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The prediction role of subject knowledge and translation ability toward technical translation done by BA students of translation studies

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Abstract. Saving the Coherence of technical translation was always a challenge for the students of translation studies. They need Translation Ability and Subject Knowledge as prerequisites to save the Coherence. This article was conducted to investigate whether Subject knowledge and Translation Ability can significantly predict the Coherence in technical translation done by the BA students or not. To fulfill the purpose of the study, 51 BA students were selected based on their performances on TOEFL. Then, they were given General Translation, to test their Translation ability, Economic Translation to test how they save Coherence and Banking Information test to assess their Subject knowledge. After that, Multiple Moderating regression analysis was performed to analyze the data. The results indicated a significant relationship between Translation Ability, Subject knowledge and Coherence in technical translation done by the BA students. Moreover, the results also demonstrated that Coherence can be significantly predicted by Translation Ability and Subject knowledge. Besides, the scores of Coherence may also predict the Translation Ability. The significance of this study lies in the fact that unlike many previous studies, it was conducted on the prerequisite of saving the Coherence in technical translation by Translation Ability and Subject knowledge of the Translator.

Keywords. Coherence, subject knowledge, technical translation, translation ability.

1. Introduction

Nowadays technical text is one of those texts that play an important role in human life, because these texts help readers solve problems! Markel (2003) says that “technical communication is not meant to express a writer’s creativity or to entertain readers; it is intended to help readers learn or do something”(p: 8).

Furthermore, many non-technical documents are aimed at a particular audience, but technical documents are more specific as regards the audience they are aimed at than most documents (Byrne, 2006:47). It means that the specific group of people refers to these texts in order to be familiar with a subject and improve their knowledge in that domain. Technical texts have also different kinds and characteristics as Byrne (2006:50-96) explains them in his book” *Technical Translation, Usability Strategies for Translating Technical Documentations*”. He states that:

Technical writers produce a wide range of documentation in an enormous variety of subject areas and industries. From gardening equipment and toys for children to aircraft maintenance manuals, tutorials for word processors as well as ice cream makers and nuclear submarines. The actual types of documents produced can vary according to the subject, the nature of the product and the industry within which the company operates. (p.50)

An increasing number of companies are using English as a working language so these technical texts should be transferred between these companies with different languages (Pinchuck, 1977). White (1996) concentrates solely on the need for linguistic compatibility of documents for different audiences and emphasizes certain cultural differences. He maintains that the way in which information is conveyed can vary quite significantly from culture to culture so translation

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can help the readers and technical text's users to understand these texts and solve their problems and improve their knowledge.

According to Kingscott (2002) it has been estimated that technical translation accounts for some 90% of the world's total translation output each year. Technical translation like technical text has different kinds, "It is commonly assumed that technical translation includes not only the translation of text in medicine and engineering but also such disciplines as economic, psychology, sociology, geography and law texts" (Javier 2004:92). One kind of technical texts as Javier (2004) mentions is economic text which is practical and consists of financial, banking and etc. (Stolez 2003: 188), also defines that "economic text is not just a "source text", it has to be conceived as a text from the word of economics".

Considering the above-mentioned characteristics of technical translation specially economic translation, in this study the researcher focused on this kind of translation. Then, the researcher will explain one of the most important factors in translated technical texts, coherence, which plays a vital role in understanding these texts. In other words, the two variables, translation ability and subject knowledge which coherence affected by will be explained and analyzed.

Technical translation like any other translation needs some prerequisites in order to be a good translation and usable for the readers; Wright and Wright (1993) claim that the translation of these texts requires: (a) a firm knowledge of the source and target language, (b) an informed layman's understanding of the subject field and (c) the writing skills needed to write on the discipline like an expert. Moreover, Robinson (2003) mentions that technical translators are like the actors and they should get to the characters. The reality is that, they should be armed with a good and solid understanding of the basic principles of translation. They should have translation ability, the ability which helps him or her in order to translate it into the target language. The others such as Byrne (2006) believes that technical translators need to impersonate the original author who is generally, though not always, an expert in a particular field and they need to write with the same authority as an expert in the target language. So in this case, the real challenge for the technical translator is to have expert knowledge of the way experts in a particular field write texts.

Although technical translators have different concerns such as transferring the information accurately, correctly and effectively and their challenge is to ensure that all of the relevant information is conveyed in such a way that the readers can use the information easily, properly and effectively also their aim is precisely the same as that of technical writing, but on the whole when considering all the above mentioned characteristics two factors are prominent; one is the translators' *subject knowledge* and the other is their *translation ability* (Byrne 2006). Fluck (1992) defines these two factors in another way "the ideal non-literary translator is often defined as a sort of a combination of the subject matter expert and the trained translator" (p. 221). So translators must have a thorough knowledge of the source language, a well-developed ability to analyse and some knowledge of the subject matter (Newmark 1988). The two discussed factors, translation ability and subject knowledge are both essential in order to write a coherent text. This study will discuss how these factors will predict the coherent in technical translation.

Coherence in writing can be achieved through the repetition of key words (Hamzah & Karuppiah, 1994). This is because repeating words is important to the sense of a paragraph's message. Such repetition emphasizes a word, connecting it through several sentences to tie them together internally. Sometimes, however, repetition becomes boring and monotonous. The repeated words should not be allowed to dominate as well. Repetition adds nothing to the sense of the paragraph; rather than pulling thoughts together more effectively (Hamzah & Karuppiah 1994). Besides, coherence in writing can be achieved through parallel structure. Parallel structures are created by constructing two or more phrases or sentences that have the same grammatical structure and use the same parts of speech. By creating parallel structures sentences will be clearer and easier to read. In addition, repeating a pattern in a series of consecutive sentences helps the reader see the connections between ideas (Hamzah & Karuppiah 1994).

Teachers in technical translation classes also try to help the students to obtain sufficient abilities to do these kinds of translations but lack of coherence can be happened in all kinds of technical texts such as economic texts. Although, Lee (2002) believes that some lack of coherence with the communicative situation can be perceived by the target recipients in the case of the translation but the recipients will probably lack some culture specific knowledge and need more explanations, so according to Montalt Ressorrecció, Ezpeleta Piorno, and García Izquierdo (2008) it seems that having subject knowledge for students beside their translation ability will help them in saving the coherence of the text and make it understandable for the readers. On the other hand, Kastberg (2009) rejects it and he believes that, since the translators do not stipulate it as a prerequisite that the literary translator be a poet (or a sailor or a matador for that matter) why then still saying that the students should also be an engineer, a lawyer or even a banker? He believes that translation ability is the only prerequisite in translation of technical texts. Besides, while the users read the translation done by students, as Kastberg (2009) mentions, they are not fully satisfied. Although teachers of technical texts tried to improve their translation abilities but they believe that while they read the translated text, the text is not understandable and somehow they can't get the purpose of it. It seems that the text is not coherent and there are no relations between the subjects through the text. Now as mentioned above due to some deficiencies like lack of coherence in technical translations done by the BA students the researcher attempted to answer the following question:

Q: To what extend does banking information and translation ability of BA students significantly predict the coherence of translated economic texts?

In order to find the answer of the above research question the researcher designed a model. According to Kenny (2011) in this model "The variable X is presumed to cause the variable Y. A moderator variable M is a variable that alters the strength of the causal relationship." It means that if we consider X as Translation Ability, Y as Coherence, so M is the Banking Information which is the moderator of this relationship. "Most moderator analysis measure the causal relationship between X and Y by using a regression coefficient. Although, classically, moderation implies a weakening of a causal effect, a moderator can amplify or even reverse that effect" (Kenny 2011:7). It means that Banking Information may resonate or even reverse the relationship between Translation Ability and Coherence. This model can be depicted as follows:

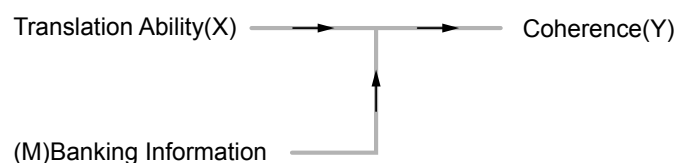


Figure 1: variables' model

2. Method

In order to find appropriate answer to the posed question, the researcher followed certain procedures and made use of certain instruments, which are reported in this section.

2.1. Participants

This study involved two groups of participants. It included BA students and raters. The researcher asked 71 BA students participate in this study. BA students were the senior students of Islamic Azad University Central Tehran Branch. In this study, the age and gender of the participants was not considered. They have been selected because of their characteristics and availability. In addition, in this study there were two groups of raters; the first group, which consisted of three raters, had postgraduate degrees in Translation Studies. Moreover, they were graduated from Islamic Azad University and most had experience in rating translated contexts. They also had several years of experience as teachers. These raters assigned in order to assess the

participants' translation ability by rating their general translation test. The second group of raters included three raters who had postgraduate degrees in Persian language and they graduated from Islamic Azad University. They had several years of experience as Persian language teachers and editors of the media. Besides, they rate their student's products and help them to write Persian texts, prose, novels and short stories correctly. They assigned for assessing coherence factor in economic text translated by the participants.

2.2. Instrumentation

In order to capture all the possible results of the research question, the instrumentation had cautiously been presented in three different sections which have been arranged in one test package. In order to homogenize the participants, standard TOFEL (2004) test includes structure (15 items) and written expression (15 items) and reading comprehension (two passages) in 30min was administered to the participants separately to make them homogenized. This test was first piloted with a group consists of 20 samples who had the same characteristics as the participants. The Kuder-Richardson formula 21 (KR-21) index of reliability reported for this instrument was 0.876. Then, after item analysis, this test without any malfunction item was administered to them. Analyzing the results of this test of language proficiency, 51 BA students proved to be the main subjects of the present study by the help of mean and standard deviation of TOEFL and considering the subjects whose scores fell in the range of one standard deviation above and below the mean.

The other instrument employed in this research was an English text for translation from English into Persian with a general subject, consisting of two paragraphs. This test was administered to measure the participants' translation ability. Besides, this test has been measured by Waddington (2001) rating scale method C.

The next instrument was a banking information test in order to assess subject knowledge of the participants. This test was administered after running standardizing test consists of 40 banking information test through randomly 20 samples with characteristics similar to those of the target groups. The results showed the index of 0.885 for the reliability that is a high degree of reliability for a test could be used in the actual administration. Moreover, after conducting item analysis, 19 items from the whole test were distinguished faulty so these nineteen items were omitted from the banking information test.

The last section was economic translation test consisting of one passage with three paragraphs. The BA students were asked to translate the mentioned passages from English into Persian. The aim of the last test was measuring the coherence of translated technical texts, so this test has been measured by the TSA (Topical Structure Analysis) rating scale (Knoch 2007).

2.3. Procedure

Prior to the main tests, the TOEFL and the banking information tests were piloted on 20 samples who were not the main participants of the study but with the same characteristics. The TOEFL test was an actual one (2004) and after administration and calculating the IF (item facility) and ID (item discrimination) had not any malfunction. Besides, after administrating the pilot banking information test 19 items deleted and the rest was considered as the main banking information test. Moreover, the results showed that the banking information test was also reliable.

Then, the main TOEFL test administered for choosing and homogenizing 71 BA students of this study. Finally, 51 BA students who scored one standard deviation below and above the mean on this test were thus chosen to take the main tests. Then, all the mentioned tests (general translation, banking information test economic translation) named in the instrumentation part administered to the homogenized samples of the study.

In order to score the translation tests (translation ability and coherence) the researcher considered

two groups of raters consist of three raters in each group. Then, to ensure the reliability of the scorings, an inter-rater reliability was run among three raters (who were instructors with related experience) in each group with a random sample of 10 out of 30 cases. The inter-rater reliability for all the three raters were high in each group thus they have been selected for the marking of the translation tests as raters. The first group used Waddington (2001) rating scale method C for assessing the translation test which was aimed to assess the translation ability of the participants and the second group used TSA rating scale (Knoch 2007) to assess the coherence of technical translation. The average score given by the three raters to each participant was ultimately calculated as the final score for him/her.

3. Results

In this study according to the model which the researcher aimed to work on, the moderating role of the subject knowledge (Banking Information) as a predictor, between translation ability and coherence of technical translation (economic translation) was investigated in BA students. In order to find the answer of the research question, the researcher used multiple moderating regression to find the answer. The data are used on this occasion to illustrate an analysis designed to test that the relationship between translation ability and coherence is moderated by banking information. So, there are three continuous variables in BA students; a predictor variable, an outcome variable and a hypothesized moderator variable, and the goal was to test the interaction between the coherence and the proposed moderator (banking information).

First of all to come up with a homogeneous group of subjects, 71 BA students took the TOEFL (2004) consisting of 51 items administered. Then, by the help of mean and standard deviation of TOEFL, the researcher selected 51 BA students whose scores fell in the range of one standard deviation above and below the mean.

After that, the researcher set the rater training sessions. According to (Weir 1990; McNamara 1996; Lumley, McNamara 1995), the most widely accepted purpose of the training session is to heighten inter-rater reliability. Hence, the researcher calculated inter-rater reliability among the raters of both translation ability and coherence to ensure the reliability of their scores on the main tests. To estimate inter-rater reliability among three raters, Cronbach's Alpha formula was applied Tab. 1.

Tests	Cronbach's Alpha	N of Items
Coherence	.969	3
Translation Ability	.895	3

Table 1: Inter-rater reliability

The index of 0.969 and 0.895 for Cronbach's Alpha entirely satisfied the researcher since it showed a high degree of reliability among raters based on Nunnally's (1978) view that the value of Cronbach's Alpha should be greater than 0.70. In addition to computing Cronbach's Alpha, Pearson Correlation also was run to investigate the correlation between raters in pairs Tab.2.

Rater of the tests	Sig.(2-tailed)	Pearson Corr.
R 1&2 (C)	.01	.74
R 1&3 (C)	.01	.74
R 2&3 (C)	.00	.78
R 1&2 (TA)	.00	.89
R 1&3 (TA)	.00	.98
R 2&3 (TA)	.00	.90

Table 2: Correlations of raters in 10 samples Note: R; Rater, C; Coherence, TA; Translation Ability

The raters of this study had high correlation in scoring. The "Tab.2" also showed that the correlation coefficient was significant among translation ability raters and also between

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coherence raters in pairs and there was a high inter-rater reliability among them.

As cited before, the final scores on translation ability and coherence which used in this study, were the mean values given by three raters on each test. For example, the final score of BA students on translation ability test was the mean of three scores given by three MA English Translation raters. The descriptive statistics of the three tests illustrated above is presented in “Tab 3”.

Tests	N	Min	Max	M	SD	V	Std.er
	stat	stat	stat	stat	stat	stat	stat
Banking information	51	1	19	9.66	4.47	20.02	.62
Translation Ability	51	3	9	5.74	1.92	3.71	.26
Coherence	51	4	8	5.82	1.16	1.34	.16

Table 3: Descriptive statistics of the main tests

After running SPSS software, the researcher first checked the prerequisites of multiple moderating regression; outlier, normality, linearity and homoscedasticity. According to Pallant (2007, p.38), “these all refer to various aspects of the distribution of scores and the nature of the underlying relationship between the variables.” The results showed that there was no outlier and the scores were normal. Then, the researcher run the test of skewness. The results of these tests are demonstrated in “Tab.4”. All obtained values of skewness divided by the standard error of skewness were within the range of -1.96 to +1.96, and thus the distributions were considered as normal in BA students (Dornyei 2007).

	N	Skewness	
	Stat	Stat	Std.Error
Banking information	51	.474	.333
Translation Ability	51	.343	.333
Coherence	51	.119	.333

Table 4: Skewness test for the distributions of scores

After that, the next step in this regard is to compute correlations between the three variables among participants’ score; the predictor variable, moderator variable and the outcome variable should be correlated otherwise the results cannot be acceptable because there is no relation, interaction between them. In the Tab.5 the researcher computed them and presented them in a correlation matrix.

Variables	Sig. (2tailed)	Pearson.Correlation
C-BI	0.000	.608
C-TA	0.000	.650
BI-TA	0.000	.514

Table 5: Correlations of the variables Note: In this matrix C consider as Coherence, BI as Banking Information and TA as Translation Ability

According to Farhady, Jafarpour, and Birjandi (2001), the indexes of 0.608, 0.650, 0.514 for correlation are considered acceptable. Due to the above results the researcher entered the BA students’ data into SPSS software in order to compute the multiple moderating regression to find the answer of the research question.

	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.724 ^a	.524	.505	.703
2	.755 ^b	.571	.543	.675

Table 6: Model Summary Multiple regression: a. Predictors: (Constant), banking information, translation ability; b. Predictors: (Constant), banking information, translation ability, moderating_effect

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In the above Tab.6 there are two models. In the first model, the correlation between predictors (Translation Ability and Banking Information) in BA students is significant with the outcome variable (Coherence) is; $R=0.724$ which means highly correlated. Besides, $R^2=52.4\% \sim 52\%$, which means that about 52% of the seen variance in the coherence scores of BA students resulted from the translation ability and banking information. It also shows that 52% of the difference between the coherence in their translations resulted from their translation ability and banking information. Adjusted R^2 is the same as R^2 but the role of N is not considered as in correlation. The subject's number is important so it can be impressive and change the results. Here adjusted $R^2=50\%$ and is not too different with R^2 . Besides, according to the next "Tab.7" ΔR^2 (R square change) of the BA students = R^2 , because in this phase the interaction or the moderating effect (banking information) has not been entered into the model yet.

Model	Change Statistics				
	R Square Change	F Change	df1	df2	Sig. F Change
1	.524	26.462	2	48	.000
2	.046	5.066	1	47	.029

Table 7: Model Summary Multiple regression

Moreover it shows that $F=26.462$ which is significant ($F \text{ Change}=0.000 < 0.05$), it means that R is a good predictor of it. In the second model Tab.6, there are not only translation ability, banking information but the moderating effect also added to the model. Moderating effect or interaction is the multiple of the z-score of the coherence with moderator (banking information). Then, in this model $R=0.755$ and $R^2=0.571 \sim 57\%$ which shows that about 57% of the variance in coherence resulted from translation ability, banking information and the interaction between the banking information as a moderator and coherence.

Then, in the next phase, the role of the interaction itself was examined, so ΔR^2 should be considered and whether it is significant or not. In Tab.7, $\Delta R^2=0.046$ which shows that the interaction about 4.6% $\sim 5\%$ which explain the variance in coherence and this is also significant ($F \text{ Change}=0.029 < P=0.05$). It also shows that banking information and moderating variable, 5% have effect on the relationship between translation ability and coherence in BA students. Moreover, if the banking information increases or even decreases, the relationship between translation ability and coherence can be weaken or even amplified. Besides, "Tab.6" shows that the difference in the coherence's variance also 54.3% explained by translation ability, banking information and moderating effect.

Due to the first regression equation; $y^{\wedge}=b_1x_1+b_2x_2+\dots+a$, in this article, (y^{\wedge}) is the coherence, (x_1) is the translation ability, (x_2) is the banking information and (a) is constant. The "Tab.7" has presented that the R of this equation in this study is significant even the researcher entered the third variable to it. Moreover, the ANOVA matrix in the next page Tab.8 shows that the second F checks the significant of this equation in BA students. F in the next table shows that R in the model summary matrix is significant, besides, the second ΔF (ΔF checks the difference which occurred by interaction) also shows that ΔR^2 is significant. According to the second regression equation ($y^{\wedge}=b_1x_1+b_2x_2+\text{moderation}+a$), in this study, $\text{Coherence}=b_1\text{Translation Ability}+b_2\text{Banking Information}+\text{Moderation}+a$. Besides, the matrix of the model summary R of this equation is 0.755 Tab.6 which is significant while referring to the F of the third row of ANOVA matrix ($F=0.000 < p=0.05$). Moreover, F Change "Tab.7" shows that while interaction added to the equation R also changed to (5%) and was significant.

Model	Sum of Squares	df	Mean Square	F	Mean Square
1-Regression	26.220	2	13.110	26.462	.000 ^a
Residual	23.780	48	.495		
2-Regression	28.534	9	9.511	20.825	.000 ^b
Residual	21.466	47	.457		

Table 8: ANOVA multiple regression: a.Predictors: (Constant), Translation Ability, Banking Information ; b.Predictors:(Constant), Translation Ability, Banking Information, moderating-effect; c.Dependent Variable: Coherence Scores

According to ANOVA matrix both model summaries in Tab.8 are significant because while the researcher refer to the first and third row of this matrix both are less than 0.05. Then, in Tab.9 the researcher tried to test that how the relationship between the variable effect the coefficient of the named equation. In other words in the first model the researcher tested the banking Information and translation ability and their effect on coherence in BA students then in the second model moderating effect added to this model. In the coefficient matrix, Tab.9, Beta is the standard form of B, because the researcher omitted the metric effect of B, so the variable which has the more Beta also has more effect on the equation.

Model	Unstandardized Coefficients		Standardized Coefficients	T	Sig.
	B	Std. Error	Beta		
1 C	-5.211E-17	.099		.000	1.000
	.373	.116	.373	3.210	.002
	.444	.116	.458	3.950	.000
2 C	.108	.106		1.019	.313
	.448	.116	.448	3.848	.000
	.483	.112	.483	4.316	.000
	M E	-.215	.095	-.233	-2.251

Table 9: Coefficients (Dependent Variable: COHERENCE)

With regard to the Tab.9 Beta of the Banking information in both models is less than Beta of Translation Ability, ($0.373 < 0.458$ also $0.448 < 0.483$) besides, Beta of Banking information is significant because $t_1 = 0.002 < p = 0.05$ in the first model and in the second model $t_2 = 0.000 < p = 0.05$. Beta of Translation Ability also is significant ($t_1 = 0.002 < p = 0.05$ and $t_2 = 0.000 < p = 0.05$). It can be found that in BA students, both Banking Information and Translation Ability, which are predictors of Coherence, are effective in order to have a Coherent translation. They can resonate or even weakening the Coherence of the Technical Translation.

Moreover, in the second model, Beta of the Moderating effect, the interaction between the Coherence as outcome variable and Banking Information as hypothesized moderator, is -0.233 which is less than Translation Ability. In addition, Beta is negative which means that the moderating effect may reverse the relationship between the Translation Ability and Coherence. It means that while Banking Information and Translation Ability of the BA students increase, it is the Coherence which causes a good Technical Translation and enables them in doing these kinds of translations. In addition beta of moderating effect is less than Translation Ability which can be inferred that the effect of Translation Ability of BA students in this model is more than moderating effect. Besides, the amount of constant in the first model (-5.211E-17) confirm that there is no error and just the three mentioned variables are predictors.

4. Discussion

According to the results, it can be found that the significant relationship between subject knowledge, translation ability and Coherence was affirmed in BA students. Moreover, the researcher found that subject knowledge and translation ability can significantly predict the coherence in technical translation. Moreover, according to the results, it can be found that

although both banking information and translation ability are predictors of coherence but having Translation Ability is more helpful in order to have a coherent translation than having Subject Knowledge. Besides, the amount of Beta for Translation Ability is more than Subject Knowledge. It can be shown that the effect of translation ability on coherence is more than subject knowledge. In addition, it means that translation ability is more effective and it can even resonate or weakening the coherence of the technical translation in BA students.

Furthermore, in the second model, Beta of the moderating effect (the interaction between the coherence as outcome variable and banking information as hypothesized moderator), is (-0.233) which is less than translation ability. Moreover, Beta is negative which means that the moderating effect may reverse the relationship between the translation ability and coherence Fig.2. According to Kenny (2011) it means that while subject knowledge, banking information, of BA students increases, the coherence of technical text will be also increased. The results show that it is their translation ability which causes a coherent technical translation and enables them in doing these kinds of translations. In Fig.2 this result is depicted.

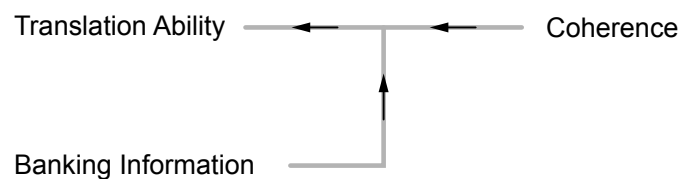


Figure 2: variables' model (result)

5. Conclusion

This research provided evidence that coherence in translated economic texts is the most important problem of these kinds of translations. The researcher also found that there is a significant relationship between subject knowledge, translation ability and coherence of technical text. In simple terms, the higher the translator's subject knowledge and translation ability, the better their ability in saving the coherence of technical text. As a result, while the Subject knowledge increases so the relation between Coherence and Translation Ability also increases.

On the other hand, while studying BA students, the prediction power of Translation Ability is more than Banking Information and moderating effect (relation between Coherence and subject knowledge). May be it can be shown BA students' Translation Ability can significantly predict the Coherence of technical translation.

In addition to the fact that there was a linear correlation between the three aforementioned variables, a predictability relationship was also established between these three. Hence, the subject knowledge can significantly predict the coherence in technical translation. In other words, BA students with high scores on the banking information test are expected to get high scores on the coherence.

Furthermore, the results showed that moderating effect was negative. Consequently, it reverses the relationship between the Translation Ability and Coherence. It means that while subject knowledge increases, the technical text becomes coherent and increases Translation Ability of the BA students. In other words, it is the Coherence which causes a good Technical Translation and enables BA students in doing technical translations.

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