المستوى المتوقع لتطور حركة النشر للبحوث الهندسية للجامعة التكنولوجية

Predicted level of development publishing movement for

Engineering Research University of Technology

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المستخلص :

يهدف البحث الى دراسة تحليل المؤثرات السلاسل الزمنية لـ "عدد بحوث النشر" للفترة (٢٠٠٧ – ٢٠٢٢) سنة. في العراق ضمن عينة في "الجامعة التكنولوجية" حسب اقتراح عدة نماذج غير خطية انحدار ذاتي من المرتبة الأولى تظهر اختلافات واضحة في عدد أرقام النشر المتوقعة، حيث يتناقص عدد المجلات الدولية للهندسة فضلا عن المجموع الكلي، مع زيادة أعداد النشر في الفترة الزمنية القادمة (٢٠٢١ – ٢٠٢٥) سنة. عن "المجلة العراقية لهندسة الحاسبات والاتصالات والسيطرة والنظم " و "المجلة العراقية لهندسة العمارة والتخطيط " .

الكلمات المفتاحية: المستوى المتوقع، البحوث الهندسية، الجامعة التكنولوجية ، المجلة العراقية لهندسة العمارة والتخطيط ، مجلة الهندسة والتكنولوجيا ، المجلة العراقية لهندسة الحاسبات والاتصالات والسيطرة والنظم.

Abstract:

This paper aimed to construct optimal predicted models with reference to the "Number of Publishing Research" in the various engineering field based on time series analysis influenced for the period (2007-2022) years. in Iraq among a sample at the "University of Technology- iraq", through applying a several non linear aut¬¬o-

regressive of a proposed models regarding oldest certified journals, as well as forecasting of the coming time publishing research for the period (2023 – 2025) years.

Objective: This paper aimed to construct optimal predicted models with reference to the "Number of Publishing Research" in the various engineering field based on time series analysis influenced for the period (2007-2022) years. in Iraq among a sample at the "University of Technology- Iraq .

Methodology: Data are selected from the website of the journals issued by the University of Technology in Iraq, which registered and published by the Ministry of High Education and Scientific research, for the mentioned period of time. Auto-regression analysis of variance-ANOVA criterion had been applied, the best model will present a smaller significant level compared among several proposed simple linear and non linear models, such that: (Logarithmic, Inverse, (Polynomial Auto-regressive of Quadratic, and Cubic) ordered, Compound, Power, S-Shape, Growth, Exponential Trend, Brown's Linear Exp. Smoothing, and Logistic) .

Results and Findings: The best predicated number of publishing research's models had differentiated significant influences levels regarding of auto-regressive parameter's estimates at significant levels in at least Value<0.05, where non linear of polynomial "Cubic-Shape" of polynomial auto-regression has been selected among studied models for the "Iraqi Journal of Computer, Communication, and Systems, International journal of Engineering and Technology, and Grand total of the studied journals", then followed by "Power-Shape" auto-regression has been selected among studied models for the " Iraqi Journal of Architecture and Planning". Forecasting for the coming time period up to 2025 years. are predicted according to an optimum significance models.

Conclusions: Analysis of influences studied time series for "Number of Publishing Research" for the period (2007-2022) years. in Iraq among a sample at the "University of Technology" according to proposed of a several non linear auto-regressive models of rank one shows clear differences in the number of an expected of publishing numbers, where the decreasing number of international journal of engineering and technology, as well as grand total, while, increment of publishing numbers in the coming time period (2021 – 2025) years. for the "Iraqi Journal of Computer, Communication, and Systems, and " Iraqi Journal of Architecture and Planning."

Key Words *: prediction level , Engineering research , University of Technology , Journal of Architecture and Planning , Engineering and Technology Journal, Iraqi Journal of Computer communication Control and Systems Engineering engineering*

Introduction: Arab scientific research is characterized by a low volume of spending and financial allocations, as the volume of spending on scientific research falls below the internationally accepted limit (1%) of the gross national income. This leads to the lack of infrastructure necessary for research, (Abdula, 2016). The issue of studying and analyzing the level of publication of local research in the various field generally in Iraq, and specifically, engineering research (i.e. The sampling Population) is one of the most important matters that educational leaders adopted in assessing the performance level of faculty members in universities and scientific centers, which reflects the level of general evaluation of performance at the various educational levels, starting with scientific departments, colleges, universities and associated committees. The local published movement may be affected by many indirect factors related to gains or the benefits that received by the researcher, specifically the scientific promotion, as the less number of points that researcher obtains for local published research compared to research published in international journals. Also, the local publishing process may take longer time than what is required for the research submitted for publication in international journals, and what international conferences offering publication of participating research in specific journals with a high impact factor, usually. In addition to that, lack of necessary financial funding and lack of interest in the Arab researcher, as well as the political system and the absence of clear scientific policies and strategies (Ahmed, 1991). For all of these and other reasons, the importance of the research was determined in studying the numbers of local research submitted for publication over a time series through studying and analysis development of the publishing movement in the engineering field in Iraqi's universities, specifically the "University of Technology" as a sample through the time series of engineering research published on the internet during years (2007-2022), specifically, among a sample of chronologically outdated journals , such that: "Iraqi Journal of Computer https://ijccce.uotechnology.edu.iq/ , Communication and Systems, Iraqi Journal of Architecture and Planning https://iqjap.uotechnology.edu.iq/ and International journal of Engineering and Technology https://etj.uotechnology.edu.iq/ ", In order to obtain an optimal models that reflects the pattern or behavior of the numbers of local research that were published during the years of the time series, leading to a prediction of those numbers that will be submitted for publication in the coming years, and this came for the first time as far as (we know).

Research Problem: Despite the characteristics and advantages that characterized local journals that accompanied rapid increases in the number of research submitted for publication in the past years in various engineering fields, that associated with the use of the latest publishing techniques and research presentation methods, there has been a noticeable reluctance in number of these researches in recent years, which contributed

to the decline in the use of it as one of the sources of documented and regimented information, and in order to identify the reality of that decline, which was accompanied by the requirements of scientific promotions for the recent faculty members, which came with a decrease in publishing points of locally and Arab journals for the purposes of scientific promotion compared with international journals, this study came to answer for the following questions:

1. What are the numbers of research published in the "University of Technology" within the time limits of research in a sample of scientific journals issued by Iraqi universities of various engineering fields, the sampling population.
2. What are the predictive models through which it is possible to identify behavior pattern of the publishing movement for engineering research and estimate the numbers expected to be published for engineering research in the coming years.

Objective: Aimed this paper to construct optimal predicted models with reference to the "Number of Publishing Research" in the various engineering field based on time series analysis influenced for the period (2007-2022) yrs. in Iraq among a sample at the "University of Technology", through applying linear and non linear auto-regressive of a several proposed models regarding oldest certified journals, as well as forecasting of the coming time publishing research for the period (2023 – 2025) yrs.

Review of Literatures:

(Abdel, 2004): Introduced a dissertation submitted to Al-Mustanasiriyah University, College of Arts, Department of Information and Libraries, titled "Structural engineering research in Iraq for the period from 1970-1999: an analytical study". The study aimed to identify the developments of research motion in the subject of structural engineering in Iraq during the past three decades and to determine the engineering intellectual output of this subject with its various vessels, with a judgmental, qualitative, objective and temporal analysis of this specialized product, as well as to identify the researchers' orientations to the subject of structural engineering in each of the three decades.

(Knight. Linda V. et al., 2008) Published research titled "Selecting an Appropriate Publication Outlet: A Comprehensive Model of Journal Selection Criteria for Researchers in a Broad Range of Academic Disciplines", The research aimed to develop graphical model to assists authors in comparing journal alternatives and provides new

researchers with insights in to how the three primary journal selection categories: such as "Specific guidelines are given for evaluating such concepts as manuscript-journal "fit," journal prestige, and journal visibility"**.**

(Kazem Hana Abdel Hakim, 2013) published a paper titled "Objective trends in the Journal of Engineering and Technology: An Analytical Study". The research aimed to identify the specialized intellectual output in the field of engineering and technology and the chronological distribution of research published on the Internet during the years 2007-2010. Engineering and technology, the journal was distinguished by its sobriety, good tabulation and regular publication, and it has a standard number 6900-1681ISSN.

Definitions of studied models (Francisco et al., n.d.)**:**

1. The simple "Non Linear" trend of Auto-Regression Function (y'_t) of testing (Polynomial (Cube)) Model of Predicted Equation is defined by:

   is defined as:

$$\widehat{\boldsymbol{Y}}'_{\boldsymbol{t}} = \boldsymbol{b0} + (\boldsymbol{b1}) * (\boldsymbol{t})^{\boldsymbol{1}} + (\boldsymbol{b2}) * (\boldsymbol{t})^{\boldsymbol{2}} - (\boldsymbol{b3}) * (\boldsymbol{t})^{\boldsymbol{3}} \quad \ldots\ldots\ldots \quad (1)$$

where: $\widehat{\boldsymbol{Y}}'_{\boldsymbol{t}}$ **:** Is the projected value of the Y_t variable for a selected value of t.

b_0 **:** Is the Y-intercept. It is the estimated value of Y when y_{t-1} = 0. Another way to put it is the estimated value of Y where the line crosses the Y-axis when t is zero.

b_1 **:** is the slope of the line, or the average change in Y' for each change of one unit in t.

b_2 **:** is the slope of the line, or the average change in Y' for each change of one unit in t^2.

b_2 **:** is the slope of the line, or the average change in Y' for each change of one unit in t^3.

t **:** is any integer value of time that is selected in the coming time.

2. The simple "Non Linear" trend of Auto-Regression Function (y'_t) of testing Power equation Auto-Regression Model: Defined by:

$$\widehat{Y}'_t = b0 * t^{b1} \quad \text{.....} \qquad (2)$$

where: $\widehat{Y}'_t$ **:** Is the projected value of the Y_t variable for a selected value of t.

b_0 **:** Is the Y-intercept. It is the estimated value of Y when y_{t-1} = 0. Another way to put it is the estimated value of Y where the line crosses the Y-axis when t is zero.

b_1 **:** is the slope of the line, or the average change in Y' for each change of one unit in t.

Methodology and Statistical analysis methods:

Optimization predicated auto-regressive of highly fitted were checked along a several proposed models of "Linear and Non-Linear" shapes, such that: [Linear, Logarithmic, Inverse, (Polynomial regression of Quadratic, and Cubic), Compound, Power, S-Shape, Growth, Exponential Trend, Brown's Linear Exp. Smoothing, Exponential, and Logistic], in order to get an optimization models that best fitted the data among those models, as well as displaying some important statistics to explain the results of fitted model for estimating a predicted equation, such as (Slope, Intercept, Correlation Coefficient, Determination Coefficient, and Regression ANOVA for testing the fitted model) and were achieved for studying influence of "Lagging passing times on the No. of Publishing Research". All statistical operations were performed through (using ready-made statistical package SPSS, ver. 22) (*SPSS Package, "Ver.-22" in Favor of Data Analyze and Obtaining the Predicated Models, as Well as Graphical Presentations*, n.d.).

Results and Findings :

The time series data on the cause of "Number of Publishing Research" in the sampled engineering fields are recorded for period (2007-2022) yrs., and table (1) represents the more fitted predicted equations which were tested in two tailed alternative statistical hypotheses.

Table (1): No. of Published Research Predicated Models under Influence of Lagging Time Series among studied Journals in Iraq

Iraqi Journal of Computer, Communication & Systems for the Period (2007 - 2022)		
Correlation Coefficient	0.67433 (S) (*)	Meaningful Non Linear Auto-Regression of Cubic Model Tested in two tailed alternative Statistical hypothesis
R- Square (**)	0.45472	
Adjusted R Square	0.33788	

Standard Error	**6.95653**				
Auto-Reg. ANOVA	**F=3.89167**		**Significant level = 0.0325 (S) (*)**		
Variables in the Equation					
Variable	**B-Beta**	**SE.B**	**Stand. Beta**	**t-test**	**P-value (*)**
Time	**3.262212**	**3.638197**	**2.037093**	**0.897**	**0.3851**
Time^2	**-0.529283**	**0.438729**	**-6.462604**	**-1.206**	**0.2477**
Time^3	**0.023521**	**0.015206**	**5.07771**	**1.547**	**0.1442**
(Constant)	**12.647059**	**8.203174**	**-**	**1.542**	**0.1454**
Predicted Equation : Model (Cubic Auto-Regression) Shape					
$(\text{No. of } \widehat{\text{Published}}) = 12.647 + (3.2622) * (\text{Time})^1 - (0.529) * (\text{Time})^2 + (0.023521) * (\text{Time})^3$					
Iraqi Journal of Architecture & Planning for the Period (2007 - 2022)					
Correlation Coefficient	**0.51418 (S) (*)**	**Meaningful Non Linear Auto-Regression of Power Model Tested in two tailed alternative Statistical hypothesis**			
R- Square (**)	**0.26436**				
Adjusted R Square	**0.22111**				
Standard Error	**0.34096**				
Auto-Reg. ANOVA	**F=6.10976**		**Significant level = 0.0243 (S) (*)**		
Variables in the Equation					
Variable	**B- Beta**	**SE.B**	**Stand. Beta**	**t-test**	**P-value (*)**
Time (per yrs.)	**0.246010**	**0.099527**	**0.514179**	**2.472**	**0.0243**
(Constant)	**7.633467**	**1.682563**	**-**	**4.537**	**0.0003**
Predicted Equation : Power Model (Auto-Regression) Shape					
$(\text{No. of } \widehat{\text{Publishing}} \text{ Research}) = 7.633467 * (\text{Time})^{0.246010}$					

Continue …

International journal of Engineering & Technology for the Period (2007 - 2022)		
Correlation Coefficient	**0.83744 (HS) (*)**	**Meaningful Non Linear Auto-Regression of Cubic Model Tested in two tailed alternative Statistical hypothesis.**
R- Square (**)	**0.70130**	
Adjusted R Square	**0.62662**	

Standard Error	**68.72408**				
Auto-Reg. ANOVA	**F=9.39128**	**Significant level = 0.0018 (HS) (*)**			
Variables in the Equation					
Variable	**B- Beta**	**SE.B**	**Stand. Beta**	**t-test**	**P-value (*)**
Time	**170.40587**	**43.769366**	**7.21345**	**3.893**	**0.0021**
Time^2	**-19.596398**	**5.889632**	**-14.506206**	**-3.327**	**0.0060**
Time^3	**0.615537**	**0.228197**	**7.188614**	**2.697**	**0.0194**
(Constant)	**-52.497253**	**88.600457**	**-**	**-0.593**	**0.5645**
Predicted Equation : Model (Cubic Auto-Regression) Shape					
$(\text{No. of } \widehat{\text{Published}}) = -52.497 + (170.0406) * (\text{Time})^1 - (19.596) * (\text{Time})^2 + (0.6155) * (\text{Time})^3$					
Grand Total of Studied Iraqi Journals for the Period (2007 - 2022)					
Correlation Coefficient	**0.82014 (HS) (*)**	**Meaningful Non Linear Auto-Regression of Cubic Model Tested in two tailed alternative Statistical hypothesis**			
R- Square (**)	**0.67263**				
Adjusted R Square	**0.58335**				
Standard Error	**71.49131**				
Auto-Reg. ANOVA	**F=7.53371**	**Significant level = 0.0052 (HS) (*)**			
Variables in the Equation					
Variable	**B- Beta**	**SE.B**	**Stand. Beta**	**t-test**	**P-value (*)**
Time	**185.42002**	**50.791184**	**7.486959**	**3.651**	**0.0038**
Time^2	**-22.067173**	**7.254768**	**-14.661095**	**-3.042**	**0.0112**
Time^3	**0.732592**	**0.298703**	**7.215315**	**2.453**	**0.0321**
(Constant)	**-45.028571**	**-45.028571**	**-**	**-0.464**	**0.6514**
Predicted Equation : (Cubic-Shape Auto-Regression) Model					
$(\text{No. of } \widehat{\text{Published}}) = -45.029 + (185.420) * (\text{Time})^1 - (22.067) * (\text{Time})^2 + (0.7326) * (\text{Time})^3$					

(*) HS: Highly Significant at P<0.01; S: Significant at P<0.05.

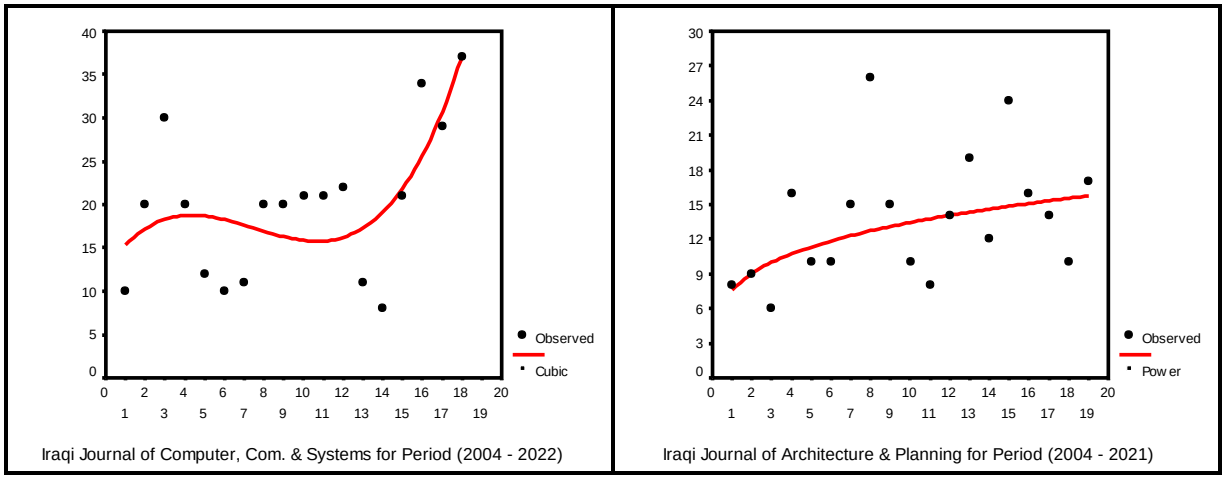
(**) R- Square : Determination coefficient.

With respect to published research predicated models under influence of lagging time series among the studied Journals in Iraq, results of auto-regressive analysis models are represented differentiated outcome's results, and as follows:

a. **Iraqi Journal of Computer, Communication and Systems for the Period (2007 - 2022):** Results shows that a meaningful non linear auto-regressive influenced of polynomial (Cube) shape model. Slope values indicating that with lagged one rank of time (1yr.) up to preceding order, there were swinging down and up influenced on the unit of "Number of Publishing Research", estimated by differentiated slops, and that are accounted significant influenced at $P_{value}<0.05$, as well as auto-correlation ship coefficient seem to be perfect (0.51418), with significant determination coefficient (26.436%). Other source of variations that are not included in the studied model, (i.e. The constant), was accounted no significant level at $P_{value}>0.05$, and that indicating not important of initial factor that not included in the studied model and having a meaningless part for participate in the interpretation the amount of variations among the functional values concerning "No. of Publishing Research".
b. **Iraqi Journal of Architecture & Planning for the Period (2007 - 2022):** Results shows that a meaningful non linear auto-regressive influenced of polynomial (Power) shape model. Slope values indicating that with lagged one rank of time (1yr.) up to preceding order, there were swinging slight up influenced on the unit of "Number of Publishing Research", estimated by differentiated slops, and that are accounted highly significant of influenced at $P_{value}<0.01$, as well as auto-correlation ship coefficient seem to be perfect (0.67433), with significant determination coefficient (70.130%). Other source of variations that are not included in the studied model, (i.e. The constant), was accounted high significant level at $P_{value}<0.01$, and that indicating inevitability of initial factor that not included in the studied model and having a meaningful part for participate in the interpretation the amount of variations among the functional values concerning "No. of Publishing Research".
c. **International journal of Engineering & Technology for the Period (2007 - 2022):** Results shows that a meaningful non linear auto-regressive influenced of polynomial (Cube) shape model. Slope values indicating that with lagged one rank of time (1yr.) up to preceding order, there were swinging down and up influenced on the unit of "Number of Publishing Research", estimated by differentiated slops, and that are accounted significant influenced at $P_{value}<0.05$, as well as auto-correlation ship coefficient seem to be perfect (0.83744), with significant determination coefficient (26.436%). Other source of variations that are not included in the studied model, (i.e. The constant), was accounted no significant level at $P_{value}>0.05$, and that indicating not important of initial factor that not included in the studied model and having a meaningless part for participate in the interpretation the amount of variations among the functional values concerning "No. of Publishing Research".

d. **Grand Total of Studied Iraqi Journals for the Period (2007 - 2022):** Results shows that a meaningful non linear auto-regressive influenced of polynomial (Cube) shape model. Slope values indicating that with lagged one rank of time (1yr.) up to preceding order, there were swinging down and up influenced on the unit of "Number of Publishing Research", estimated by differentiated slops, and that are accounted highly significant influenced at $P_{value}<0.01$, as well as auto-correlation ship coefficient seem to be perfect (0.82014), with significant determination coefficient (67.236%). Other source of variations that are not included in the studied model, (i.e. The constant), was accounted no significant level at $P_{value}>0.05$, and that indicating not important of initial factor that not included in the studied model and having a meaningless part for participate in the interpretation the amount of variations among the functional values concerning "No. of Publishing Research".

Figure No. (1): Shows the long term trends analysis for the period (2007-20202) yrs. on the "Number of Publishing Research" concerning studied sampling of engineering journals in Iraq.



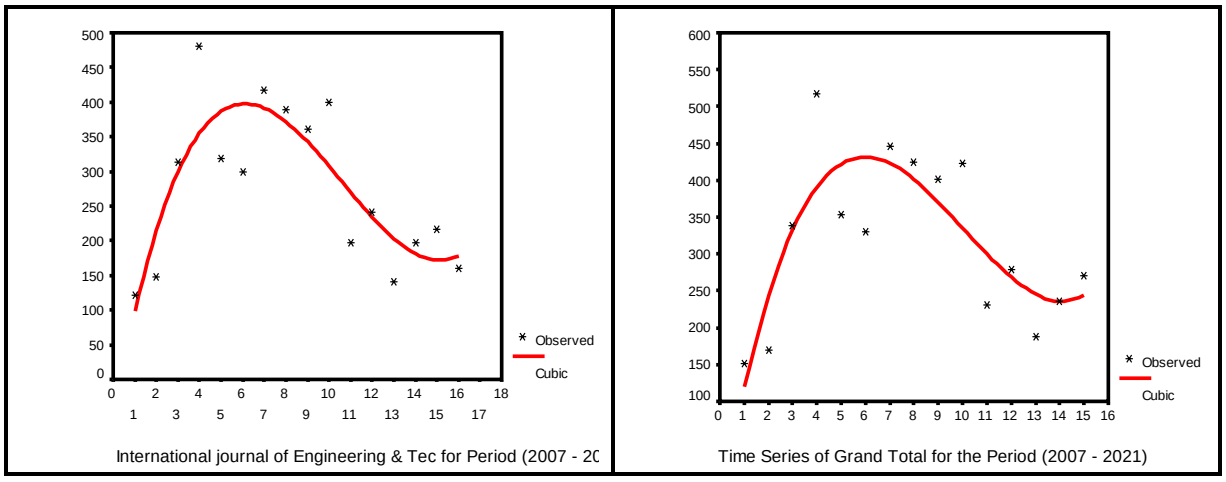


Figure (1): long term trends analysis for the period (2007-20202) yrs. on the "Number of Publishing Research" concerning studied sampling of Engineering Journals in Iraq

In order to clarify the long term trend line of the predicted values for the studied "Number of Publishing Research", for the sampled journals in Iraq, table (2) illustrated projection of long term trend numerically, for the next period (2023-2025) yrs, which indicates a possible levels of increment in the coming years.

Table (2): Predicted No. of Publishing Research for the Period (2023-2025) yrs. under Influence of Lagging Time Series for the Period (2007-2022) yrs. for sampled journals in Iraq

Publishing in the Coming Years	Iraqi Journal of Computer, Communication & Systems	Iraqi Journal of Architecture & Planning	International journal of Engineering & Technology	Grand Total
2023	37	10	205	329
2024	44	10	255	415
2025	52	10	333	537

Conclusions: Analysis of influence numbers of publishing research time series for the lagging period (2007-2022) yrs. concerning sampled of engineering journals in Iraq among a proposed of a several non linear auto-regressive models of lagged one, shows clear differences in the numbers of an expected publishing research in the coming time, where the increasing the "Number of Publishing Research" associated with the "Iraqi Journal of Computer, Communication and Systems", and "International journal of

Engineering and Technology", while "Iraqi Journal of Architecture & Planning" are coming with the same numbers, as well as an incremental increases at a high rates regarding to resulted of grand total of the sampled journals in the projection time up to 2025 years.

Recommendations

1- Encouraging researchers and scholars to conduct studies on the strengths and weaknesses of the journals issued by the University of Technology in terms of the number of research papers and addressing the problems facing researchers in publishing their research.

2- Conducting studies on the problems facing researchers in publishing their research in terms of procedures for communicating with researchers in publishing their research.

3- Oblige the departments that publish the magazine to publish everything related to the magazine from the editorial board and recent publications, in both languages, in order to be clear to every beneficiary**.**

4- Lack of specialized journals at the University of Technology. Work to increase them by supporting departments and encouraging them to publish journals at the core of specialization**.**

5- The university's website contains a link to the university's journals

https://iqjap.uotechnology.edu.iq/browse?_action=issue This site does not contain support for other languages, that is, it suffices with the English language. It is preferable that there be an overview of what is published on the site and supports different languages For the benefit of all researchers in the world. And work to provide everything related to the site from the moment of its creation and the official books that are circulated to universities from the ministry regarding the site and what it contains and everything that would support researchers from specialization as well as fromnon-specialization **.**

6- Establishing a database of the writings of the professors of the University of Technology, not limited to research, but rather their writings of books that support the educational process (curricula) (research).

References:

1. Abdel, R. . L. F. (2004). *Structural engineering research in Iraq for the period from 1970-1999: an analytical study*. Al-Mustanasiriyah University.
2. Abdula, K. O. (2016). The reality of scientific research in developing countries compared to developed countries in the localization of technology [Almelisea China and Japan] model. *Journal of the College of Basic Education for Educational and Human Sciences*, *30*.
3. Ahmed, B. . (1991). Arab Scientific Research: Reality, Its Return, and Future Aspirations. *Arab Affairs Journal*, *65*.
4. Francisco, B., Koopman, S. J., & Andre.Lucas. (n.d.). Nonlinear autoregressive models with optimality properties. *Econometric Reviews*, *39*(6).
5. Kazem Hana Abdel Hakim. (2013). Objective trends in the Journal of Engineering and Technology: An Analytical Study. *The Professor's Journal of Human Sciences*, *1*(207), 433–450.
6. Knight. Linda V., A., T., & DePau, S. (2008). ,. International journal of Doctoral Students. *Selecting an Appropriate Publication Outlet: A Comprehensive Model of Journal Selection Criteria for Researchers in a Broad Range of Academic Disciplines*, *3*.
7. *SPSS Package, "Ver.-22" in favor of data analyze and obtaining the predicated models, as well as graphical presentations*. (n.d.).