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Research Article

Appraising correlation between material requirements planning system and sustainable development: A study of north oil company, Iraq

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ABSTRACT

Studies have shown that material requirements planning systems are critical to organisations' performance and the balance of sustainability. It would translate to schedule production and deliver the right environmentally friendly products. However, there is a paucity of studies regarding material requirements planning systems and their role in enhancing environmentally friendly products in developing countries such as Iraq. This study appraises the correlation between the material requirements planning system and sustainability development to enhance efficiency in North Oil Company, Iraq. To address the study's objectives, the researchers developed a hypothetical scheme to express the assumed relationship between the research variables and hypotheses tested. The study adopted a questionnaire survey for the data collection and 40 questionnaires retrieved as suitable from the North Oil Company's employees in Iraq. The collected data were subjected to descriptive and inferential statistics. The research shows a significant correlation between material requirements planning systems and sustainability development. As part of the study's implications, it suggests increasing the attention to all ways to enhance sustainable development in the researched company. It implies that improving efficiency and protecting the environment through unceasing improvement of processes and feedback to the organisation cannot be exaggerated.

Keywords: Company; Iraq; Material requirements planning system; Relationship; Sustainable development

1. Introduction

Proper planning leads to successful implementation and achieving the desired goals, as planning and controlling production processes takes a lot of managers' time and effort. Therefore, companies that produce final products need an efficient system to plan the requirements for materials and parts to make these

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products achieve most of the available capacities. One of the modern management methods, the materials requirements planning system (MRPS), must be used to achieve it[1]. This concept can be traced to Frederick W. Taylor's Shop Management[2]. It has undergone phases with some theoretical constructs that survived as independent sub-systems. Zhu et al.[1] described MRPS as a medium-term production planning. It assists in planning the end item requirements of the master production schedule. It also helps companies plan production in the required quantities and specific times and accurately within the available resources. Companies today think carefully about using resources optimally while ensuring the resources for future generations[4].

The importance of the research cannot be over-emphasised. This importance is embodied in the light of its treatment of one of the recent topics in the field of Iraq's industrial sector, which is the use of the materials requirements planning system and explaining its role in promoting sustainable development in the field of petroleum products and the results that may result from that. It would open the horizon and encourage other researchers to delve into the details of other variables not addressed in this research, which would accumulate knowledge about the variables studied. The study crystallises in directing the researched field to address this topic and apply it to benefit and enhance the performance of the researched company and creating awareness and interest among officials about adopting new methods in management through an intact understanding of the philosophy of this method and how to apply it[1]. To contribute to enhancing the performance of the researched company. The research aims to extrapolate previous relevant research studies and best practices in planning material needs and sustainable development in oil production operations. Also, it will explore current practices in petroleum products about planning material requirements and sustainable development and consider the possibility of improving them. Lastly, it will explain the nature of the connection and the impact of the materials requirements planning system on sustainable development.

The motivation of this research is the lack of studies linking the material requirements planning system, which ensures proper planning of production operations on the one hand, and sustainable development that seeks to benefit from resources for the current generation and subsequent generations on the other hand, using the North Oil Company, Iraq as a case study. Hence, there is an increasing interest of industrial companies in finding technologies that enable them to meet the requirements of their customers in a way that does not cause harm to the environment while preserving the ability of subsequent generations to achieve their interests[5]. It is necessary to adopt advanced systems for planning and obtaining resources, and the material requirements planning system may be the most appropriate technology to achieve this. This is because MRPS provides the right components to clients. From here emerges the research problem in explaining the role of the material needs planning system in developing social development, which can be formulated with the following questions:

a) Does the management of the surveyed company have a clear vision of the material requirements of the planning system and sustainable development?

b) What is the relationship between the materials requirements planning system and sustainable development?

c) Does the material requirements planning system contribute to promoting sustainable development?

Based on the problem statement and research questions, the study postulated the following hypotheses, as illustrated in **Figure 1**:

a) There is no significant correlation between the materials requirements planning system and sustainable development, and the following hypotheses emerge from it.

b) There is no significant correlation between master production scheduling and sustainable development.

c) There is no correlation relationship between the bill of materials and sustainable development.

d) There is no correlation relationship between inventory data and sustainable development.

e) There is no correlation relationship between a specific period and sustainable development.

f) There is no influence relationship between the material requirements planning system and sustainable development.

g) There is no impact relationship between master production scheduling and sustainable development.

h) There is no impact relationship between the bill of materials and sustainable development.

i) There is no impact relationship between inventory data and sustainable development.

j) There is no impact relationship between appointed times and sustainable development.

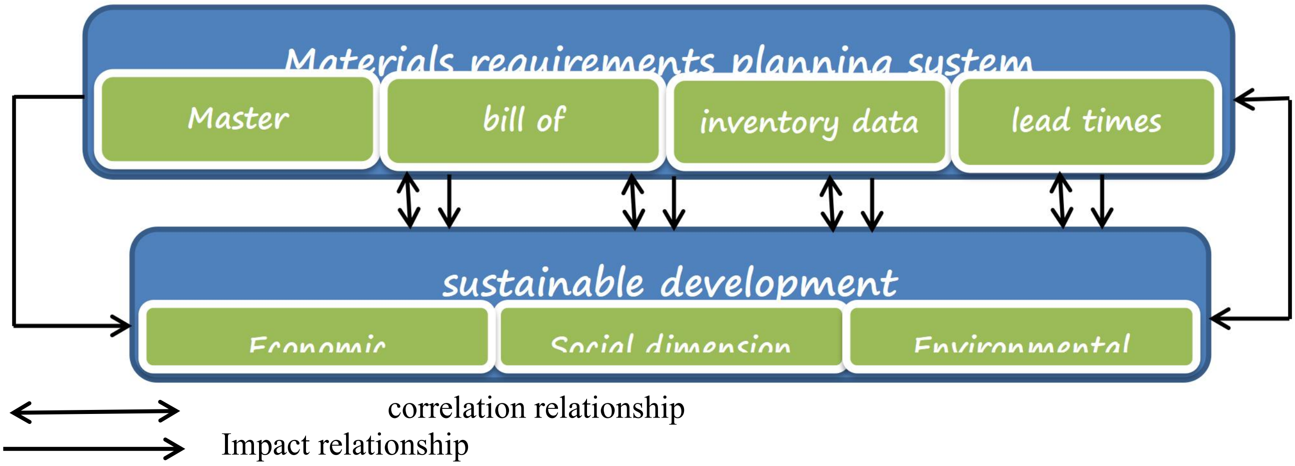

Figure 1. Hypothetical model for the research.

Source: *Authors work*

2. Literature review

2.1. The concept of the materials requirements planning system

Many manufacturing industries resort to developing their operating strategies by focusing on the cost of manufacturing and large-scale production to achieve stability in their customers' demand, especially since market demand has become highly volatile. In addition to dynamic customer desires and small-sized products with faster delivery, which has pushed companies towards improving operating systems to be more flexible, faster responsive, and adaptable to the dynamic market through implementing effective systems for manufacturing, planning, and control, represented by the materials requirements planning system, which was first introduced by Orlicky in 1975, and advanced technology systems were introduced to it to be a global system for effective production methods in manufacturing industries[1,6]. The material requirements planning system is defined as one of the systems for planning and controlling production and inventory, which is used to prepare requirements plan for final products and their sub-component parts and raw materials and the times of need for them to prepare production or purchase orders[7]. It can also be defined as "*a method of calculating the number of parts or types of specific materials required and the times at which they are required. This requires file data that can be checked and updated when the system is running*" [8]. It can also be defined as "*the techniques and methods used in planning the activities and requirements of the production process optimally, with high efficiency and effectiveness, within the required timings and dates*" [9].

The MRPS is a production and inventory management system that needs information about production and inventory. Accordingly, the components of the system are represented by its basic inputs and outputs, which can be summarised as follows[10]:

a) Master Production Scheduling: The Master Production Schedule (MPS) specifies what will be manufactured (e.g., the number of finished products or items) and when. The schedule must be consistent with the overall plan. The overall plan also defines the overall production level in general terms (e.g., product families, standard hours, or dollar size). The plan, typically developed by the sales and operations planning team, includes a variety of inputs, including financial data, customer demand, engineering capabilities, labour availability, inventory fluctuations, supplier performance, and other considerations, and each of these inputs contributes to their own way to the overall plan.

b) Bill of Materials: From the master table, the MRP calculates the required size and timing of major assemblies, subassemblies, and materials. Information about the parts required for each product is needed. This is called a "bill of materials." Initially, it is easier to think of these elements as the product's structure[8].

c) Inventory data: A typical computerized inventory record includes the following data segments. The item master data segment contains the part number, the unique item identifier, and other information: lead time, standard cost, etc. The inventory status segment contains a complete materials plan for each item over time. Finally, the subsidiary data segment contains information concerning outstanding orders, requested changes, detailed demand history, and the like[11].

d) Lead times: In addition to calculating the volume of materials required, MRP also considers when each of these parts will be required, i.e., timing and scheduling of materials. This is done through a back-scheduling process, which considers the lead time (time allowed to complete each stage) at each assembly level[8].

2.2. Benefits of the material requirements planning system

Material requirements planning enables managers to easily determine the quantities of each component for a given order size, know when orders are issued for each component, and be alerted when items need attention. There are still other benefits that include the following[1,12]:

a) Low running inventory levels are due to the exhibit matching demand.

b) Ability to follow physical requirements.

c) Ability to evaluate capacity requirements resulting from a given master schedule.

d) A way to allocate production time.

e) Ability to easily determine inventory usage by back-scanning.

Other researchers believe that the material requirements planning system achieves the following benefits[13]:

a) The required materials and components are determined in quantity and time by considering the grace period for production and purchasing components.

b) Increase efficiency by determining production time and delivery time.

c) Ensuring enough raw materials and materials needed to carry out the planned production and supply to the customer.

2.3. The concept of sustainable development

There are many opinions and different ideas about sustainable development, as some researchers believe that it means "development that guarantees economic growth, social justice, and environmental protection simultaneously. It is simply that field that is shared by society, the environment, and the economy[14-15]. It can also be described as "*the organising principle for conserving exhaustible resources necessary to provide the needs of future generations of life on planet Earth*"[16]. This definition focuses on exhaustible resources and the possibility of exploiting them optimally, ensuring the interests of future generations are achieved. It can be viewed from the perspective of "*focusing on the optimal exploitation of resources with the aim of meeting the needs of the current generation, taking into account the needs of future generations, and its main goal is to protect the environment*"[5]. In the same vein, it can be viewed as "*meeting human needs at present without affecting the ability of future generations to achieve their goals*"[17]. It can also be defined as "*the optimal exploitation of resources to achieve well-being for the current generation and subsequent generations, and to preserve them for subsequent generations to benefit from them*"[4]. Based on the above, researchers believe that sustainable development is the development of strategic plans that allow the exploitation of resources to meets the needs of the current generation and subsequent generations.

Sustainable development goals:

When measuring the environmental, economic, and social reality, applying the principles of sustainable development can achieve several goals that can be summarised as follows[15,18-21]:

- Improving the productivity of natural resources exploited in industry.
- Reducing cost due to efficient use of energy and materials.
- Reducing dependence on unstable energy sources.
- Achieving stability in natural resource markets and prices.
- Providing job opportunities for the healthiest and best educated.
- Increased confidence in a stable future is vital for the prosperity of the global economy.

Omer and Noguchi[22] stated a set of goals that sustainable development seeks to achieve. This includes:

- Sustainable development seeks to improve residents' quality of life at the urban and rural levels in a qualitative rather than quantitative manner.
- Respecting the natural environment by establishing and consolidating the population and environment relationship to achieve integration and harmony.
- Creating full awareness of existing problems that could occur in the future by participating in finding solutions to them.
- Work to achieve optimal exploitation of natural resources rationally by viewing the resources as exhaustible and limited and striving to utilize them optimally.
- Diligently striving to connect technology with society and working to educate society about its importance in various areas of life.
- Striving to make continuous and appropriate changes in society's needs and priorities.

2.4. Dimensions of sustainable development

By reviewing the opinions of researchers in the field of sustainable development, most of them, including Ebekozien et al.[19-20], agree that it has three basic dimensions, as presented in **Figure 2**. This includes:

- The social dimension: The process of sustainable development includes human development that aims to improve levels of health care and education, as it emphasizes the necessity of individuals participating in making development decisions that affect their lives, as the human element forms the basis of the definitions presented for sustainable development, and the important elements that it refers to. They are the elements of justice, fairness, and equality. There are two types of fairness: fairness to future generations, whose interests must be considered. The second type is fairness to people living in the present who do not have fair opportunities with others to obtain natural resources and social services. Sustainable development aims to end this disparity and aims, in its social dimension, to provide loans to informal economic sectors and improve educational opportunities and health care for the community[23].
- The economic dimension: This dimension aims to reduce waste in surface and underground natural resources and rationalize the use of economic potential. Sustainable development is concerned with equality between people and countries at the level of economic development. Global indicators indicate that the people of developed countries enjoy social well-being and wealth, and their level of economic growth has increased, which has led to the development of production and consumption patterns in them. On the other hand, developing countries are witnessing a significant deterioration in their natural resources and a decline in the performance of their economy, which reflects negatively on the social aspect of their people through high unemployment rates and a low standard of living for their individuals. This requires rationalizing the exploitation of resources in a way that leads to protecting the environment and improving the economic and social conditions for present and subsequent generations[24].
- The environmental dimension: The environmental dimension is one of the most important dimensions of sustainable development, as environmental considerations have been neglected and absent in development planning and economic and social planning. Hence, sustainable development must be a source of strength to enhance the environment's ability to provide the requirements for economic activities for generations, preserve and maintain the environment, and preserve the life support system[25]. **Figure 2** shows the basic dimensions of sustainable development:

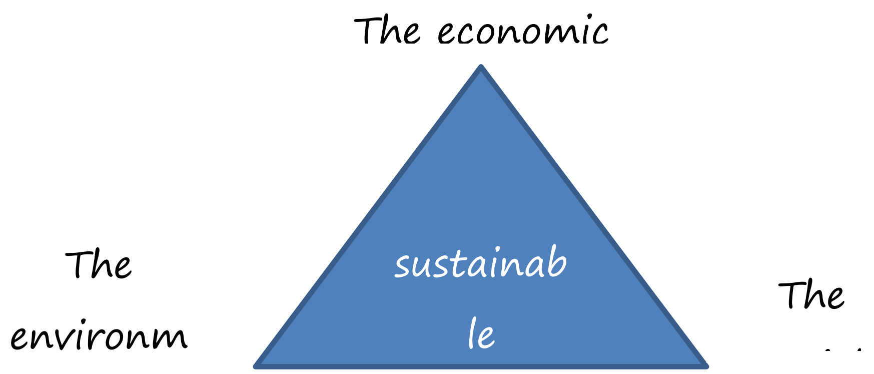

Figure 2. A triangle of the basic dimensions of sustainable development.

Source: *Modified from Habib and Hanan*[14]

3. Research method

This section provides a statistical description of the research variables based on its hypotheses and hypothetical model to demonstrate the nature of the correlation and influence relationships between the dimensions of the material requirements planning system and sustainable development using a set of statistical tools (descriptive and inferential statistics). The tools include arithmetic means, standard deviations, coefficients of variation, simple correlation coefficient, and correlation coefficient to measure correlations and influence between research variables.

The company's origin is the Iraq Oil Company, founded in 1929 in Kirkuk[26-27]. The geographical area of the North Oil Company extends from the Turkish border in the north to latitude (32.5) degrees south and from the Iranian border in the east to the Syrian and Jordanian borders in the west. It includes the northern and central Iraqi governorates, namely Kirkuk, Nineveh, Salah al-Din, Baghdad, Diyala, and parts of the Babil and Diwaniyah governorates[27]. The company produces crude oil and natural gas from oil and gas fields located within its operations. The researchers adopted a quantitative research design. It adopted a survey data collection method using a closed-ended structured questionnaire[28]. Plano-Clark and Crewswll[29] affirmed that this approach describes patterns in a larger group. The study population was employees of the North Oil Company in Iraq. From the questionnaires administered, 50 were retrieved and certified as suitable for analysis. The researchers adopted Version 25 of the Statistical Package for the Social Sciences (SPSS) to conduct the study. The Cronbach's alpha coefficient was adopted to test the reliability via a 3-point Likert scale (agree – 3, neutral – 2, and disagree – 1).

4. Findings and discussion

Table 1 presents the results of the statistical analysis and shows the agreement among the research sample members on the interest of the management of the surveyed company in the materials requirements planning system, as the arithmetic means for all dimensions exceeded the hypothetical **arithmetic mean** of (2) according to the three-way Likert scale. The value of the general average was 2.5677 with a standard deviation of 0.1812, and the value of the coefficient of variation was 7.0568. This indicates the homogeneity of the sample studied and the response rate was 86.396. The most prominent dimensions that contributed to enriching this system are the lead times, as the value of the arithmetic mean for this dimension reached 2.7250 with a standard deviation of 0.3884 and a coefficient of variation of 2.8220 and the response rate to it was 89.112. The least contributing dimension was the main production scheduling, which amounted to the arithmetic mean for this dimension, which was 2.3666 with a standard deviation of 0.3884 and a coefficient of variation of 16.411, and the response rate was 84.001. The other dimensions obtained averages of agreement limited to these two averages. The results also show the complete agreement of the researched sample members on the interest of the management of the researched company with sustainable development, as the arithmetic means for all dimensions exceeded the hypothesized arithmetic mean of (2) according to the three-point Likert scale, and the value of the general average reached 2.4208 with a standard deviation of 0.2499 and the value of the coefficient of variation reached 10.323 which indicates the homogeneity of the sample studied and the response rate was 84.611.

The results also show the complete agreement of the research sample members on the interest of the management of the researched company in sustainable development, as the arithmetic means for all dimensions exceeded the hypothesized arithmetic mean of (2) according to the three-point Likert scale, and the value of the general average reached 2.4208 with a standard deviation of 0.2499 and the value of the coefficient of variation reached 10.323 which indicates the homogeneity of the sample studied and the response rate was 84.611. The most prominent dimension that contributed to enriching sustainable development is the economic dimension, as the arithmetic mean value for this dimension reached 2.6375, with a standard deviation of 0.1897 and a coefficient of variation of 7.1924, and the response rate to it was 83.932. The least contributing dimension was the environmental dimension, as the arithmetic mean for this dimension was 2.2875, with a standard deviation of 0.5018 and a coefficient of variation of 21.936. The response rate was 82.761, and the social dimension obtained an average agreement limited to these two averages.

Table 1. Arithmetic means, standard deviations, coefficients of variation, and response rates for the research variables.

Research variables	**dimensions**	**Arithmetic mean**	**standard deviation**	**Coefficient of variation**	**Response rate %**
Material requirements planning system	Master production scheduling	2.3666	0.3884	16.411	84.001
	Bill of materials	2.6666	0.2649	9.9339	85.143
	Inventory data	2.5125	0.3486	13.874	87.330
	Lead times	2.7250	0.0769	2.8220	89.112
General Average		2.5677	0.1812	7.0568	86.396
sustainable development	Economic dimension	2.6375	0.1897	7.1924	83.932
	Social dimension	2.3375	0.3467	14.832	87.141
	Environmental dimension	2.2875	0.5018	21.936	82.761
General Average		2.4208	0.2499	10.323	84.611

Source: *Authors work.*

4.1. Results of tested hypotheses:

Testing the correlation relationships between the material requirements planning system and sustainable development:

The results of **Table 2** reflect the values of the correlation coefficient between the independent variable (material requirements planning system) at the overall level and the dependent variable (sustainable development), where the value of the correlation coefficient reached (0.83) at the level Significant (0.05). The results also show the values of the correlation coefficient for the dimensions of the independent variable with the dependent variable, where the main production scheduling came in first place with a correlation coefficient of (0.72), followed by inventory data with a correlation coefficient of (0.67), and the bill of materials came in third place with a correlation coefficient of (0.59). Time limits ranked last with a correlation coefficient of (0.58). Based on the above, the first main hypothesis and the sub-hypotheses are rejected, and the alternative hypotheses are accepted, which stipulate that there is a correlation between the material requirements planning system and sustainable development at the overall level and at the dimensional level.

Table 2. Values of the correlation coefficient between the material requirements planning system and sustainable development.

Independent variable / **Dependent variable**	**materials requirements planning system**				
	Master production scheduling	**Bill of Materials**	**Inventory Data**	**Lead Time**	**Aggregate Index**
sustainable development	0.72	0.59	0.67	0.58	0.83*

Source: *Authors work*

4.2. Testing the influence relationships between the two research variables

a) **Testing the relationship of the impact of the materials requirements planning system on sustainable development at the overall level:**

Table 3 shows that there is a significant effect of the materials requirements planning system on sustainable development in terms of the value of the Correlation Coefficient (R^2) of (0.87), which indicates that the material requirements planning system causes (87%) of the differences in sustainable development. The remaining percentage is due to other factors that were not included in the model. This result is supported by the P-value of (0.001), which is less than (0.05), and by observing the calculated (F) value of (63.09), which is higher than its tabulated value of (4.09) at a significance level of (0.05), and then note the value of Beta, which reached (0.89). This indicates that a change in the materials requirements planning system by one unit leads to a change in sustainable development by (89%). Based on the above, the second null hypothesis can be rejected, and the alternative hypothesis can be accepted, which states that the material requirements planning system has a statistically significant effect on sustainable development.

Table 3. The impact of the material requirements planning system on sustainable development.

Independent variable / Dependent variable	materials requirements planning system					
	R^2	F		B_0	B	Sig.
		Calculated	Tabular			
sustainable development	0.87	63.09	4.09	0.86	0.89	0.001

Source: *Authors work.*

b) **Testing the impact of the dimensions of the material requirements planning system on sustainable development:** This test reflects the sub-hypotheses emanating from the second hypothesis, which states that there is no statistically significant effect of the dimensions of the materials requirements planning system on sustainable development. By following the results presented in **Table 4**:

- There is a significant impact of the master production schedule on sustainable development, as indicated by the value of the Correlation Coefficient (R^2) of (0.79), which indicates that (79%) of the differences in sustainable development are due to the master production schedule. The remaining percentage is due to other variables that cannot be controlled or were not included in the model. This result is supported by the calculated (F) value, which reached (14.09), which is higher than its tabular value of (2.74) at two degrees of freedom (5.19) and a significance level of (0.05). This result is confirmed by the (P-value) of (0.00), which is less than (0.05). The value of the regression coefficient Beta was (0.89), which indicates that a change in the master production schedule by one unit will lead to a change in sustainable development by (89%). The above is an indication of the impact of the master production schedule on sustainable development in the researched company, this means the more the researched company adopts the master production schedule accurately, the more it will affect sustainable development. Accordingly, the study rejects the first sub-hypothesis and accept the alternative hypothesis that there is a significant impact of the master production schedule on sustainable development. The value of the Beta regression coefficient was (0.89), which indicates that a change in the master production schedule by one unit will lead to a change in sustainable development by (89%). The above indicates the impact of the master production schedule on sustainable development in the researched company, i.e., the more the researched company adopts the master production schedule accurately, the more it will affect sustainable development. Accordingly, the study rejects the first sub-hypothesis and accepts the alternative hypothesis that the master production schedule significantly impacts sustainable development. Findings agree with Heizer et al.[10], Brugmann[30], and Ching et al.[31]. Ching et al.[31] explained the role of production schedules through Industry 4.0-enabled sustainable manufacturing.

- There is a significant impact of the Bill of Materials on sustainable development, as indicated by the value of the Correlation Coefficient (R^2) of (0.84), which indicates that (84%) of the differences in sustainable development are due to the Bill of Materials. The remaining percentage is due to other variables that cannot be controlled or were not included in the model. This result is supported by the calculated (F) value, which reached (22.63), which is higher than its tabular value of (2.74) at two degrees of freedom (5.19) and a significance level of (0.05). This result is confirmed by the (P-value) of (0.00), which is less than (0.05). The value of the regression coefficient Beta was (0.85), which indicates that a change in the Bill of Materials by one unit will lead to a change in sustainable development by (85%). The above indicates the impact of the Bill of Materials on sustainable development for the research company. This means whenever the research company pays more attention to the Bill of Materials for the parts used in manufacturing the products, that leads to an effect on sustainable development. Accordingly, the study rejects the second sub-hypothesis and accepts the alternative hypothesis that the bill of materials significantly impacts sustainable development. Findings agree with Slack and Jones[8] and Darshan et al.[32]. Darshan et al.[32] found that combining and integrating renewable energy sources in a building and the cost-saving due to energy-efficient appliances improve the achievement of sustainable construction projects.
- There is a significant impact of inventory data on sustainable development, as indicated by the value of the Correlation Coefficient (R^2) of (0.62), which indicates that (62%) of the differences in sustainable development are due to inventory data. The remaining percentage is due to other variables that cannot be controlled or were not included in the model. This result is supported by the calculated (F) value, which reached (12.15), which is higher than its tabular value of (2.74) at two degrees of freedom (5.19) and a significance level of (0.05). This result is confirmed by the (P-value) of (0.00), which is less than (0.05). The value of the regression coefficient Beta was (0.77), which indicates that a change in inventory data by one unit will lead to a change in sustainable development by (77%). The above indicates the impact of inventory data on sustainable development in the research company. This means the more accurate the inventory database of materials the researched company has, the more it will impact sustainable development. Accordingly, the study rejects the third sub-hypothesis and accepts the alternative hypothesis that inventory data significantly impacts sustainable development. Findings agree with Schroeder and Goldstein[11] and Kongboon et al.[33]. Kongboon et al. [33] suggested creating a database for greenhouses to enhance actions for city development and, by extension, mitigate carbon emissions from construction projects.
- There is a significant impact of lead times on sustainable development, as indicated by the value of the Correlation Coefficient (R^2) of (0.56), which indicates that (56%) of the differences in sustainable development are due to periods. The remaining percentage is due to other variables that cannot be controlled or were not included in the model. This result is supported by the calculated (F) value, which reached (10.73), which is higher than its tabular value, which is (2.74), at two degrees of freedom (5.19) and a significance level of (0.05). This result is confirmed by the (P-value) value, which is (0.00), which is less than (0.05). The value of the regression coefficient Beta was (0.64), which indicates that a change in lead times by one unit will lead to a change in sustainable development by (64%). The above indicates the impact of lead times on sustainable development in the research company. The more accurately the research company determines the lead times for production processes, the more this will affect sustainable development. Accordingly, the study

rejects the fourth sub-hypothesis and accepts the alternative hypothesis that led times limits significantly impact sustainable development. Findings agree with Slack and Jones[8] and Jouzdani and Govindan[34]. Jouzdani and Govindan[34] emphasised the economic aspect of highly perishable products and the need to reduce the environmental impact of the chain supply. This is possible without compromising the economic aspect.

Table 4. The impact of the dimensions of the material requirements planning system on sustainable development.

Independent variable / **Dependent variable Dimensions**	**materials requirements planning system**					
	R^2	**F**		**B_0**	**B**	**Sig.**
		Calculated	**Tabular**			
Master Production Schedule	0.79	14.09	2.74	0.86	0.89	0.000
Bill of Materials	0.84	22.63	2.74	1.23	0.85	0.000
Inventory Data	0.62	12.15	2.74	0.93	0.77	0.000
Lead Times	0.56	10.73	2.74	0.76	0.64	0.000

Source: *Authors work*

5. Conclusions and suggestions

Achieving the objectives requires obtaining logical results that can be interpreted and considering which proposed solutions can be given to the research problem. In this context, the researchers have been keen to discuss the research results based on the analysis of field data collected from the North Oil Company, thus achieving a set of conclusions. The research reached several conclusions, the most important of which were as follows: First, the research results revealed the interest of the management of the research company in both the material requirements planning system and sustainable development. Second, the correlation coefficient values vary between each dimension of the material requirements planning system and sustainable development. The study noticed that the master production scheduling dimension was the strongest in the correlation relationship, while the lead times dimension was the weakest in the correlation relationship. Lastly, the research results showed that the material requirements planning system significantly impacts sustainable development; whenever the researched company uses this system, it will enhance sustainable development. Also, the dimensions of the material requirements planning system vary in their impact on sustainable development, with the most influential dimension being the master production schedule. However, future studies should consider a wider coverage of companies in Iraq and develop a model that empirically represents the correlation between the material requirements planning system and sustainable development. At the same time, lead times were the least influential dimension.

Considering the conclusions reached by the research, the following recommendations are presented that would enrich the researched field:

- It is necessary to pay attention to systems that enhance sustainable development for companies in general and for the North Oil Company in particular by adopting the dimensions that express them (the social, environmental, and economic dimensions).
- Also, it is necessary to pay attention to the material requirements planning system in the North Oil Company, as it is one of the most important ways to enhance sustainable development.

Improving the infrastructure of the material requirements planning system and providing the necessary capabilities for proper implementation ensures sustainable development enhancement.

Author contributions

Conceptualisation, H.S.D., A.M.S., and B.K.K.; methodology, H.S.D., M.A.H., and A.E.; software, H.S.D., A.M.S., B.K.K., M.A.H., and A.E.; validation, H.S.D., A.M.S., M.A.H., and A.E.; formal analysis, H.S.D., A.M.S., B.K.K., M.A.H., and A.E.; investigation, H.S.D., A.M.S., B.K.K., M.A.H., and A.E.; resources, H.S.D., A.M.S., B.K.K., M.A.H., and A.E.; data curation, H.S.D. and A.M.S.; writing—original draft preparation, H.S.D., A.M.S., B.K.K., and M.A.H.; writing—review and editing, H.S.D., M.A.H., and A.E.; visualization, H.S.D., and A.E.; supervision, H.S.D., A.M.S., B.K.K., M.A.H., and A.E.; project administration, H.S.D., M.A.H., and A.E.; funding acquisition, H.S.D. and M.A.H. All authors have read and agreed to the published version of the manuscript.

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Conflict of interest

The authors declare no conflict of interest.

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