge here was that mentioned by brian that the project manager wasn't just responsible to make the construction phase only, but also to make the design phase too by his team. ( Davis Ciprikis, 2016).

They had to get exterior contractor who understand the conditions of the rating system and sit with the client to fully explain for him the benefits gained from applying it. he is the master who have the agreement policy toward actions. ( Davis Ciprikis, 2016).

So the project manager made a plan to manage this big responsibility in achieving a sustainable construction for a 3 stories building by making at the first day a meeting to make a job distribution for the people in the site to have a clear divided responsibility tasks for everyone, the major responsibility that was pointed toward the manager was documentation and coordination between parties. ( Davis Ciprikis, 2016).

When brian was asked about the hardest thing he faced as a project manager in achieving the project his answer was that the supervisors and guides who are responsible to monitor the performance were not present all the time they just come to say the elements that need to be achieved only, which made the people working feel that there is a gap between them and lack of full image to achieve the desired needs.

**Patrick** is a manager in OCSC company in the mechanical and electrical sustainability departments, he is responsible to apply the LEED system in the refurbishment project on the central bank of Ireland and it have achieved the BREEAM , also he have been involved in making the Dublin airport to gain the LEED certificate. he stated that he worked in green project Dublin central airport Ireland. ( Davis Ciprikis, 2016).

The problem faced was that after they submitted the tenders to the government to make refurbishment, the rule of the government appeared to stated that all the project that is under construction or is newly must get a LEED certificate, therefore the tender was sent back to the company to make a huge change for the whole plans starting with the plans.

Therefore, they had to get an exterior manager to safe the situation since that the rating system don general was a new thing to them so they had to get someone who is specialized in such field. the major reason for the delay in time in the construction process was the process of going backward and forward , which is to tell people what do they need to do.

By eliminating this step, the time consuming became more developed because having a manager who are having knowledge and full aware of his role and the others responsibilities, now the client and the manager and workers are knowing exactly their roles and don't need to come each time to take approval on their steps. ( Davis Ciprikis, 2016).

The major rule of a sustainable project manager with the client is to answer the main question a client ask " what do you do differently from other managers?", therefore a sustainable manager should show that he/she is energy modeler, and explain briefly the applied aspects of sustainable principles. ( Davis Ciprikis, 2016). also the project manager should make the client feel that the sustainable aspects that have been applied have been translated to reducing the money, how to maximize the usage of the surrounding environment and convert it to energy for the building.

Furthermore, the main aim was for the project manager to make implementation of both practical and measurable strategies and solutions intended to deliver the highest levels of sustainability performance through site development, water savings, energy efficiency, materials selection and internal environment quality, with integration with the leadership competences, to serve the future generation and apply the TBL.



**Table.6. case study findings.**

Sustainable principles:	Availability:	Leadership competences:	Availability:
TBL	✓	Intellectual	✓
Increasing the complicity	✓	Managerial	✓
Interest of both current and future generations	✓	transformational	✓
Life cycle orientation	✓		
Short term and long term orientation	✓		

source: ( Davis Ciprikis, 2016).

After the studies of the site, the manager has found out that to rich TBL and interest of both current and future generations, the main concern will be in the envelope of the building, by making triple panel glazing. also the manager had to use energy modeling to support him in making the design advanced needs such as the site analysis and orientation.

Also, the project manager had successfully applied the 3 leadership competences, even though he didn't cover all their points, but still apply the three of them was a perfect progress comparing it to other case studies. furthermore, the next tables are going to explain more the details of the progress.

**Table.7. case study findings.**

<b>Leadership competences:</b>	
<b>Intellectual</b>	
Critical analysis	✓
Vision and motion	✓
Strategic perspective	✓
<b>Managerial</b>	
Resource management	✓
Engaging communication	✓
empowering	✓
Developing	✓
Achieving	✓

<b>transformational</b>	
Develop followers in to leaders	✓
Inspire followers beyond their own interest.	✗

<b>Sustainable principles:</b>	
<b>TBL</b>	
Sustainable aspects( environmental).	✓
Social aspects	✓
Cost and finance aspect/reduction.	✓
<b>Increasing complicity</b>	✓
<b>Interest of both current and future generations</b>	
Services	✓
Futuristic materials	✓
Applying the function	✓
<b>Life cycle orientation</b>	
Analysis.	✓
Cost.	✓
Assessment.	✓
Impact assessment.	✗
Stakeholder- based life cycle assessment.	✓
Engineering.	✗
Design.	✓
Planning.	✓
Upgrade.	✗
Management.	✓
Project life cycle.	✗

<b>Short term and long term orientation</b>	
Current solving the problem that take short time	✘
Solving future problems that will take long time	✔

source: ( Davis Ciprikis, 2016).

In order to have a successful TBL, the manager made sure to have a safe environment from construction, therefore he started thinking about the construction wastes and see which one will it be useful to be reused and recycled, and the results was reducing 54% of the structural elements by making reuse to the previous materials, and 90% of the construction wastes was taken from the land fill of the site.

Project manager used the futuristic materials thought reducing the energy by using Vacuum tube solar panels to fulfill the hot-water requirements, also thought of reducing the water by having ultra-low-flow water fixtures, and collection of rainwater.

**5.2.2. Conclusion:**

Even though the project had successfully progressed the leadership competences and sustainable principles to gain the LEED certificate, but the problem is still occurred that the project manager were not qualified enough to do such role alone, therefore had to get a exterior supervisor for the project to balance between achieving the sustainable principles and the leadership competences. so still there is a problem of lack of knowledge for the managers who are suppose to lead others to achieve the desired aim

**5.3. Findings of case studies:**

Findings have shown that people who are in this field are small percentage, and that the experience of the people who are working in this field can't be compared to others who are still theoretically developing it, but all of them have agreed that the role of project manager is very important to be focused on. to simplify the findings, the researcher extracted them in form of guide lines for the managers who are willing to go through this field.

- 1) To examine the role of project manager on green building and rating system.
- 2) To examine the challenges of meeting a complete set of sustainable indicators
- 3) Determine site management challenges.
- 4) Make a form of communication on sustainable projects.

**6. Generic findings**

This paper aimed to identify different trends for this research topic, from this literature review it was proved that the problem of lack of project managers who apply sustainable construction due to lake of papers informing their roles is less importance in Asia, while it is highly important in Europe and Egypt. But actually, both the manager and the building should be integrated to have a sustainable buildings, and this one of the aims of the vision 2030.

Also, as it was shown in the analyzed case studies, in order to make a successful sustainable building that follow the rating system, the country should get external expert, which cost higher budget of time and money for the country. and since that by 2030 making sustainable buildings will be an obligatory, therefore it is very important to increase the awareness of the skills of the managers to be able to cope with the achievement is sustainable construction, to avoid having exterior managers.

The scarcity in Egypt in having lack in project managers who are capable to apply sustainable construction with coordination with the leadership competences may be related to the performance of Egypt GDP , it was found out that at the end of 2016, the GDP was decreasing, while at the same time the rate of unemployment decreased. this means that people started searching for the type of work that have less regulations which is the construction industry. therefore the GDP decreased in 2016 with lack and decreasing in quality, and regardless to the environmental aspects and rating system.

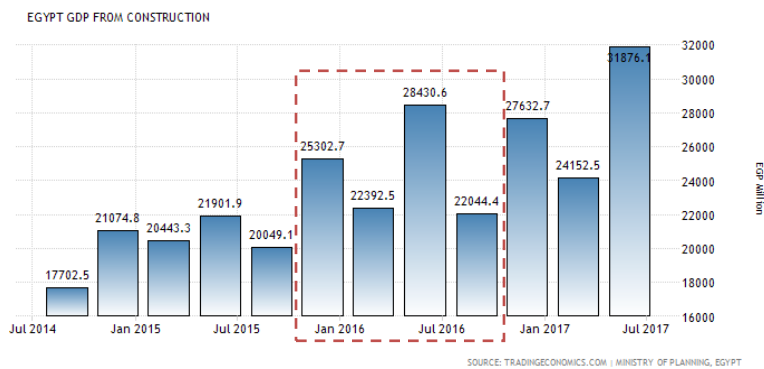


Fig.(13). the percentage of GDP ( source: authors, after extant literature)



Fig.(14). the percentage of unemployment ( source: authors, after extant literature)

## 7. Conclusion

Finally, this paper compressed the core components of project manager prompting sustainable projects. Estimation of this exploration gives a linkage between the leadership competences and sustainable projects, as in the case studies. This esteem is given to project manager to build up the groupings of the environmental analysis in 2030. , so that by 2030 we have all the managers aware of their exact role in the cycle of sustainable development.

The next phases will be more elaborating the role of project manager in terms of combining between the leadership competences and the sustainable principles to provide a new matrix provided to the project managers , identifying the responsibilities of the project managers in each phase toward the below items in the figure:

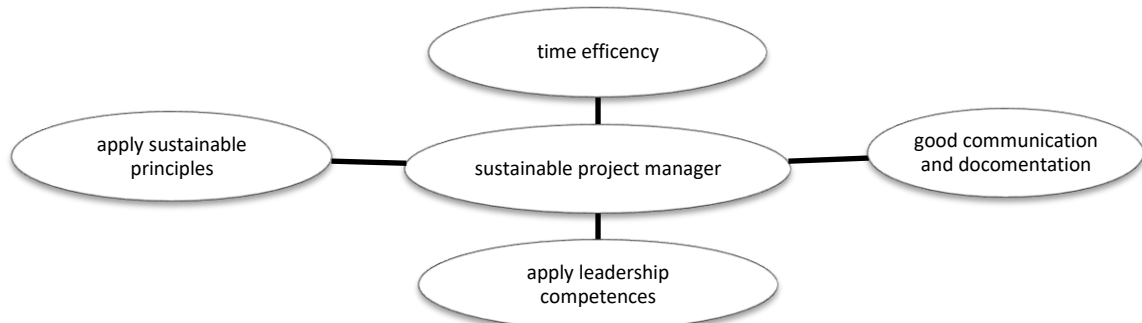


Fig.(15). the outcome chart ( source: authors, after extant literature)

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