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Reliability and Validity Analysis of the Personal and Environmental Orientation on Competencies in the Context of Industrial Revolution 4.0: A Pilot Study Using Structural Equation Modeling Approach

Ani Liza Abd Rahman *
Universiti Tenaga Nasional
Email: aniisa3312@gmail.com

Nor Hazlin Nor Asshidin
Universiti Tenaga Nasional
Email: Hazlin@uniten.edu.my

Mohd Nur Ruzainy Alwi
Universiti Tenaga Nasional
Email: ruzainy@uniten.edu.my

Amar Hisham Jaaffar
Universiti Tenaga Nasional
Email: amarhishamjaaffar@gmail.com

**Corresponding Author*

Abstract

Purpose: The aims of this study is to present the validity and reliability of the instruments related to the effect of the personal and environmental orientation of RIASEC model on the competencies in the context of Industrial Revolution 4.0 (IR 4.0) focusing on the pilot study result.

Design/methodology/approach: The questionnaire was designed through two phase. Phase 1 involved instrument development process and phase 2 involved quality assessment process. The questionnaire piloted through 57 diploma students from Politeknik Muadzam Shah, Pahang who are undergoing the practical training. The samples were purposively selected among B40 students. The pilot study were conducted through online survey. The data were analysed using PLS-SEM through the measurement model analysis.

Findings: The measurement model analysis findings which are the loadings, convergent validity and discriminant validity was greater than the threshold value. This means, the reliability and validity of the instrument was confirmed.

Research limitations/implications: The limitations includes a sample of the study that was rather homogenous which only focused on TVET programmes in Malaysian Polytechnic and B40 students. In addition, due to the sample of this study was relatively small with only 57 samples. Notwithstanding, the number of samples is still acceptable for pilot study.

Practical implications: This study provide a guideline for future researchers in examining the study regarding the relationship between individual's characteristic and interest toward required competencies that focusing the context in Malaysia.

Originality/value: The study result shows that personal and environmental orientation of RIASEC model on the competencies are reliable for the actual survey.

Paper type: Research paper

Keywords: Personal and environmental orientation, RIASEC, Competencies, IR 4.0.

Introduction

In many countries, the policy makers play an important role in ensuring young people are get a jobs including Malaysia. The role played has borne fruit when the number of employed people in Malaysia has increased and at the same time the unemployment rate began to decline in year 2021, unfortunately, unemployment among youth ages 15 to 30 remains high (Department of Statistic of Malaysia (DOSM), 2021). Malaysia was ranks at third-highest of youth unemployment rate in ASEAN after Indonesia and the Philippines since 2018 (Dass, 2018). In addition, the highest rate of youth unemployment recorded by first degree graduates for three consecutive years which are in 2016, 2017 and 2018 (MOE, 2019). In fact, the largest rate was recorded by graduates from low income family or also known as Bottom 40 Percent (B40) group (MOE, 2019; Ngah et al., 2019). Additionally, the threat of the COVID-19 pandemic has put considerable pressure to B40 group due to job retrenchment and reduce of income (Rashid, 2020). The situation becomes worse when the new Industrial Revolution (IR) i.e. IR 4.0 brought a huge changes in various aspects particularly in terms of jobs skills (Andreas, 2018; Chiam & Joshua, 2019) and labor markets (Kurt, 2019; Paim, 2017; WEF, 2018) as well as causes a recession of employment in many sectors (Andreas, 2018; Chiam & Joshua, 2019; WEF, 2016).

Hence, inspiring the Holland theory, this study utilise the concept of personal and environmental of RIASEC model to determine the competencies in the context of IR 4.0 that fit for students especially among B40 group at polytechnic Malaysia. Holland theory highlights six personal orientations that parallel with six environments orientations that collectively known as RIASEC: Realistic (R), Investigative (I), Artistic (A), Social (S), Enterprising (E) and Conventional (C) (Holland, 1997). In terms of IR 4.0 competencies, this study focuses on employability competencies that indispensable for IR 4.0 namely complex problem solving (CPS), critical thinking (CT) and creativity. However, prior conduct the actual research, the constructs validation need to take into consideration.

Therefore, this study aims to present the validity and reliability of the instruments related to the effect of the personal and environmental of RIASEC model on the competencies in the context of IR 4.0. For that purpose, a Partial Least Square Structural Equation Modelling (PLS-SEM) approach are employed for this study by involving the pilot study data. By using of this approach, this study is expected to extend the existing knowledge in the literature in terms of the validity and reliability of the instrument specifically involving personal and environmental orientation of RIASEC model with the IR 4.0 competencies. Thus, the detail of literature review, research methods and research findings will be discussed on the following section.

Literature Review

Competencies in the context of IR 4.0

The IR 4.0 is a term that represents a radical transformation of industry that has dramatically impacted many aspects in the fields of business, education and manufacturing. The presence of the IR 4.0 also forecasted to bring far-reaching changes in the nature of work. New occupations may require individuals possess multi-competencies including technical, cognitive and soft skills. Accordingly, many researches has been conducted to identify the competencies indispensable for IR 4.0. Previously, WEF has listed the top ten IR 4.0 competencies within five years which is for 2015 to 2020 and 2018 to 2022 as stated in Table 2.1 (WEF, 2016; WEF 2018). From the lists, can be concluded that WEF consistently highlights CPS, CT and

creativity as indispensable for IR 4.0. Other than that, Kamaruzaman et al. (2019) reveals ten competencies that are in line with IR 4.0 requirement particularly for engineering field. Based on the results of study, it was found that CPS, CT and creativity listed into ten competencies required by engineering students. In addition, Nugraha et al. (2020) also found creative and innovative, problem solving and CT become employability competencies in TVET areas for IR 4.0 phase. Similarly, Khalid & Ahmad (2021) found that CPS, CT and creativity are included in the list of competencies required by graduates in encountering the work challenge during IR 4.0. On the basis of these findings, the rationale for this study to focus more on these three competencies without ignoring the important of other competencies.

Complex Problem Solving (CPS)

CPS refers to the circumstance that stress human to interface with the problems that have the elements of complexity, intransparency, and dynamics (Herde et al., 2016; Neubert et al., 2015). Basically, CPS exist with unclear problem definition and goals to be accomplished (Dorner & Funke, 2017). Accordingly, the process of knowledge acquisition that requires the complex interaction of basic cognitive and non-cognitive procedures is critical to ensure the process of knowledge application can be implemented in order to find the potential solution for a complex problem encountered (Herde, 2016; Neubert et al., 2015).

Critical Thinking (CT)

CT can be defined as a logical and reflective thinking that is often used to do a task, make a decision and reaching solution on problem solving (ÖZyurt, 2015). Usually, CT is concern with the process of accessing, analysing and synthesising the data or information (Joynes et al., 2019). CT skill has a capability to polish human abilities in terms of communication, information literacy as well as examine, interpret and assess proof (Joynes et al., 2019). Indeed, human will effectively examine complex circumstances, produce efficient solutions and make a good decision with CT ability (Moneva et al., 2020).

Creativity

Creativity is characterised as human ability to construct a new and valuable ideas, conjure fresh approaches of thinking and also materialise unexpected questions and answers by reintegrate and matching information and knowledge acquired (Joynes et al., 2019). Besides that, there has a several processes that should take into consideration in order to create something creative including: 1) identify the problems, defects, and conflicts; 2) discover a solutions and put forward hypotheses and; 3) test and transform those hypotheses to provide an extraordinary result (Shi et al., 2020). Moreover, as per a humanistic perspective, a person with creativity abilities has the cognizance and the aptitudes to address crisis in extraordinarily ways by simply using their intrinsic motivation (Nakano & Wechsler, 2018). In short, creativity requires more abilities, in terms of openness, hierarchical thinking, independence as well as exploratory behavior (Shi et al., 2020).

Table 1: Employability Competencies for IR 4.0

Competency	WEF 2016; 2018				Kamaruzaman et al., 2019	Nugraha et al., 2020	Khalid & Ahmad, 2021
	IR 4.0 Competencies				Engineering Skills in line with IR 4.0 Skills	Employability Skills in TVET	
	2015	2018	2020	2022			
***Complex Problem Solving**	√	√	√	√	√	√	√
Coordinating With Others	√		√				√
People Management	√		√				
***Critical Thinking**	√	√	√	√	√	√	√
Negotiation	√		√				
Quality Control	√		√				
Service Orientation	√		√				
Judgment And Decision Making	√		√				
Active Listening	√		√				
***Creativity**	√	√	√	√	√	√	√
Analytical Thinking And Innovation		√		√	√		
Active Learning And Learning Strategies		√		√	√		
Attention To Detail, Trustworthiness		√					
Emotional Intelligence		√		√	√		
Reasoning, Problem Solving And Ideation		√		√	√		
Leadership And Social Influence		√		√	√		
Coordination And Time Management		√					
Technology Design And Programming,				√	√		
System Analysis And Evaluation				√	√		
Interpersonal Skills						√	
Knowledge of Technical						√	
ICT Skills						√	
Communication						√	

The Concept of Personal and Environmental Orientation of RIASEC Model

The concept of personal and environmental orientation involves the measurement of six RIASEC model. These models were introduced via the most prominent theory in vocational psychology namely Holland theory (Holland, 1997; Nye et al., 2017). Personal orientation refers to the individual interest and abilities while environmental orientation demonstrate the work environments and work characters (Holland, 1997; Nye et al., 2017).

Realistic Type

Individual of this type facing difficulty with social and interpersonal skills (Rocconi et al., 2020). In fact, they like to outdoor job with equipment compared to working with people (Mason et al., 2020). Although many practice their job outdoors as opposed to indoors, they are choosing to be surrounded by people with realistic type (Rocconi et al., 2020; Zahour et al., 2020). Basically, individuals with this type are keen on mechanical or technical activities and no issue to play with or fix any damage (Ertl & Hartmann, 2019; Zahour et al., 2020). The reasonable occupations that suit the interests of realistic people are surveyor or radiologist (Ertl & Hartmann, 2019).

Investigative Type

Most Investigative individual able to work individually but when work in a team, their character may appear to be somewhat cold and far off (Mason et al., 2020; Zahour et al., 2020). Consequently, they are always faced with the issue of lack of leadership skills (Holland, 1997; Mason et al., 2020; Sheldon et al., 2019). Surprisingly, they like the activities or tasks that can test their problem solving skills, for instance, collect the data, make an assumption and search for solution (Mason et al., 2020). All these activities stress them to absorb their thoughts and play with ideas (Zahour et al., 2020). In terms of work, they lean toward occupations like aerospace engineer or general internist (Ertl & Hartmann, 2019).

Artistic Type

Artistic individual is known as a creative people due interested in creative and artistic activities (Ertl & Hartmann, 2019). This individual has a capability to become more expressive, original, and intuitive when using ideas and invent objects (Allen, 2005; Holland, 1997; Mason et al., 2020). Due to gifted with great sensitivity and imagination, they like to deal with the extraordinary circumstances (Allen, 2005; Ferreira et al., 2016; Mason et al., 2020; Zahour et al., 2020). An artistic individual is an independent and non-conformist person, however lacks the skills of bureaucratic organisation (Holland, 1997; Allen, 2005; James, 2017; Zahour et al., 2020). Although unable to manage a routine tasks, this kind of individual is ready to work with discipline in attempt to polish their artistic ability and to complete long-term work (Zahour et al., 2020). Usually, the occupations like architectural drafter or geneticist are well suited to this Artistic individual (Ertl & Hartmann, 2019).

Social Type

Social people are awarded with social skills that allow them to show their understanding, cooperative and flexibility compared to others (Holland, 1997; James, 2017; Rocconi et al., 2020; Sheldon et al., 2020). Indeed, they perceived that maintaining the quality of relationship with other people is one of the priority in their life (Zahour et al., 2020). Social people also keen with activities or work environment that give emphasis to social interaction and interpersonal relations (Ertl & Hartmann, 2019). Moreover, they enjoy to interact with other people (Mason et al., 2020). Usually, the interaction with people surrounds is done in order to help, educate, entertain, treat and promote growth (Zahour et al., 2020). They enjoy teaching

or helping other people. Therefore, people categorised under Social type fit to become as teacher, music therapists or midwives (Ertl & Hartmann, 2019).

Enterprising Type
Individuals of this type are good in making a decision, communicate, sell ideas, and implements the leadership role (Mason et al., 2020; Zahour et al., 2020). Based on those abilities, it is not surprising if they wise in convincing and influencing people in surround (Ertl & Hartmann, 2019; Zahour et al., 2020). Other than that, they are very efficient in carrying out any tasks, projects or businesses due to the sense of organisation, planning, and initiative that naturally possessed (Zahour et al., 2020). Since Enterprising persons are interested in leading others, they favour occupations that involves clinical research coordinators or natural sciences managers Ertl & Hartmann, 2019).

Conventional Type
Individuals of this type prefer to involve with activity that requires them to predict the outcome. They are also known well organised person (Mason et al., 2020).They dislike to make any improvisation instead prefer structured things and repetitive tasks such as calculate, classify, and maintain registers or folders (Zahour et al., 2020). In fact, they are able to be an effective person when performing any tasks that require accuracy and repetitive tasks (Zahour et al., 2020). This type of people prefer to choose the occupation that involve the clerical and numerical skills like actuary (Ertl & Hartmann, 2019).

Methods

Samples

Sample respondents for this pilot study were purposively selected based on purposive sampling technique from a population of diploma students from Politeknik Muadzam Shah, Pahang (PMS) who are undergoing the practical training. The target respondents were chosen among students from the B40 group. The samples were purposively selected according to the identical criteria to the real respondents. Nonetheless, the sample used in this pilot study will not be involved in the actual study

Data collection

The questionnaire were piloted through diploma students who are undergoing the practical training from PMS using the quantitative method. The pilot study were conducted through online survey. Additionally, a total of 57 questionnaires were received from the respondents. In the context of this study, only questionnaires filled out by respondents who are categorised under the B40 students will be considered. In relation to the number of participants, there is an argument that 10 to 30 participants considered adequate for pilot study (Johanson & Brooks, 2009). Additionally, other opinions stated that participants from 25 to 100 are considered reasonable for a pilot study (Cooper & Schindler, 2003).

Design

Phase 1: Instrument Development
In attempt to identify the B40 students, the questions regarding family background status such as parent occupation and parent income were included in this research instrument. For personal and environmental orientations of RIASEC model, the items were separately measured. The items in this constructs were used to gather the information regarding six personality type and six environment orientation which consists of Realistic, Investigative, Artistic, Social, Enterprising and Conventional types using 5-point Likert scale with the responses ranged from

1 = Strongly Disagree to 5 = Strongly Agree. In addition, all items used in this part were adopted from Holland (1997) and Mason et al., (2020). Furthermore, for competencies in the context of IR 4.0, the items were formed in three different sub-section that comprise of: 1) CPS; 2) CT; and 3) creativity. The items on CPS were adapted from Pandit, R. (2011) entitled Problem- solving style questionnaire. Meanwhile the items regarding CT were adapted from Moneva et al. (2020) whereas items of creativity were adapted from Doman & Kamaruddin (2011). All items in this section is measured using a 5-point Likert scale.

Phase 2: Quality Assessment

In terms of content validity, pre-test phase were conducted to evaluate the quality of the items. In pre-test phase, the questionnaires was sent to six experts by hand and using email. The experts in the field of psychology, TVET and language were selected among academicians and active practitioners. The questionnaire were examined in terms of clarity, simplicity and the ambiguity of the scale items. The expert in psychology field was asked to comment the suitability of the items for students whether there is easy to answer or not. Based on the expert's judgments, no items eliminated and the 5-point Likert scaling techniques were suitable for performing the further test. Furthermore, the items in the questionnaire were modified based on the comments and suggestions of the experts in terms of grammatically error and the sequence of presenting the statements before a pilot study conducted. Finally, based on the pre-test results, the questionnaire were piloted to the respondents.

Data analysis

As proposed, the data collected were analysed using PLS-SEM approach. By using PLS-SEM approach, the validity and reliability of the instrument tested through measurement model analysis. At the measurement model stage, there is two criterion were fulfilled namely the convergent validity and the discriminant validity. According to Hair et al. (2017), the convergent validity examined through loadings, average variance extracted (AVE) and composite reliability (CR). Meanwhile, the discriminant validity tested via HTMT (Franke & Stardest, 2019).

Findings

Demographic Profile of the Respondent

Demographic Profile of Respondents presents the detailed results of demographic data of the sample. As shown in Table 2, 42 respondents are in the parental income group (household income) below RM2, 500 (73.69%), followed by 10 respondents that have parental income RM 2,501 to RM 3, 170 (17.54%). Furthermore, 5 respondents categorised under parental income range between RM3, 971 to RM 4, 850 (8.77%). Furthermore, 5 respondents categorizsed under parental income range between RM3, 971 to RM 4, 850 (8.77%). In addition, the study analyses the data with a 57 sample respondents out of which 21 respondents are male (36.84%) and female with 36 respondents (63.16%). Meanwhile, In terms of age groups, most of the respondents' age fall between 21 to 25 years old (92.98%) and only 4 respondents are age between 26 to 30 years old (7.02%). Furthermore, from the point of view of respondent's race, 50 (87.72%) are Malay respondent which holds the highest number of respondents. This followed by Indian respondent with 7 (12.28%).

Table 2: Demographic Profile of Respondent

Demographic Variable	Characteristics	Frequency (n =57)	Percentage (%)
Parents' income (household income)	Below RM 2,500	42	73.69
	RM 2,501 - RM 3,170	10	17.54
	RM 3,971 - RM 4.850	5	8.77
Gender	Male	21	36.84
	Female	36	63.16
Age	21 - 25 years old	53	92.98
	26 - 30 years old	4	7.02
Race	Malay	50	87.72
	Indian	7	12.28

Common Method Variance

Prior to further the reliability and validity analysis, need to be ensured that the data collected using the single source of data should be free from the common method variance issue. In this study, Harman's single-factor with nine constructs that consists of Realistic, Investigative, Artistic, Social, Enterprising, Conventional, CPS, CT and creativity was carried out. The analysis in Table 3 demonstrate that the largest variance explained by the single factor accounted for 38.50%, which was below the suggested value of 50% (Podsakoff et al., 2003). Therefore, can be considered that the data collected for this study are free from the CMV issue.

Table 3: Total Variance Explained

Component	Initial Eigenvalues			Extraction Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	49.66	38.50	38.50	49.66	38.50	38.50

Measurement Model Analysis

In attempts to confirm the reliability and validity of the reflective items constructed, the measurement model analysis are employed for this study. The measurement model will ensure that the specific variable used are truly measured and differed from other variable. In the measurement model stage, there is two types of validities need to be achieved namely convergent validity and discriminant validity.

According to Hair et al. (2017), convergent validity can be examined through loadings, average variance extracted (AVE) and composite reliability (CR). In addition, the convergent validity is confirmed when the value of loadings and average variance extracted (AVE) are equal or greater than 0.5 while the value of composite reliability (CR) is equal or greater than 0.7 (Hair et al., 2017). Table 4 illustrates the results of the convergent validity for this study. Based on the result shown, all values for loading, AVE and CR were greater than the threshold values as stated in the literature. The findings indicate that the values of loading were ranged from 0.665 to 0.966 and the values of AVE were ranged from 0.587 to 0.882. Meanwhile, the CR values were ranged between 0.894 and 0.987. Therefore, the convergent validity has been confirmed.

Table 4: The Convergent Validity

Constructs and Items	Loadings	CR	AVE
Realistic			
I like to work with machines.	0.815	0.894	0.587
I like to work with objects.	0.843		
I like to work with tools.	0.824		
I like fixing electrical appliances.	0.665		
I like fixing automobiles.	0.681		
I like fixing furniture.	0.752		
Investigative			
I like to observe, learn, investigate, analyse, and evaluate things (problems / situations).	0.748	0.940	0.637
I like to solve problem in depth.	0.795		
I like to be engaged in a task that allows me to use analytical ability.	0.747		
I like to explore the causes of a phenomenon or an accident.	0.819		
I like to verify a scientific theory with practice.	0.816		
I like to think about the principles of how things develop or change.	0.853		
I like to learn about different scientific theories via books or lectures.	0.804		
I like to study a certain theory in depth through a series of references or data.	0.811		
I like to apply science to practical problems.	0.788		
Artistic			
I like using imagination or creativity.	0.736	0.924	0.602
I like to be engaged in a task that allows me to show my artistic talents.	0.753		
I am an innovative person.	0.760		
I hope I would become an artist or a writer.	0.773		
I like to create portraits or photographs.	0.751		
I like to write lyrics or compose music of any kind.	0.778		
I like to design furniture, clothing or posters.	0.834		
I like to design stage setting for a play.	0.817		
Social			
I like helping people.	0.823	0.952	0.664
I like to teach or train people.	0.797		
I like to develop people.	0.802		
I am good at listening to others.	0.836		
I have capabilities to make people feel at ease.	0.834		
I like to talk with people to help them feel happy.	0.879		

Constructs and Items	Loadings	CR	AVE
I like understanding human relations.	0.863		
I love to be involve with charity work.	0.742		
I like to resolve disputes for others.	0.754		
I like to encourage people when they are feeling down or facing difficulties.	0.809		
Enterprising			
I like to do things that have an impact on others' decisions.	0.739	0.946	0.686
I have strong managerial capacity.	0.798		
I prefer to be involved with plan for the developmental orientation of a team or company.	0.864		
I prefer to be involved with making investment analysis for a company.	0.846		
I prefer to take part in marketing social practices.	0.807		
I prefer to be involved with work that allocate the human, material or financial resources of an organisation.	0.810		
I like to meet important executives or leaders.	0.875		
I enjoy paying attention to the sales of listed companies.	0.878		
Conventional			
I like to carry things out in detail.	0.805	0.955	0.658
I like to deal with data or paperwork.	0.814		
I am able to follow fixed process.	0.839		
I am an orderly person.	0.747		
I am an accurate person.	0.705		
I like filling out forms, organising files and checking data.	0.844		
I enjoy taking inventory of supplies or product.	0.759		
I like to check paperwork or products for error and flaws.	0.882		
I enjoy recording data and checking materials.	0.866		
I like to handle daily affairs in office.	0.832		
I like activities that classify or put different kinds of items in order.	0.813		
CPS			
I perceive it is important to analyse all the facts and put them in systematic order when facing problem.	0.909	0.952	0.741
I perceive it is important to focus on long-term implications rather than minor and details.	0.926		
I perceive it is important to realise the benefit of any project/task before I put energy for it.	0.829		
I perceive it is important to deal with new and complicated things.	0.840		
I perceive it is important to not let problems upset me, no matter how difficult they are.	0.843		

Constructs and Items	Loadings	CR	AVE
I perceive it is important to learn new skills even though I did well in things that I like to do.	0.893		
I perceive it is important to maintain harmony in group work to ensure its efficiency.	0.775		
CT			
I feel it is important to understand the logical connections between ideas.	0.923	0.974	0.842
I feel it is important to classify between important and irrelevant information.	0.914		
I feel it is important to construct strong evidence-based arguments.	0.926		
I feel it is important to evaluate situations from different perspectives.	0.922		
I feel it is important to interpret the real meaning of information.	0.949		
I feel it is important to analyse ideas and arguments.	0.893		
I feel it is important to reach conclusions based on evidence.	0.895		
Creativity			
I think enthusiasm is important to acquire or learn something.	0.922	0.987	0.882
I think it is important to possess a large number of ideas or solutions to problems.	0.923		
I think it is important to formulate criteria to judge my decision making.	0.966		
I think it is important to abandon old thinking in order to produce a great variety of ideas.	0.919		
I think it is important to rearrange elements of thought to create new ideas or products.	0.925		
I think it is important to fearlessly change the existing ideas and products.	0.944		
I think it is important to come up with unique ideas.	0.942		
I think it is important to explore experience and actions.	0.957		
I think it is important to grow in various ways to understand things.	0.956		
I think it is important to connect between old and new ideas to generate new insights.	0.934		

Furthermore, Franke and Sarstedt (2019) proposed that, the discriminant validity is confirmed using the hetero-trait mono-trait ratios (HTMT) when the values are less than or equal to 0.90. As shown in Table 5, the HTMT values of the entire constructs for this study were lower than 0.90. Subsequently indicating that the discriminant validity is confirmed. Overall, based on the results of the convergent validity and the discriminant validity, can be concluded that the items constructed for this study were valid and reliable.

Table 5: Discriminant Validity HTMT

		#1	#2	#3	#4	#5	#6	#7	#8	#9
#1	Artistic									
#2	CPS	0.544								
#3	Conventional	0.517	0.649							
#4	Creativity	0.460	0.788	0.687						
#5	CT	0.465	0.893	0.632	0.805					
#6	Enterprising	0.784	0.670	0.640	0.645	0.670				
#7	Investigative	0.597	0.631	0.622	0.587	0.663	0.780			
#8	Realistic	0.391	0.469	0.303	0.315	0.449	0.474	0.526		
#9	Social	0.544	0.494	0.437	0.505	0.514	0.605	0.466	0.232	

Discussion and Conclusion

The aim of this study is to examine the reliability and validity of research instruments related to the effect of personal and environmental orientations of RIASEC model on competencies of IR 4.0 context among B40 students using the PLS-SEM approach. By using the PLS-SEM approach, the measurement model analysis was applied. Based on the measurement model analysis findings, the loadings, convergent validity and discriminant validity was greater than the threshold value. This means, the reliability and validity of the instrument was confirmed. Subsequently, the research aim has fulfill. Previously, there are many studies examine the research instruments concerning RIASEC model. Han & Sears (2019) measure balancing work and family demand using RIASEC personality type, which shows the value of reliability were ranged from α=.91 to α=.95. Besides, Ertl & Hartmann (2019) also using the same model to identify the interest on STEM fields for students and the results of reliability were ranged between α=.56 and α=.75. Additionally, there is study that reveals the value of reliability and validity of RIASEC model on students in Saudi Arabia context were ranged from α=.60 to α=.70 (Aljojo & Saifuddin, 2017). Although all those studies established adequate reliability and validity standard, the measurement mainly emphasised on the different approach which is Cronbach's Alpha coefficient. Due to the different and the large number of constructs, this study look at into other approach of validation that can be used to validate each individual items of the instruments.

The test of reliability and validity is important for questionnaire development to ensure each items representing the actual meaning and role of each constructs, subsequently, contribute comprehensively to the research framework. The results of study by using PLS-SEM demonstrated that, a 76 items measuring instrument that comprises nine scales developed in this study was confirmed to be highly valid and reliable. This instrument provide a guideline for future researchers in examining the study regarding the relationship between individual's characteristic and interest toward required competencies that focusing the context in Malaysia. Overall, the study of personal and environmental orientation of RIASEC model on the competencies are reliable for the actual survey.

Theoretical Implications

Theoretically, this study provide further testing on the RIASEC model from different context using polytechnic student in Malaysia.

Practical and Social Implications

For practical implications, this study provide a guideline for future researchers in examining the study regarding the relationship between individual's characteristic and interest toward

required competencies which focusing in the Malaysian context. This study also can inspire to future researchers to extend the findings of this study to the other context or scope of study.

Limitations and Suggestions for Future Research

Although this study provides significant insights into the research topic, there are certain limitations that should be noted. The limitations includes a sample of the study that was rather homogenous which only focused on TVET programmes in Malaysian Polytechnic and B40 students. Thus, future researcher may be able to use other sample such as Malaysian Technical University Network (MTUN) or other TVET institutions like community college, vocational college and GIATMARA. In addition, due to the sample of this study was relatively small, it become a limitation for this study. Notwithstanding, the number of samples is still acceptable for pilot study. Thus, it is rational for future researchers to identify the other context of study to obtain a big sample of study.

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