

*Original Research*

## **The Presentation of Intellectual Property Pattern of Open Access Medical Journals (Iran)**

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### **Abstract**

Intellectual property is necessary in the flourish of research, development, and science as well as technology promotion in the new Internet and digital spaces. The key purpose of the protection of intellectual property is to prevent abuse and plagiarism, to encourage scientists and authors to conduct scientific research and literary activities, and to make their results accessible to the scientific community. Compliance with the codes of ethics, intellection, and human rights are the reason for the application of the laws of intellectual property rights at the national and international levels. The present study is an applied-exploratory study and a quantitative-qualitative research. The researcher-made questionnaire (content analysis and Delphi panel) consists of five main components (publisher, author, publications, subject, and commercialization) and 63 questions. Questionnaires were sent to the statistical population of the study, which was all the open access medical journals. About 611 completed questionnaires were entered into spss24 software. Validity and reliability, exploratory and confirmatory factor analysis and finally presentation of the model with PLS software were examined on the questionnaires. As can be seen from the findings, Cronbach's alpha values, composite reliability, and average variance are statistically acceptable. In addition, the Cronbach's alpha coefficient for most factors is greater than 0.7. Therefore, it is inferred that the variables have acceptable reliability. The AVE value is calculated for the components, with almost all variables having an acceptable convergent validity. The results show that there is a significant difference between the components. Considering the obtained results, it can be concluded that there is a relationship between the factors and intellectual property of journals. The quality indicators of the model confirmed this correlation as well. Finally, the results show that the questionnaire can be used with open access medical journals to examine intellectual property.

**Keywords:** Intellectual Property Rights, Medical Journals, Open Access, Open Access Journals.

### Introduction

Intellectual property is generally characterized as non-physical property that is the product of original thought. Typically, rights do not surround an abstract, non-physical entity; rather, intellectual property rights surround the control of physical manifestations or expressions of ideas. Intellectual property law protects a content-creator's interest in her ideas by assigning and enforcing legal rights to produce and control physical instantiations of those ideas (Adam, 2018). The authors' rights, in general definition, means protecting the work of its creators (authors) by preventing the making of illegal and impermissible copies of their work. In fact, the authors' rights cover a wide spectrum of creative human activities. Actually, access to information resources without prevention has led to breaking the laws related to the authors' rights (Soltanifar, 2010). Today, there is a heated discussion about the importance of intellectual property (moral) and maintaining it at the national, regional, and international levels, the expansion of communication by the World Wide Web, and quick and easy access to all the information. Some people's abuse of works and achievements of others have added to the importance of maintaining this type of property and its credit (Shir Ali & Karimi, 2018). The World Intellectual Property (WIPO) refers to creations of the mind, inventions, literary and artistic works; and symbols, names, and images used in commerce (WIPO, 2014). Using the intellectual property right should help facilitate access, and it should not prevent the access to knowledge and information. No doubt, without prejudice toward the legitimate interests of the author's rights holder, this will increase the gap between information-rich and information-poor (Norman, 1997).

The ability to recopy, facility of information dissemination, expansion of the geographical boundaries, increment and facility of violating the intellectual property of literary or artistic personality, inability of identification of the copyright infringer in the digital environment, transmission of information quickly to millions of people around the world, information security and protection, storage of large amount of information in very limited space, and the simultaneous use of information and information resources can be counted as other features of digital environment (Rostami, 2015). However, there are open access journals, including permanently open electronic journals, free of any legal restrictions concerning intellectual property and authors' rights. These journals are published by nonprofit institutions such as the Public Library of Science (PLOS) or BioMed Central (Suber, 2019). Among the reasons which have accelerated the open access process are the traditional (author's interest in publishing research result) dimension, new information technologies (development of the World Wide Web) dimension, serials crisis dimension, and intellectual property rights in cyberspace and the Internet dimension. Due to the importance of significant publishers' journal subscriptions, today, authors make their articles openly available online; of course this is an ability in dealing with change (Laakso & Björk, 2016). Moreover, open access journals, as one of the main infrastructures of the free flow of information, have created this worldwide outline for all countries so that they will be able to make their scientific productions easily available to researchers (Khalili, 2015).

Considering that the national medical science universities have open access journals in different subject areas and that the journals are the scientific communication channels of universities, there has not yet been a discussion about the intellectual property rights according to the extracted and general information based on failure to respect intellectual property rights. The components of intellectual property are publisher, author, publications, subject, and

commercialization, which are extracted using content analysis. Thus, the focus of the research is on the presentation of the model. According to the content provided, the purpose of this research is to provide a suitable model for the intellectual property of open access medical journals. To this end, the following research question has been raised and examined. Research Question: What are the components of intellectual property rights for designing a proper pattern in the open access journals of Iran's Ministry of Health?

### Literature Review

MacLeavy, Harris & Johnston (2020) concluded that journal publication in geography changed significantly in the late 20th century as its dominance by learned societies was captured by (large, multi-national) commercial organizations making large profits from freely-donated authors' intellectual property. Further changes are now proposed, involving journals being freely accessible, sustained not by subscriptions but rather by author payments, which will enhance capitalist publishers' profit-making potential and disadvantage authors. Alternatives are needed, returning to the earlier model whereby research papers are not treated as profit-making commodities. McIntyre (2018) asserted that researchers surveyed academic librarians about their open access publishing practices. This analysis explored approaches to journal selection, awareness of open access options, and self-archiving practices. Fifty percent of the librarians in the study considered free open access when selecting a potential journal for publication, but a journal's fit to the topic and peer review were higher priorities. Findings indicate that, although many librarians publish in open access journals or take advantage of institutional repositories, there are still barriers to publishing in open access journals, including article processing charges, the tenure and promotion culture, and uncertainty around intellectual property rights. Björk (2018) observed that many fields of business have been profoundly changed by the emergence of the Internet which is a truly disruptive innovation. The reviewing, publishing, and retrieval of articles have also benefited enormously from digitalization.

Sahoo, Mohanty & Sahoo (2017) in a study, based on participation in open access journal production in India from 2003 to 2016, realized that the U.S and India have been more effective by adopting the open access policy in scientific journals scope. Rowley, Johnson, Sbaffi, Frass & Devine (2017) in her study, concluded that identifying the academic potential for the publishing cycle is a distinction. Academic reports demonstrate that reusing a work is related to its noncommercial use. There is a significant difference in the number of requests for status in comparing technology and medical science to art, humanities, and social sciences, but in general, its impact was low. In their study Ross, Magee, Walker & Wood (2012) contended that the 'restricted access's approach involves the use of non-disclosure agreements, legal documents that must be signed between the trial lead centre and collaborative sites. Potential sites must guarantee they will not disclose any details of the study before they are permitted to access the protocol. The main advantages of the restricted access approach are for the lead institution and nominated principal investigator, who protects their intellectual property associated with the trial. The main disadvantages are that ownership of the protocol and intellectual property is assigned to the lead institution; defining who 'needs to know' about the study protocol is difficult; and the use of non-disclosure agreements involves review by lawyers and institutional representatives at each site before access is permitted to the protocol, significantly delaying study implementation and adding substantial indirect costs to research institutes. This extra step may discourage sites from joining a trial. It is possible that the

restricted access approach may contribute to the failure of well-designed trials without any significant benefit in protecting intellectual property. Funding agencies should formalize rules around open versus restricted access to the study protocol just as they have around open access to results. Elliott (2005) considered that the legal regime has been tightened and attitudes of funders, employers and researchers have changed so that serious challenges are emerging to the free flow of ideas and information on which the scientific enterprise rests. It is important that individual scientists are aware of their rights and convinced to use them in the public good.

A review of the theoretical and specialized literature of the researches showed that a large volume of them have been conducted in the field of copyright and open access to scientific information in cyberspace, but there has not been any study on the intellectual property rights and open access medical journals in the world and Iran. Most studies have focused on the theoretical approaches (theoretical foundations and frameworks explanation) and none of the backgrounds have independently addressed this issue. Outside of Iran, researchers such as MacLeavy, Harris & Johnston (2020), McIntyre (2018), Bayry (2013), Ravoli (2017), and Björk (2018), and in Iran, researchers such as Mousavi, Zarei, Zavaraghi & Akbarpour (2019), Rostami (2015), Mohtasham & Mashhadi (2014), Khalili (2015), and Saeedi & Haji Hosseini (2013) have conducted effective studies concerning this issue. The result of all the research is that access to information should be free and open. Access must be with permission, and intellectual property laws must be followed.

### Methodology

The present study is a qualitative-quantitative one. The qualitative approach was used in the designing stage of the questionnaire, and the quantitative approach was used in designing the conceptual pattern. In addition, this study is an applied research and exploratory study looking for presenting a new intellectual property pattern of open access medical journals. In general, the present study is the path to determining goals, analyzing text contents and extracting their components, designing questionnaires, examining the validity and reliability of the questionnaire and eliminating its defects, implementing the questionnaire in the statistical population, fitting model, and analyzing the obtained results. The statistical population of the study is all medical journals available on Iran Medical Journals Information System, and they are updated and approved by the ministry of health on a daily basis. On the last date of examination on 98.11.30, there were 430 journal titles on this website. Among these journals, the rank confirmation of 310 active serials and 7 journals are canceled.

In examining the statistical data, there are 78 PubMed-indexed journal titles, 84 ISI-indexed journals, 120 Scopus-indexed journal titles, and 40 shared PubMed-, ISI-, and Scopus-indexed journal titles. Other journals are on databases such as SID, Iran Medex, Magiran, etc. On this website, all the journals, which have timely publications, are marked with green, publication delay of one number with yellow, and publication delay of two numbers with orange while journals with publication delay of three numbers or more and the cancelation of the publication imprimatur are marked with red. There are about 75 journals in the health-related subject area, 28 journals in the nursing area, 259 journals in the medical area, 10 journals in the paramedical area, 15 journals in the pharmacy area and 16 journals in the dentistry and other areas of biology, jurisprudence, law and medical ethics, herbal and traditional medicine. In examining 430 journals on the ministry of health website, 155 journals are in English (36%), and 275 are in Persian (64%). Fifty-five association publishers, 26 commercial publishers, and 352

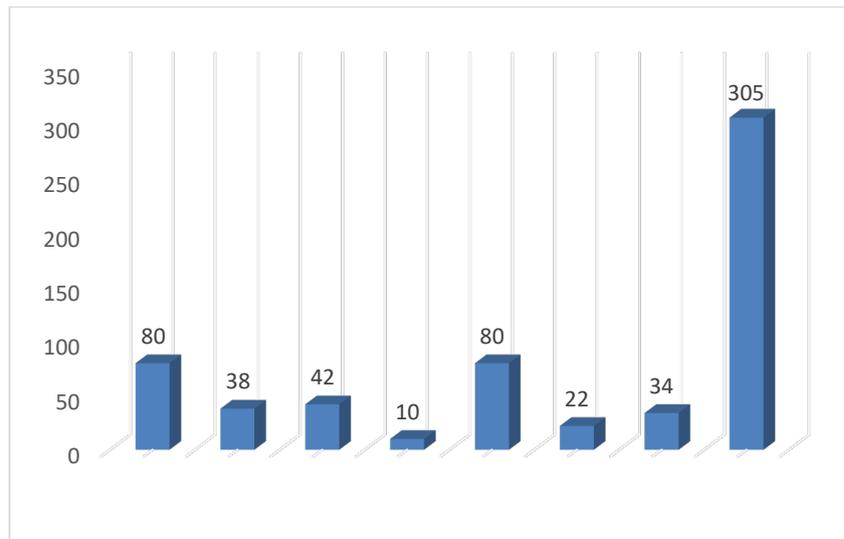
governmental publishers cover the open access journals of the ministry of health. In examining the authors' rights in journals, the authors' rights or copyright have often been only mentioned. Only a few limited journals have copyright and author's rights forms. About 45 journals have forms based on copyright compliance on websites. Fifty-five association publishers, 26 commercial publishers, and 352 governmental publishers cover the open access journals of the ministry of health.

The main tool for collecting the data was a researcher-made closed questionnaire format, which included 5 components and 63 questions designed based on the primary conceptual pattern. The questionnaire was designed using content analysis of the search for information in the Scopus databases. About 700 documents were searched, and 300 documents were analyzed and evaluated after examining and determining the thematic relation of documents to the subject of the study. These documents mostly consisted of journal articles, information on databases and journals' websites, online information, books, summaries of conferences, and related reports. The questionnaire's validity was confirmed using the Delphi panel (three steps) with professors and experts' comments. It should be noted that, in this questionnaire, the answers were designed on the five-choice Likert scale and the "level of agreement" scale. Content Validity Ratio (CVR) and Content Validity Index (CVI) were used to examine the content validity and reliability, quantitatively. The questionnaire's reliability in the statistical population was calculated by answering the initial questionnaire, and the questionnaire was validated using the Cronbach's alpha index for different dimensions of the questionnaire, which was greater than 7 percent. The questionnaire consists of two parts; the first part contains demographic information, and the second part contains information related to the study's objectives. The exploratory factor analysis was used for determining the dimensions of the questionnaire, and after this stage, confirmatory factor analysis was used for the final confirmation of the questionnaire. In the second phase of the study, the Structural Equation Model (SEM) and PLS software were used for fitting. The software used for confirmatory factor analysis was PLS and SPSS24 for other analyses.

### Results

After collecting data and information, the results were described using descriptive analysis, which includes central and distribution indicators such as frequency percentage, charts, and tables. Among the questionnaires sent to chief editors and managers in charge of 430 journals as well as managers in chief of the ministry of health, about 611 questionnaires were returned. All the statistical analyses were done based on this number of questionnaires. The following information was obtained based on the demographic information of questionnaires:

From the 611 filled questionnaires, 147 journals were in Persian and 464 in English. Governmental publications were reported about 81%, associations about 14%, and commercial publications about 5%. A total of 80 journals are indexed in Scopus, PubMed, and Web of Science databases. Thirty-eight journals are indexed in Scopus and PubMed, and 42 journal titles are indexed in Scopus and Web of Science (Figure 1).

Figure 1: *Open Access Medical Journals Index*

About 105 questionnaires announced that their journals had intelligence property forms. The release period is mentioned in the table 1.

Table 1. *Frequency Variable of Release Period*

Publication frequency	No.	Percentage
Monthly	20	5.02
Quarterly	290	73.79
Bimonthly	54	13.74
Bio Quarterly	29	7.37
total	393	100

In the examined case, 73.79% were quarterlies, and 7.37% were Bio Quarterly. We used SPSS for determining effective factors and characteristics as well as identifying these characteristics for answering and achieving results in the first question. Based on the Kaiser-Meyer-Olkin (KMO) index result, which equals 0.885 (Table 2), the questionnaire data of the study can be reduced to a number of underlying and fundamental factors.

Table 2

*The Statistical Value of KMO*

Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		.885
Bartlett's Test of Sphericity	Approx. Chi-Square	72547.437
	df	1770
	Sig.	.000

Since the statistical value of KMO equals 0.885, the data are suitable for factor analysis. The result of Bartlett's Test of Sphericity was also significant, which shows that the correlation matrix between items is not an identity or unit matrix. This means, on the one hand, that there is a high correlation between items inside each factor and, on the other hand, that there is no correlation between items of a factor and items of another factor.

In answering the question: "what are the characteristics of the intellectual property pattern

of open access medical journals are?" the following factors are identified and analyzed, respectively:

Table 3

*Recognition of the Contribution of Each Factor in Explaining Variance Collection of All Items*

Component	Initial Eigenvalues			Extraction Sums of Squared Loadings			Rotation Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
Publisher	19.102	31.837	31.837	19.102	31.837	31.837	12.508	20.847	20.847
Commercialization	8.728	14.547	46.384	8.728	14.547	46.384	10.149	16.916	37.763
Journals	6.247	10.411	56.795	6.247	10.411	56.795	10.120	16.866	54.629
Topic	5.839	9.731	66.526	5.839	9.731	66.526	6.550	10.916	65.545
author	4.123	6.872	73.398	4.123	6.872	73.398	4.712	7.853	73.398

Table 3 shows the rotated eigenvalues of extraction factors. In this test, factors 1 to 5 have the eigenvalues greater than one with the first factor accounting for 20.484%, the second factor for 16.916%, the third factor for 16.866%, the fourth factor for 10.916%, and the fifth factor for 7.853% of variance. The sum of variances shows that this questionnaire can account for 74% of the total intellectual property variance of journals. In the initial values column, initial eigenvalues for each factor are estimated in the form of explained variance collection. The explained variance is in terms of the total variance percentage and cumulative percentage.

The eigenvalue of each factor is a ratio of the variance of all the variables, which is explained by that factor. The eigenvalue can be calculated by the sum of squared factor loadings related to all variables in that factor; therefore, the eigenvalue shows the exploratory importance of the factors with respect to the variable. If a factor has a low eigenvalue, it means it is contributing little to the explanation of the variance in the variable. In the extraction sums of squared loadings column, the explained variances of factors is presented, which have the eigenvalues greater than one. The column of the rotation sums of the squared loadings shows the sum of extraction factor values after rotation. As can be seen, the five factors can explain variances if we rotate the obtained factors by the Varimax method.

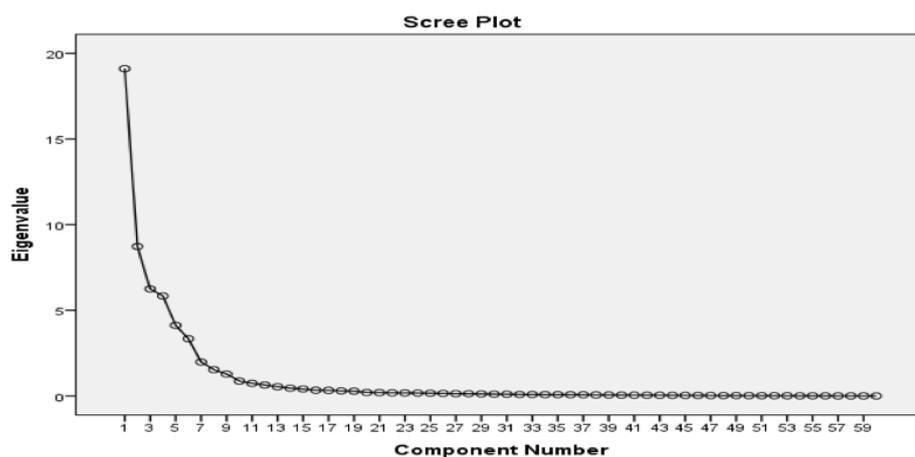


Figure 2: Scree Plot for the Number of Factors Determination

This Scree Plot graph is used for determining the number of optimal factors. The graph indicates that eigenvalues decrease after the fifth factor; therefore, five factors can be extracted

as the important factors that have the most important role in explaining the variance data.

#### Confirmatory Factor Analysis:

In order to respond to the effectiveness of each of the identified features in the intellectual property pattern of open access medical journals, we used the confirmatory factor analysis as follows:

One-dimensional factors such as Cronbach's alpha and composite reliability were used for reliability assessment, and convergent validity index was used for validity assessment. If Cronbach's alpha is one block greater than 0.7, the block becomes one dimensional (Azar, Gholamzadeh & Qanawati, 2012). Since Cronbach's alpha presents a stricter estimation of internal consistency reliability of latent variables, another indicator is used in structural path models called composite reliability. When the value is greater than 0.7, the block is one dimensional. Convergent validity was used for the validity assessment of the model. Convergent validity means that a set of reagents explains the main structure (ibid). Fornell & Larcker (1981) suggest using Average Variance Extracted (AVE) as a criterion for convergent validity. A minimum of 0.5 AVE indicates sufficient convergent validity, meaning that a latent variable can explain more than half of its distributors' averages. The validity and reliability of assessment provide the evaluation of structural path models. The four main criteria of the coefficient of determination and prediction relation are used for this model's assessment. The coefficient of determination ( $R^2$ ) is the main criterion for exogenous latent variables assessment. In structural path modeling, the values equal to 0.67, 0.33, and 0.19 are described as significant, average, and weak, respectively. Cronbach's alpha values, composite reliability, and the Average Variance Extracted are statistically acceptable. Moreover, Cronbach's alpha coefficient value is greater than 0.7 for most factors. Therefore, it can be inferred that variables have acceptable reliability. The AVE value is calculated for components so that it can be inferred that almost all variables have acceptable convergent reliability (Table 4).

Table 4

The AVE value for components

Component	original sample	Average sample	SD	Statistics	P	R <sup>2</sup>
Intellectual Property of Publications Publisher -	0.807	0.808	0.011	74.896	<0.001	0.651
Intellectual Property of Publications Commercialization-	0.895	0.895	0.007	137.174	<0.001	0.8
Intellectual Property of Publications Journals-	0.799	0.800	0.011	70.909	<0.001	0.639
Intellectual Property of Publications Topic-	0.557	0.564	0.015	36.909	<0.001	0.310
Intellectual Property of Publications author-	0.378	0.381	0.029	12.999	<0.001	0.143

As can be seen in the table above, the results show that there is a significant relationship between the components. Considering the obtained results, it can be concluded that there is a relationship between the factors and intellectual property of journals. For the qualitative examination of the assessment model, the CV-Communality and CV-Redundancy indicators were used. If the CV-Communality of the lurking variable is positive, it means that the measurement model has an appropriate quality. The CV-Communality values are given in Table 5:

Table 5  
Evaluation of Model Quality Indicators

Component	Excess index	Share index
Publisher	0.336	0.504
Commercialization	0.477	0.560
Journals	0.351	0.516
Topic	0.066	0.359
author	0.074	0.297

As can be seen from the values in the table above, the measurement model has an appropriate quality.

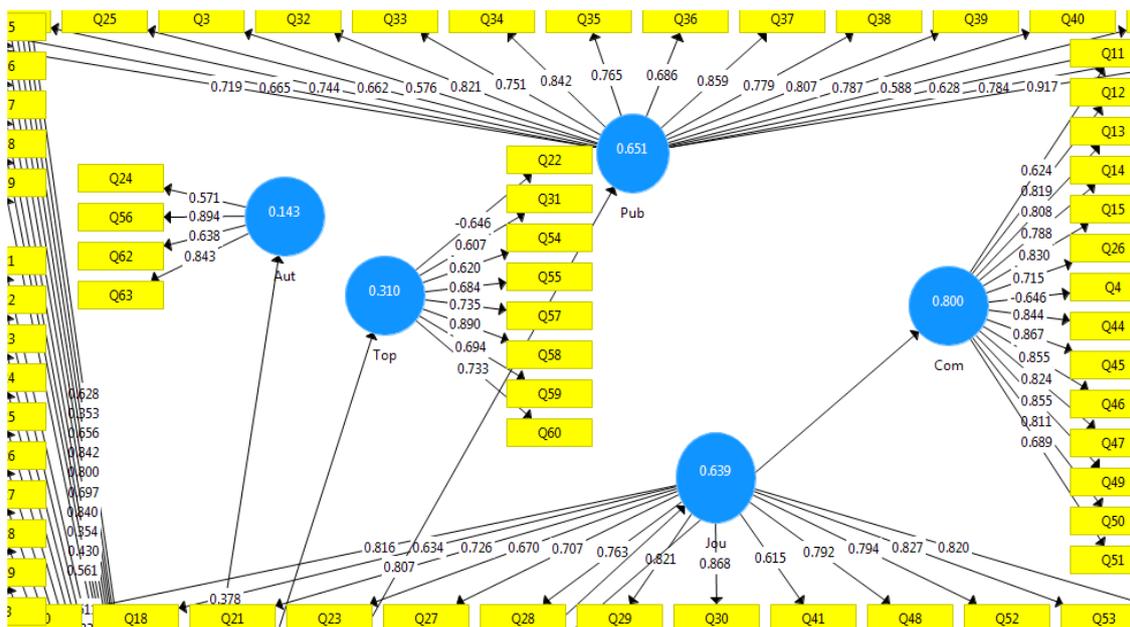


Figure 3. Path Coefficient Diagram

The path coefficient (beta coefficient) demonstrates the strength and the type of relationship between the two latent variables. It is a number between -1 and +1. If it equals zero, it indicates that the two latent variables lack a linear relationship, suggesting a correlation between the two latent variables. According to Figure 8.4, since all numbers are between -1 and +1, there is a linear relationship and correlation between the latent variables.

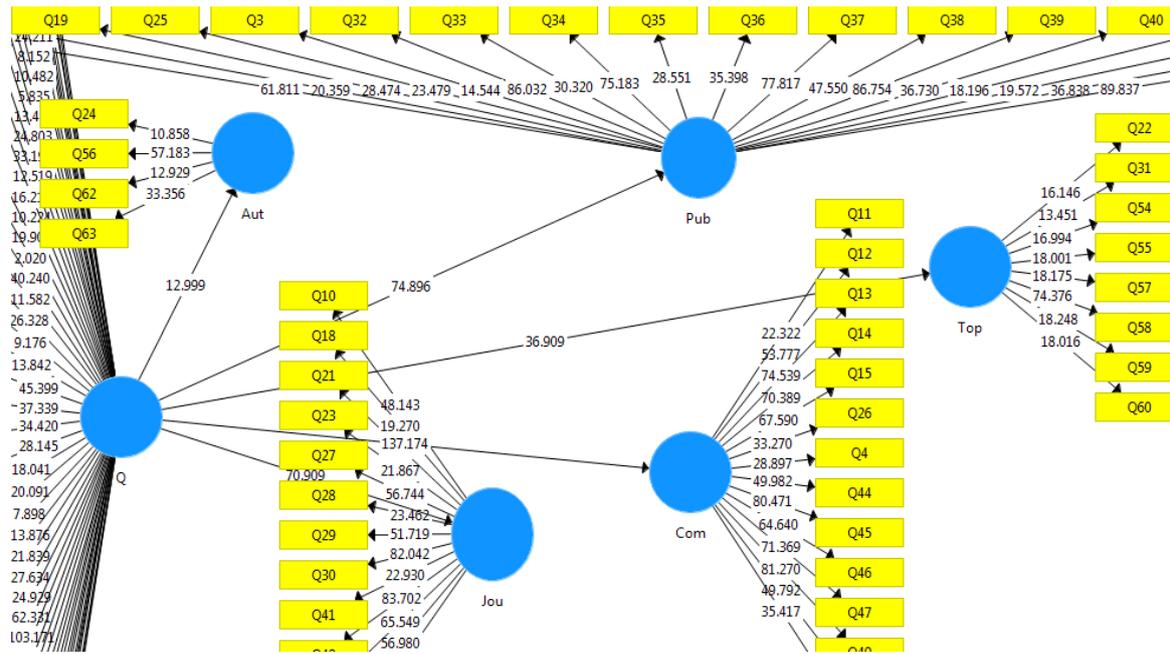


Figure 4. T-Statistics

If the factor loading between the questionnaire questions and the latent variables is greater than 0.4, we conclude that the latent variable in question is well measured by the question we used for that structure. The T-statistic value is the main criterion for confirming or rejecting the hypotheses. If this statistical value is higher than 1.64, 1.96, and 2.58, respectively, we conclude that the hypothesis is confirmed at the levels of 90, 95, and 99 percent. In this example, because the total factor loading of the questions is greater than 0.4, we conclude that this questionnaire confirms the questionnaire’s hypothesis, the design of the intellectual property pattern of open access medical journals.

### Discussion and Conclusion

The components of intellectual property were extracted by using content analysis. A researcher-made questionnaire was completed by reliability and validity assessments and examined to present a pattern. In addition to descriptive information of journals, we used confirmatory factor analysis for the identified characteristics in the intellectual property pattern of open access medical journals. About 611 completed questionnaires were entered into spss24 software. Validity and reliability, exploratory and confirmatory factor analysis and finally presentation of the model with PLS software were examined on the questionnaires. As can be seen from the findings, Cronbach’s alpha values, composite reliability, and average variance are statistically acceptable. According to the findings, the value of Kaiser-Meyer-Ulkin index (KMO) is 0.885. The data of the research questionnaire can be reduced to a number of basic infrastructural factors. These components include the five main components of publisher, author, subject, business, and publications, and 63 questions, which make up the questionnaire. Moreover, because the KMO statistic is 0.885, the data are a good factor for analytics. The result of the Bartlett test is also significant. This shows that the correlation matrix between the items is not the same matrix. That is, on the one hand, there is a high correlation between the items within each factor, and, on the other hand, there is no correlation between the items of

one agent and the items of another agent. Besides, using confirmatory factor analysis in PLS software, the questionnaire reduction was confirmed to five components. The quality indicators of the model also confirmed this. As can be seen from the findings, Cronbach's alpha values, composite reliability, and Average Variance Extracted are statistically acceptable. In addition, the Cronbach's alpha coefficient for most factors is greater than 0.7. Therefore, it is inferred that the variables have acceptable reliability. The AVE value is calculated for the components, with almost all variables having an acceptable convergent validity. The results show that there is a significant difference between the components. Considering the obtained results, it can be concluded that there is a relationship between the factors and intellectual property of journals. This is similar to the emphasis Laakso & Björk (2016) and MacLeavy, Harris & Johnston (2020) put on intellectual property rights in cyberspace and the Internet. The emphasis is on free access and compliance with intellectual property law. Ross et al. (2012) asserted that there should be free and open access to information. Access must be with permission, and intellectual property laws must be followed. And we are looking at that in this study. These five key components are the publisher, author, subject matter, commercialization, and journals with sixty-three subset questions that form the questionnaire. The Bartlett test results are significant as well, demonstrating that the correlation matrix between the items is not the identity or unit matrix. That is, on the one hand, there is a high correlation between the items within each factor and, on the other hand, there is no correlation between the items of one factor and the items of other factors. In addition, the reduction of the questionnaire to five components was confirmed using confirmatory factor analysis in PLS software. The quality indicators of the model confirmed this issue as well. The results show that there is a relationship between the components studied and the intellectual property of free access to medical journals. The components and questions have acceptable reliability and convergence. Finally, the questionnaire can be used in open access medical journals to examine intellectual property.

According to the findings, the following is recommended:

- Use this questionnaire for medical journals.
- Do this research for non-medical journals in the future

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