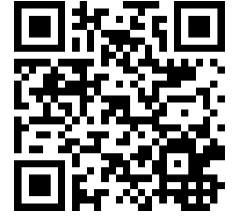# Impact of Industrial Revolution 4.0 (IR4.0) Knowledge, Application Learning, University Policy, Commitment to Study and Motivation on Assimilate IR4.0 in Education

Zamri Chik[1], Abdul Hakim Abdullah[2], Abdullah Zawawi Mohd Noor[3], Md Shuhaimi Ismail[4]

[1,2,3,4] Faculty of Islamic Contemporary Studies, Universiti Sultan Zainal Abidin, Gong Badak Campus,21300 Kuala Terengganu, Terengganu, Malaysia

ABSTRACT: The fourth Industrial Revolution (IR4.0) involving automation technology is a new challenge to various sectors and is able to make changes along with digital transformation to remain competitive. Thedevelopment of science and technology has changed the world of learning with the emergence of IR4.0, which focuses more on the construction of virtual reality technology without much use of human power to have an impact on students. In this context, higher education is a very important field and cannot be separated from the impact of these latest developments. The findings of this study summarize that the role of IR4.0 knowledge, learning application, university policy, commitment to study and motivation,are very important to students in their learning. This realization requires the role of the lecturers to work hard to instill the spirit of learning in their students. Various studies have been made related to therole of motivation in learning, and most of them show that motivation plays a role in encouraging students to obtain better academic achievements. In addition, the commitment of students in their learning is also very important, especially not to miss out on technology in education. While diverse teaching methods are important to practice but need to be in line with the requirements of the university and the government and not burden students and lecturers. The Ministry of Education emphasizes the importance of principles, ethics and a responsible attitude in driving IR4.0 with the advancement of digital innovation and the production of IOT in the context of human capital empowerment. Therefore, the development of IR4.0 in teaching and learning based on knowledge, learning application, university policy, commitment to study and motivation is able to improve the quality of achievement in university education. But the development of IR4.0 requires sacrifices from educators, students, parents, the community and then the government because it will definitely face various obstacles and obstacles.

KEYWORDS: IR4.0 Knowledge, Learning Application, University Policy, Commitment to Study, Motivation,Assimilation of IR4.0 in Education

INTRODUCTION

The fourth Industrial Revolution (IR4.0) involves automation technology that presents new challenges to all sectors in the country, requiring them to make changes along with digital transformation, in order to remain competitive. The development of science and technology has changed the world as the first generation revolution gave birth to history when human and animal energy was replaced by the emergence of machines. IR4.0 which emphasizes the construction of virtual reality technology without much use of human power will definitely have an impact on various aspects of life (Daricin & Herceg, 2018). In this context, higher education is a very important field and does not miss the impact of this latest development. The existence of Institutions of Higher Education (IHE) especially Public Institutions of Higher Education (PIHE) throughout the country in general, to produce quality human capital to fill the workforce vacancy in the future. The big challenge at the moment is to increase the productivity of the adult generation to use technology compared to the middle generation and those who have just graduated from university (Bodrow, 2017; Kayikci, 2018; Wilkesmann, 2018). However, the extent to which students understand the development of IR4.0 in education while they are in the ivory tower. Are PIHE students knowledgeable about IR4.0? What are the learning applications that are often used duringlearning at the university level? What about university policy in relation to IR4.0? Do students have a commitment to study when they become a university? Do students have the motivation to know and use technology related to IR4.0? Therefore, this study will examine the role played by factors based on knowledge of IR4.0, the learning application used,

Impact of Industrial Revolution 4.0 (IR4.0) Knowledge, Application Learning, University Policy, Commitment to Study and Motivation on Assimilate IR4.0 in Education

university policy, commitment to study and student motivation on the assimilation of IR4.0 in education among PIHE students, based on aspects of their understanding, implementation and evaluation.

RESEARCH METHODOLOGY

The research method used is quantitative and uses research instruments that have been adapted according to the suitability of factors based on knowledge of IR4.0, the learning application used, university policy, commitment to study and student motivation on the assimilation of IR4.0 in education among PIHE students. Data were analyzed using Structural Equation Modeling (SEM) with the help ofthe IBM-SPSS-AMOS version 21.0 program. SEM is formed with two (2) main models namely Measurement Model and Structural Model. Before the SEM test is performed, an adaptation test shouldbe conducted to ensure that the indicators tested truly represent the construct being measured. Confirmatory Factor Analysis (CFA) is a measurement model test to ensure that each construct meets procedures such as validity and reliability for each construct tested (Kline, 2016; Hair et al., 2006; Schumacker & Lomax, 2004).

FINDINGS

There are two (2) types of output when running the SEM (Structural Equation Modeling) procedure, namely graphic output and text output. The graphical output produces standardized regression values and unstandardized regression values between constructs. Running the SEM procedure produces standardized regression values and unstandardized regression values.
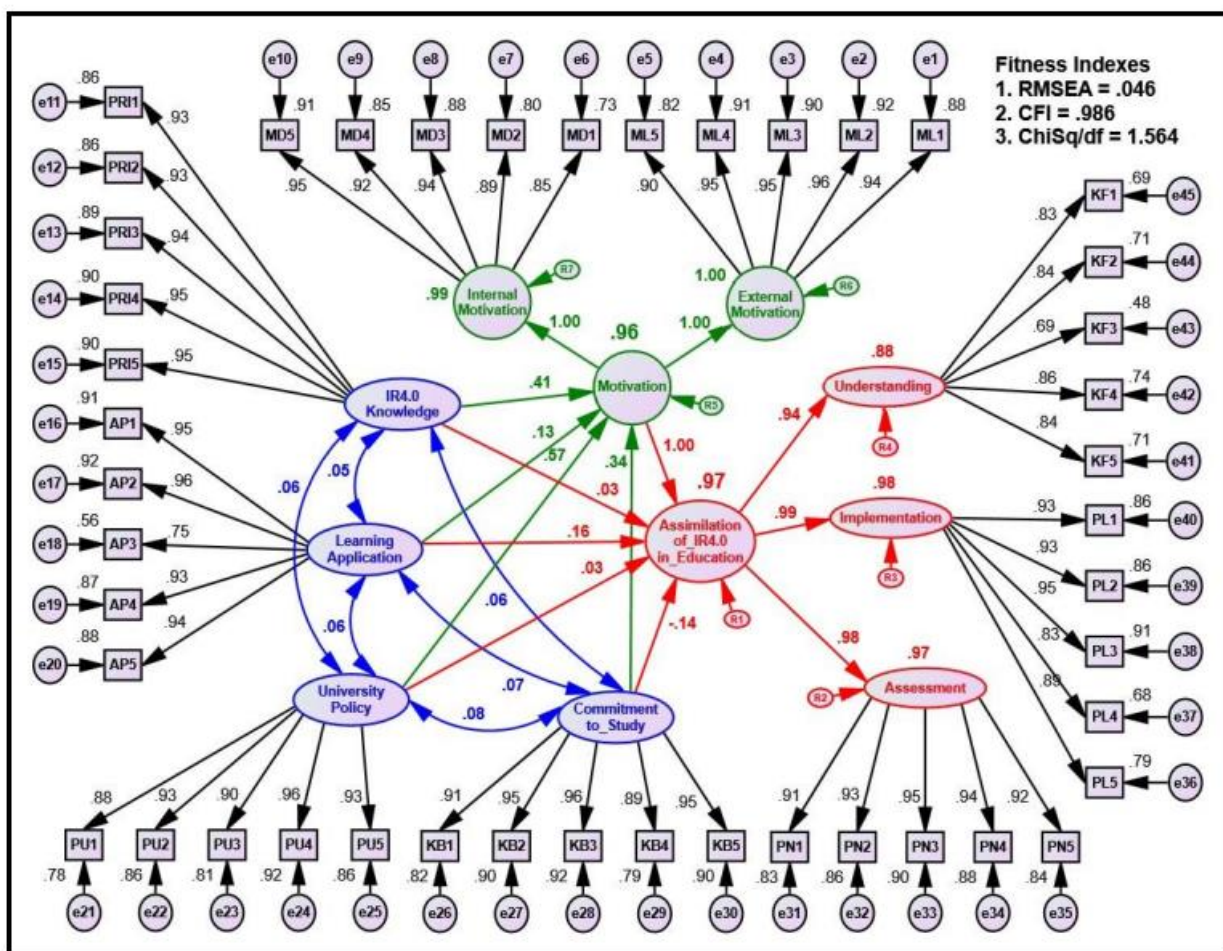

Figure 1: Standardized Regression Values

The R^2 value for the Assimilation of IR4.0 in Education (AIRE) is 0.97. This shows five (5) predictor constructs in the model (one headed arrow) which are IR4.0 Knowledge (IRK), Learning Application (LA), University Policy (UP), Commitment to Study (CS) and Motivation (MV) contributed as much as 97 percent (%) to the Assimilation of IR4.0 in Education (AIRE) among the population in this study. The R^2 value for Motivation (MV) is 0.96. This shows four (4) predictor constructs in the model (see arrow) which are IR4.0 Knowledge (IRK), Learning Application (LA), University Policy (UP) and Commitment to Study (CS) contribute as much as 96 percent (%) to Motivation (MV) among the population in this study.

Impact of Industrial Revolution 4.0 (IR4.0) Knowledge, Application Learning, University Policy, Commitment to Study and Motivation on Assimilate IR4.0 in Education
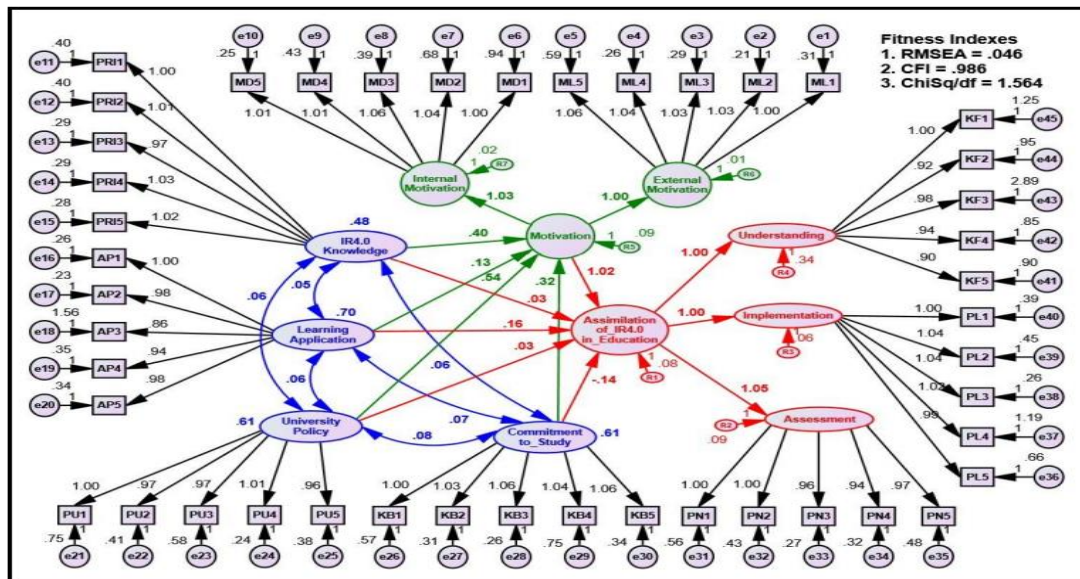

Figure 2: Unstandardized Regression Values

The regression equation for Assimilation of IR4.0 in Education (AIRE) and Motivation (MV) is:

a)   AIRE = 0.03IRK + 0.16LA + 0.03UP + (-0.14)CS + 1.02MV (R^2 = 0.97 = 97 %).

b)   MV = 0.40IRK + 0.13LA + 0.54UP + 0.32CS (R^2 = 0.96 = 96%).

The double-headed arrow is the value of the correlation between two independent, namely the correlation between IR4.0 Knowledge (IRK) with Learning Application (LA) results in a value of 0.05, between IR4.0 Knowledge (IRK) with University Policy (UP) results in a value of 0.06, between IR4.0 Knowledge (IRK) with Commitment to Study (CS) results in a value of 0.06, between Learning Application(LA) with University Policy (UP) results in a value of 0.06, between Learning Application (LA) withCommitment to Study (CS) results in a value of 0.07, between University Policy (UP) with Commitmentto Study (CS) results in a value of 0.08, and the result of this correlation value shows that the Structural Equation Modeling (SEM) model built is valid based on the construct, due to the non-occurrence of multicollinearity problems.

Table 1 from Figure 2 above, shows the results of direct effect hypothesis testing for IR4.0 Knowledge, Learning Application, University Policy, Commitment to Study and Motivation (independent variable) on Assimilation of IR4.0 in Education (dependent variable).

Table 1: Hypothesis of Direct Effect Between Constructs

Direct Effects Hypothesis	P	Decision
H1: IR4.0 Knowledge has a significant effect on Assimilation of IR4.0 in Education.	***	Supported
Learning Application has a significant effect on Assimilation of IR4.0 inEducation.	***	Supported
H3: University Policy has a significant impact on Assimilation of IR4.0 in Education.	***	Supported
ommitment to Study has a significant effect on Assimilation of IR4.0 inEducation.	***	Supported
Motivation construct has a significant effect on Assimilation of IR4.0 inEducation.	***	Supported
H6: IR4.0 Knowledge has a significant effect on Motivation.	***	Supported
H7: Learning Application has a significant effect on Motivation.	***	Supported
H8: University Policy has a significant effect on Motivation.	***	Supported
H9: Commitment to Study has a significant effect on Motivation.	***	Supported

Analysis Effect of IR4.0 Knowledge (IRK) on Assimilation of IR4.0 in Education (AIRE)

Based on the analysis of Figure 2 above and Table 2 below shows that IR4.0 Knowledge (IRK) has a significant effect on Assimilation

Impact of Industrial Revolution 4.0 (IR4.0) Knowledge, Application Learning, University Policy, Commitment to Study and Motivation on Assimilate IR4.0 in Education

of IR4.0 in Education (AIRE). The estimated regression weight (regression weights - β) is 0.034, the significance level is 0.001 (Estimate = 0.034, S. E. = 0.129, C. R. = 7.809, p < 0.001, Label = Significant). The results of this study show that IR4.0 Knowledge (IRK) has a positive and significant effect on Assimilation of IR4.0 in Education (AIRE). Therefore, when IR4.0 Knowledge (IRK) increases by 1 unit, an increase also occurs by 0.034 units on Assimilation of IR4.0 in Education (AIRE). Therefore, the testing of hypothesis **H1** in this study is supported based on the observed data.

Table 2: Regression Coefficient Value, Probability (p) IR4.0 Knowledge (IRK) on Assimilation of IR4.0 in Education (AIRE)

Construct		Construct	Estimate	S. E.	C. R.	P	Label
AIRE	<-	IRK	0.034	0.129	7.809	***	Signifikan

***Significant value at the significance level, p < 0.001

Analysis Effect of Learning Application (LA) on Assimilation of IR4.0 in Education (AIRE)

Based on the analysis of Figure 2 above and Table 3 below shows that Learning Application (LA) has a significant effect on Assimilation of IR4.0 in Education (AIRE). The estimated regression weight (regression weights - β) is 0.163, the significance level is 0.001 (Estimate = 0.163, S. E. = 0.044, C. R. = 2.561, p < 0.001, Label = Significant). The results of this study show that Learning Application (LA) has a positive and significant effect on Assimilation of IR4.0 in Education (AIRE). Therefore, when Learning Application (LA) increases by 1 unit, an increase also occurs by 0.163 units on Assimilation of IR4.0 in Education (AIRE). Therefore, the testing of hypothesis **H2** in this study is supported based on the observed data.

Table 3: Regression Coefficient Value, Probability (p) Learning Application (LA) on Assimilation of IR4.0 in Education (AIRE)

Construct		Construct	Estimate	S. E.	C. R.	P	Label
AIRE	<-	LA	0.163	0.044	2.561	***	Signifikan

***Significant value at the significance level, p < 0.001

Analysis Effect of University Policy (UP) on Assimilation of IR4.0 in Education (AIRE)

Based on the analysis of Figure 2 above and Table 4 below shows that University Policy (UP) has a significant effect on Assimilation of IR4.0 in Education (AIRE). The estimated regression weight (regression weights - β) is 0.031, the significance level is 0.001 (Estimate = 0.031, S. E. = 0.020, C. R. = 5.057, p < 0.001, Label = Significant). The results of this study show that University Policy (UP) has a positive and significant effect on Assimilation of IR4.0 in Education (AIRE). Therefore, when University Policy (UP) increases by 1 unit, an increase also occurs by 0.031 units on Assimilation of IR4.0 in Education (AIRE). Therefore, the testing of hypothesis **H3** in this study is supported based on the observed data.

Table 4: Regression Coefficient Value, Probability (p) University Policy (UP) on Assimilation of IR4.0 in Education (AIRE)

Construct		Construct	Estimate	S. E.	C. R.	P	Label
AIRE	<-	UP	0.031	0.020	5.057	***	Signifikan

***Significant value at the significance level, p < 0.001

Analysis Effect of Commitment to Study (CS) on Assimilation of IR4.0 in Education (AIRE)

Based on the analysis of Figure 2 above and Table 5 below shows that Commitment to Study (CS) has a significant effect on Assimilation of IR4.0 in Education (AIRE). The estimated regression weight (regression weights - β) is -0.140, the significance level is 0.029 (Estimate = -0.140, S. E. = 0.064, C. R. = - 2.178, p < 0.001, Label = Significant). The results of this study show that Commitment to Study (CS) has a positive and significant effect on Assimilation of IR4.0 in Education (AIRE). Therefore, when Commitment to Study (CS) increases by 1 unit, an increase also occurs by -0.140 units on Assimilation of IR4.0 in Education (AIRE). Therefore, the testing of hypothesis **H4** in this study is supported based on the observed data.

Table 5: Regression Coefficient Value, Probability (p) Commitment to Study (CS) on Assimilation of IR4.0 in Education (AIRE)

Construct		Construct	Estimate	S. E.	C. R.	P	Label
AIRE	<-	CS	-0.140	0.064	-2.178	0.029	Signifikan

***Significant value at the significance level, p < 0.001

Impact of Industrial Revolution 4.0 (IR4.0) Knowledge, Application Learning, University Policy, Commitment to Study and Motivation on Assimilate IR4.0 in Education

Analysis Effect of Motivation (MV) on Assimilation of IR4.0 in Education (AIRE)

Based on the analysis of Figure 2 above and Table 6 below shows that Motivation (MV) has a significant effect on Assimilation of IR4.0 in Education (AIRE). The estimated regression weight (regression weights - β) is 1.016, the significance level is 0.001 (Estimate = 1.016, S. E. = 0.124, C. R. = 8.192, p < 0.001, Label = Significant). The results of this study show that Motivation (MV) has a positive and significant effect on Assimilation of IR4.0 in Education (AIRE). Therefore, when Motivation (MV) increases by 1 unit, an increase also occurs by 1.016 units on Assimilation of IR4.0 in Education (AIRE). Therefore, the testing of hypothesis **H5** in this study is supported based on the observed data.

Table 6: Regression Coefficient Value, Probability (p) Motivation (MV) on Assimilation of IR4.0 inEducation (AIRE)

Construct		Construct	Estimate	S. E.	C. R.	P	Label
AIRE	<-	MV	1.016	0.124	8.192	***	Signifikan

Analysis Effect of IR4.0 Knowledge (IRK) on Motivation (MV)

Based on the analysis of Figure 2 above and Table 7 below shows that IR4.0 Knowledge (IRK) has a significant effect on Motivation (MV). The estimated regression weight (regression weights - β) is 0.399, the significance level is 0.029 (Estimate = 0.399, S. E. = 0.183, C. R. = 2.180, p < 0.001, Label = Significant). The results of this study show that IR4.0 Knowledge (IRK) has a positive and significant effect on Motivation (MV). Therefore, when IR4.0 Knowledge (IRK) increases by 1 unit, an increase also occurs by 0.399 units on Motivation (MV). Therefore, the testing of hypothesis **H6** in this study is supported based on the observed data.

Table 7: Regression Coefficient Value, Probability (p) IR4.0 Knowledge (IRK) on Motivation (MV)

Construct		Construct	Estimate	S. E.	C. R.	P	Label
MV	<-	IRK	0.399	0.183	2.180	0.029	Signifikan

***Significant value at the significance level, p < 0.001

Analysis Effect of Learning Application (LA) on Motivation (MV)

Based on the analysis of Figure 2 above and Table 8 below shows that Learning Application (LA) has a significant effect on Motivation (MV). The estimated regression weight (regression weights - β) is 0.134, the significance level is 0.001 (Estimate = 0.134, S. E. = 0.015, C. R. = 5.237, p < 0.001, Label = Significant). The results of this study show that Learning Application (LA) has a positive and significant effect on Motivation (MV). Therefore, when Learning Application (LA) increases by 1 unit, an increase also occurs by 0.134 units on Motivation (MV). Therefore, the testing of hypothesis **H7** in this study is supported based on the observed data.

Table 8: Regression Coefficient Value, Probability (p) Learning Application (LA) on Motivation (MV)

Construct		Construct	Estimate	S. E.	C. R.	P	Label
MV	<-	LA	0.134	0.015	5.237	***	Signifikan

***Significant value at the significance level, p < 0.001

Analysis Effect of University Policy (UP) on Motivation (MV)

Based on the analysis of Figure 2 above and Table 9 below shows that University Policy (UP) has a significant effect on Motivation (MV). The estimated regression weight (regression weights - β) is 0.544, the significance level is 0.001 (Estimate = 0.544, S. E. = 0.145, C. R. = 3.534, p < 0.001, Label = Significant). The results of this study show that University Policy (UP) has a positive and significant effect on Motivation (MV). Therefore, when University Policy (UP) increases by 1 unit, an increase also occurs by 0.544 units on Motivation (MV). Therefore, the testing of hypothesis **H8** in this study is supported based on the observed data.

Table 9: Regression Coefficient Value, Probability (p) University Policy (UP) on Motivation (MV)

Construct		Construct	Estimate	S. E.	C. R.	P	Label
MV	<-	UP	0.544	0.145	3.534	***	Signifikan

***Significant value at the significance level, p < 0.001

Impact of Industrial Revolution 4.0 (IR4.0) Knowledge, Application Learning, University Policy, Commitment to Study and Motivation on Assimilate IR4.0 in Education

Analysis Effect of Commitment to Study (CS) on Motivation (MV)

Based on the analysis of Figure 2 above and Table 10 below shows that Commitment to Study (CS) has a significant effect on Motivation (MV). The estimated regression weight (regression weights - β) is 0.320, the significance level is 0.001 (Estimate = 0.320, S. E. = 0.060, C. R. = 5.358, p < 0.001, Label = Significant). The results of this study show that Commitment to Study (CS) has a positive and significant effect on Motivation (MV). Therefore, when Commitment to Study (CS) increases by 1 unit, an increase also occurs by 0.320 units on Motivation (MV). Therefore, the testing of hypothesis **H9** in this study is supported based on the observed data.

Table 10: Regression Coefficient Value, Probability (p) Commitment to Study (CS) on Motivation (MV)

Construct		Construct	Estimate	S. E.	C. R.	P	Label
MV	<-	CS	0.320	0.060	5.358	***	Signifikan

***Significant value at the significance level, p < 0.001

CONCLUSION

Overall, the analysis of the impact of the based on Assimilation of IR4.0 in Education (AIRE), shows a significant effect. The analysis of the impact of the IR4.0 Knowledge (IRK), Learning Application (LA), University Policy (UP) and Commitment to Study (CS) on Motivation (MV), also showed a significant effect. The results of this study show the effect of factors based on IR4.0 Knowledge (IRK), Learning Application (LA), University Policy (UP), Commitment to Study (CS) and Motivation (MV), very important in student learning. Therefore, the university needs to play a role on these factors to further improvethe academic achievement of their students, besides the emphasis is also given to lecturers in their learning to university students.

REFERENCES

1) Bodrow, W. (2017). Impact of Industry 4.0 in service oriented firm. *Advances in Manufacturing, 5* (4), 394 - 400.

2) Chik, Z., & Abdullah, A. H. (2018). Developing and validating instruments for measurement of motivation, learning styles and learning disciplines for academic achievement. *International Journal of Academic Research in Business and Social Sciences, 8* (4), 594 - 605.

3) Daricin, D., & Herceg, I. V. (2018). *Industry 4.0 and paradigm change in economics and business management*. Lecture Notes in Mechanical Engineering, (9783319895628), 37 - 56.

4) Hair, J. F., Black, W. C., Babin, B. J., Anderson, R. E., & Tatham, R. L. (2006). *Multivatiate data analysis(6th ed.).* New Jersey: Pearson Education International.

5) Kayikci, Y. (2018). Sustainability impact of digitization in logistic.s *Procedia Manufacturing, 21 (3)*, 782 -789.

6) Kline, R. B. (2016). *Principles and practice of structural equation modeling* (4th edition). New York: TheGuilford Press.

7) Schumacker, R. E. & Lomax, R. (2004). *A beginner's guide to structural equation modeling (2nd edition)*.Mahwah, New Jersey: Lawrence Erlbaun Associates Publishers.

8) Wilkesmann, M., Wilkesmann, U. (2018). Industry 4.0 - organizing routines or innovations? *VINE Journalof Information and Knowledge Management Systems, 48* (2), pp: 238 - 254.