Work-readiness integrated competence model: Conceptualisation and scale development

Abstract

Purpose – The purpose of this paper is to conceptualise graduate work-readiness and to develop a scale to measure it.

Design/methodology **–** The methodology entailed the compilation of a literature review and the conduct of qualitative interviews and a focus group to generate items. This study used the 'resource-based view (RBV)' approach to conceptualise a multidimensional – '*Work-readiness integrated competence model (WRICM)'*– consisting of four main factors (namely, intellectual, personality, meta skill and job-specific resources), with a further ten sub-dimensions. Further, a series of tests were performed to assess its reliability and validity.

Findings **–** A final 53 item WRICM scale covering four dimensions and ten sub-dimensions of graduate work-readiness was developed based on the perceptions of 362 HR professionals and managers from seven Asia-Pacific countries. The ten sub-dimensions covering 53 work readiness skills reflect the perceptions of stakeholders regarding the work-readiness of graduates. The scale was found to be psychometrically sound for measuring graduate work-readiness.

Research limitations- Though the WRICM model is based on the inputs of different stakeholders of graduate work-readiness (employers, educators, policy-makers and graduates), the development of the WRICM scale is based on the perspectives of industry/employers only.

Practical implications **–**The WRICM model has implications for education, industry, professional associations, policy-makers and for graduates. These stakeholders can adapt this scale in assessing the work-readiness of graduates in different streams of education.

Originality/value **–**The authors believe that the WRICM model is the first multi-dimensional construct that is based on a sound theory and from the inputs from graduate work- readiness stakeholders from seven Asia Pacific countries.

Keywords: graduate work-readiness, work-readiness scale, work-readiness model, scale development

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1. Introduction

In the wake of contemporary requirements from employers, graduate work-readiness has emerged as an important criterion for employment and has become increasingly demanded in the development of university graduates' capabilities (Cavanagh, 2015; Hager and Holland, 2006). Graduates are expected to exit their studies in work-ready mode and with demonstrable levels of employability (Clarke, 2017). There has been growing interest in conceptualising graduate work-readiness during the past few years, accompanied by the development of several measurement instruments to underpin the graduate work-readiness construct (Cabellero et al, 2011; Cavanagh et al, 2015; Cotzee, 2014; Hambur, Rowe and Luc, 2002; Jollands et al, 2012; Litchfield et al, 2010; Raftopoulos, 2009; Walker et al, 2015). As a construct, graduate work-readiness is still in its early stages of development and there is both a lack of clarity and consistency regarding what is meant by work-readiness, and also with respect to the general skills and attributes that demonstrate it (Cabalerro, 2010). Given the public policy significance of the topic, it is surprising that the concept remains largely undefined and flexible, nor is it fully integrated or contextualised within a learning process (Burgess et al, 2018). Thus, there is a need to provide a valid conceptualisation and to develop an associated measurement framework.

Extant graduate work-readiness measures have been developed and validated in country-specific studies (Caballero et al, 2011; Cotzee, 2014; Hambur et al., 2002; Raftopoulos et al., 2009; Walker et al, 2015), yet it has not been measured in the context of a specific region (for example, the Asia- Pacific in this case). It is worthwhile therefore to propose a measure of graduate work-readiness for such a region, as the countries included in this study share similarity in terms of high growth rates; significant movements of cross-border trade, labour and capital; and most important of all, there have been large flows of students across borders to access tertiary qualifications (Burgess et al, 2018).

Based on these observations, this study posits a *Work-readiness integrated competence model* (WRICM) based on a sound theoretical framework, and further systematically develops a WRICM scale to measure graduate work-readiness, and to provide an initial assessment of the exploratory scale's psychometric properties. The focus of the study is on graduates who have completed tertiary education programs, and the discussion therefore focuses on pre-job entry and graduates who are seeking their first full-time job in industry. The main purpose for proposing such a model and scale stems from the fact that there is no uniform model or scale for accurately documenting graduate work-readiness within the context of escalating and changing needs in education and practice. Graduate work-readiness can always be considered as outcome oriented, and the goal is to produce graduates who have effective knowledge and competence that can be utilised in practical work settings. Although examples of competency-based assessment are more prevalent in the medical and nursing literature (i.e., Objective Structured Clinical Examination *(OSCE)* and Competency Outcomes and Performance Assessment *(COPA)* Model) which assess graduates against a 'performance situation', there is no similar framework for measuring the work-readiness of graduates from a broad diversity of

disciplines. Considering these observations, a robust work-readiness framework is warranted that can capture the readiness levels of graduates and can inform future research to further come up with performance situation based assessment measures. Thus, this research proposes the WRICM scale as an effective framework for the full range of core competencies essential for graduates to be considered 'work-ready.' The WRICM framework has the potential to subsequently create performance-based assessment measures, similar to those used in medical and nursing contexts, that can inform different stakeholders about the actual levels of work-readiness levels based on the WRICM.

The paper begins with a review of the literature on graduate work-readiness (GWR) and discusses various models and taxonomies of graduate work-readiness and associated competencies observed in the extant literature, together with a consideration of the different measures of GWR reported in earlier studies. The following section explains the development of the proposed *Work-readiness integrated competence model (WRICM)*. The paper then describes how the qualitative research was conducted in parallel with the literature review to identify the factor structure of the WRICM framework, and explains the procedures followed to refine the initial pool of 93 items into the proposed 10-item WRICM construct. A series of tests was performed to assess its reliability and validity, as well as the unidimensionality of its constituent dimensions. The final section highlights the usefulness of the WRICM framework and scale for researchers and managers and concludes with recommendations for future research.

2. Review of literature

2.1 Graduate work-readiness

The extent to which graduates are work-ready is suggested to be indicative of potential job performance, success or promotion and career advancement (Atlay and Harris, 2000; Casnor-Lotto and Barrington, 2006). There is a range of terms used in the literature to describe the notion of GWR, including 'graduate employability', 'work-preparedness', 'transferable skills', 'key competencies', 'generic attributes' and 'graduate-ness' (Caballero and Walker, 2010; Litchfield et al., 2008). These terms allude to the extent to which graduates possess certain skills, knowledge and attributes that contribute to their employability, and enable them to be ready for and successful in the work environment (Kizito, 2010; Walsh and Kotzee, 2010). The GWR construct has been observed to be both different and complementary to more general notions of employability (Loughborough University, 2016), and extant research has cautioned that it should not be dismissed as a low-level construct, or as a merely a substitute rather than a complement to employability (Caballero et al., 2011). For the sake of clarity, an employable graduate is one who possesses a certain set of credentials which match the employer's required role and person specifications and has the potential to develop further (Dacre-Pool, Qualter and Sewell, 2014); whereas a work-ready graduate has the potential to perform at the required level consistently with minimum supervision and to contribute value to the organisation (Gardner and Lui, 1997).

Previous research has observed that graduates who are work-ready and have the requisite competencies are better prepared for a seamless transition into post-graduation employment and long-term career success (Cavanagh et al. 2015; Clark, 2013; Finn, 2017; Jackson, 2016;

Velasco, 2014). Not only does the literature about GWR represent an educator's perspective but it also focuses on best practices and issues identified by employers. To date, much research has been conducted in establishing various graduate work-ready competencies/skills that employers seek (Ashman et al. 2008; Jackson, 2016; Male et al. 2010; Peng et al. 2016). The possession of relevant competencies – namely, knowledge, attributes, skills, abilities, and other attributes - are manifest in graduate employability through the performance of tasks in specific work contexts which result in improved job performance (Coll and Zegwaard, 2006; Gow and McDonald, 2000; Jackson, 2009; Spowart, 2011; Teijeiro, 2013). Work-ready graduates are deemed to have acquired these competencies to ensure industry sustainability and high productivity in conditions of intensified global competition (Fenwick and Hall, 2016).

Although there is a consensus amongst concerned stakeholders (educators, employers and graduates) on the importance of identifying the work-readiness competencies of their graduates, the same cannot be said for which graduate competencies are the most important (Bridgstock 2009; Daniels and Brooker, 2014; Holmes 2013;). Several studies have focused on detailed breakdowns and taxonomies of particular work-readiness competencies required to enhance graduates' employability (Burnett and Jayaram, 2012; Casner-Lotto and Barrington, 2006; Griesel and Parker, 2009; Lowden et al., 2011). Moreover, different stakeholders attribute value differently, and vary in terms of the skills, capabilities, and competencies articulated by employers as being indicative of graduate work-readiness (Bridgstock, 2009; Caballero et al., 2011; Cavanagh et al., 2015; Green, Hammer and Star, 2009, Hager and Holland, 2006; Wye and Lim, 2009). It is easy enough to compile lists of graduate work-readiness competencies, but it is quite a different matter to conduct the research needed to determine whether these competencies are the actual work-readiness attributes sought by graduates and employers to seamlessly integrate them into the workplace. Due to disparities in listed competencies in previous literature (Bridgstock, 2009) and their origins; and a very few attempts to identify the commonalities, limitations and deficiencies between the various lists proposed by different researchers; it is worthwhile to point out the need for a valid GWR model, with a clear set of related competencies and sound theoretical foundations.

2.2 Measurement of graduate work-readiness

Extant research reports very limited evidence for a specific measure of graduate work-readiness (Caballero et al.,2011; Cotzee, 2014; Hambur et al., 2002; Raftopoulos et al., 2009; Walker, Storey, Costa and Leung, 2015). Hambur et al (2002), for example, developed a scale – the Graduate Skills Assessment (GSA) - for the measurement of generic skills acquired by graduates through their university experience and which may be relevant to university achievement and future employment. Raftopoulos et al's (2009) Work-Readiness Skills Scale was based around the competencies outlined by employers and graduates (oral and written communication, self-discipline, time management, interpersonal skills and teamwork, problem-solving skills and positive work ethics) in the Fasset Sector (finance, accounting, management-consulting and other related financial services organisations) of South Africa. Caballero et al (2011) subsequently developed a comprehensive measure of the attributes and characteristics of work-readiness in graduate contexts. Four factors, namely, personal characteristics, organisational acumen, work competence, and social intelligence were identified as the attributes and characteristics of work-readiness and they further quantified

them in terms of a scale – the *Work-Readiness Scale (WRS)*. Coetzee's (2014) *Graduate Skills and Attributes Scale (GSAS)* comprised an eight-factor theoretical framework based on Coetzee (2012) which clustered eight graduate skills and attributes into three holistic, overarching attitudinal domains of personal and intellectual development; scholarship, global and moral citizenship; and lifelong learning. Further, based on the findings of Walker et al. (2013) and the 64-item work-readiness scale WRS developed by Caballero et al. (2011), Walker et al (2015) further tested the original WRS and confirmed the theoretical constructs from previous literature (Caballero et al., 2011; Walker et al., 2013) and the validity of the revised WRS-GN (graduate nurse population).

All the above scales have the potential to systematically measure GWR, but they suffer from some limitations. For example, the GSA does not assess the personal attributes and personality traits that may be associated with implementing these generic skills. Coetzee's (2014) GSAS was predominantly limited to black and female early-career participants in the economic and management sciences field in a South African open and distance-learning (ODL) higher education institution. Similarly, Caballero et al.'s (2001) WRS and Walker et al. (2015) WRS-GN samples mainly included graduate engineers and graduate nurses, while Coetzee's (2014) GSAS was predominantly limited to early-career participants in the arts field in a South African open and distance-learning (ODL) higher education institution.

Another salient limitation of the measurement of graduate work-readiness concerns the evaluation of requisite work-readiness competencies by the education stakeholders. Although these stakeholders have actively and continuously engaged in the process of redesigning the course curriculum for different educational streams to implement the competency-based outcome-focused curriculum for preparing work-ready graduates, there is no set of mutually-agreed work-readiness competencies or uniformity in assessing them. Thus, keeping in view this shortcoming, and the inability of the above-mentioned scales to be generalised for other disciplinary fields, educational, student, age, race or gender groups, this research proposes a new scale - the WRICM - based on the resource-based view theory, that can be operationalised in the contexts of different disciplines and different countries or a specific region.

3. The work-readiness integrated competence model (WRICM)

This study conceptualises graduate work-readiness in the context of strategic management theory using the 'resource-based view (RBV)'. It has been posited in earlier research that people are strategically important to firm success, as they are an internal source of competitive advantage (Wright et al, 2001). The human resources of a firm are observed as the pool of human capital under the firm's control in a direct employment relationship (Wright and McWilliams, 1994). Further, the resource-based view suggests that organisations can create competitive advantage by acquiring or developing resources that are rare, valuable, and hard to imitate and replace (Barney, 1991). The Finch et al study (2016), following Barney (1991) and Teece, Pisano and Shuen (1997), extended this notion further and suggested that employability can be viewed as the complex integration and application of five specific resources and dynamic capabilities: namely, intellectual, personality, meta skill, job-specific, and integrated dynamic capabilities. Based on Finch et al.' (2016) categorisation of

employability along the resource-based view, we conceptualise that graduate work-readiness can be defined as an integrated dynamic competence that requires the reconfiguration, synthesis and integration of four resources/dimensions - namely, intellectual, personality, meta skill, job-specific - that needs to be channelled by graduates into a holistic, compelling and personal narrative that appeals to potential employers. We propose this model as a '*Work-readiness integrated competence model (WRICM)*' that may serve as a platform for further research into graduate work-readiness.

Further, the *Work-readiness integrated competence model (WRICM)* is proposed as a multidimensional model comprising four main factors (dimensions) with ten sub-dimensions covering different skills, derived from a review of the literature and based on interviews and focus groups. The main four factors/dimensions are termed as intellectual, personality, meta-skill, job-specific dimensions. This study further suggests that intellectual resources comprise foundation and cognitive skills, and personality resources include innovation and creativity, leadership and self-management skills. In a similar vein, this study views meta-skills as consisting of information technology; team work, political, communication and systems thinking skills; whereas job-resources contain core skills. The following figure (1) shows the conceptualisation of our WRICM. The section after the figure discusses the four main dimensions and sub-dimensions in detail.

Insert Figure 1 here

3.1 Intellectual resources

Intellectual resources are referred to as cognitive skills that are complex, and involve decision-making, problem-solving, reasoning, and knowing how to learn from previous situations (Reid and Anderson, 2012). Earlier research has demonstrated a strong relationship between intellectual resources and employability across a variety of occupations and contexts (Hinchliffe and Jolly, 2011; Scherbaum et al., 2012; Schmidt and Hunter, 2004; Stiwne and Jungert, 2010), thus it appropriately fits as one of the dimensions of GWR.

3.1.1: Foundation skills

Foundation skills is a term that has been described in the extant literature to describe literacy and numeracy as part of a suite of skills linked to employability (Black and Yasukawa, 2010). Most vocational and higher education courses underpin these foundation skills and employers expect graduates to be proficient in these basic skills to participate in modern workplaces and contemporary life (Durrani and Tariq, 2012; SCOTESE, 2012). Foundation skills are necessary for increasing productivity in a highly competitive, globalised economy, and thus it is promoted extensively by governments, industry and skills organisations (Black and Yasukawa, 2015).

3.1.2: Cognitive skills

Given the World Economic Forum's observations (2016) that the highest levels of skills stability between 2015-2020 are likely to be found in the media, entertainment and information sector, whereas a large amount of skills disruption is expected to happen in the banking sector, industry, infrastructure and mobility (World Economic Forum, 2016); it is argued that the future workforce must have the capacity to deal with more cognitive tasks (Frey and Osborne, 2013). Cognitive skills such as critical thinking, problem-solving, decision-making and strategic thinking are the skills that a graduate is required to master in order to establish and sustain competent performance in the complex and unpredictable environment of modern-day workplaces.

3.2 Personality resources

The importance attached to personality traits by employers as an indicator of future performance, contributions and career success (Hogan, Hogan and Roberts, 1996; Wellman, 2010), warrants it to be included as an important dimension of graduate work-readiness.

3.2.1: Innovation and creativity skills

Innovation and creativity skills involve the ability to be original and inventive, and to apply lateral thinking and to re-conceptualise roles in response to changing demands related to success (Evers et al., 1998, p. 121). Extant research has highlighted that creativity and innovation have become increasingly important in the workplace (Casner-Lotto & Barrington, 2006). Thus, a need exists for graduates to have these skills to adapt to constant change situations at modern day workplaces.

3.2.2: Leadership skills

Leadership skills include the ability to motivate others to achieve organisational goals and are widely acknowledged as critical in graduates (Casner-Lotto and Barrington, 2006; CIHE, 2008; Schermerhorn, 2008). Although there is international debate about whether leadership skills can be developed in the classroom (Posner, 2009), it has also been observed in earlier research that stakeholders consider leadership to be a critical skill for graduates to accomplish job performance (Rosenberg et al; 2012).

3.2.3: Self-management skills

Research has demonstrated that graduates with well-developed career self-management skills experience higher levels of subjective and objective career success after graduation (Bridgstock, 2011). Self- management skills have been referred to as the non-technical skills necessary for getting, keeping, and doing well on a job (de Guzmanv and Choi, 2013; Jackson and Chapman, 2012)

3.3 Meta-skills resources

Meta-skills can also be considered as a dimension of graduate work-readiness, as recent research has noted these skills to be important predictors of employability (Canadian Council of Chief Executives, 2014; Economist Intelligence Unit, 2014; Finch et al., 2012).

3.3.1: Information technology (IT) skills

Information Technology (IT) Skills include the ability to select procedures, equipment, and tools to acquire and evaluate data (SCANS, 1991). An increasingly knowledge-intensive industry environment demands graduates who are always at the front of the 'technology innovation curve' (Collet et al., 2015). Moreover, in the wake of a gradual decline in the number of skilled and semi-skilled workers in favor of the specialised workforce that is competent in information technology and informatics (Ghaith, 2010), IT skills have become vital for graduates.

3.3.2: Team work and political skills

Changing models of economic efficiency have placed more emphasis on key skills including teamwork and political skills (Brown, 1999). It is suggested that succeeding in and managing stressful organisational environments, because of the increased social and interpersonal requirements, is at least partially due to the good teamwork and political skills possessed by many executives (Perrewe, 2000; Stevens and Campion, 1994). To work effectively together, graduates must possess specific knowledge, skills, and attitudes (KSAs), such as the skill of monitoring each other's performance, knowledge of their own and teammate's task responsibilities, and a positive disposition toward working in a team (Cannon-Bowers et al., 1995; Sims, Salas, and Burke 2004). Moreover, organisations are often seen as being composed of individuals and groups who pursue their own sometimes incompatible goals, leading to organisational conflict, which is considered inherent and neither 'good' nor 'bad' (Lee and Piper, 1986). Thus, teamwork and conflict-resolution or internal political skills become an important ingredient for a work-ready graduate. Thus, teamwork and political skills become an important ingredient for a work-ready graduate.

3.3.3: Communication skills

Effective communication skills are an extremely important issue for effective organisational behaviour, relationships, and work processes (Conrad and Newberry, 2012). In order to prepare future leaders, educators need to ensure that graduates have the necessary communication skills to begin their career (Lolli, 2013). Moreover, communication skills are ranked as very important by the overwhelming majority of employers in the recruitment, job success and promotion of graduates (McMurray et al, 2016).

3.3.4: System thinking skills

Systems thinking skills include the ability to understand and operate within social, organisational, and technological systems (Rosenberg et al., 2012). These skills involve designing and suggesting modifications to systems and explaining the interaction of systems in the context of the global economy (Senge, 2000). These skills are reflections of graduates' system-thinking ability in seeing the "world view" or to be able to see things holistically and as interconnected (Maani and Maharaj, 2004). Hence, system-thinking skills can be categorised as an intermediate work-readiness asset for graduates.

3.4 Job specific resources

Lastly, the inclusion of job-specific resources as an important dimension of this model is based on the fact that employers have indicated in previous research that the graduates must possess the minimum proficiencies required to perform a specific role (Bhaerman and Spill 1988, cited in Finch et al, 2016).

3.4.1: Core business skills

The term 'core business skills' is used to describe the transferable skills which underpin competent performance in all fields (Gibbons-Wood and Lange, 2000). In our study 'core business skills' is used encapsulate the essential practical skills of a business in which the graduate intends to find an employment. Considering the employment needs of graduates, encapsulated in the core business skills of a specific industry, this becomes an important attribute of graduate work-readiness.

4. Scale development

This study employed a rigorous approach using both quantitative and qualitative methodology; and further, through factor loadings, construct reliability, average variance extracted, and correlation matrix, the scale was developed. To ensure a strong conceptual framework and ensuing scale, this research followed a three-pronged approach. This comprised a review of the literature (to generate an initial pool of items), semi-structured interviews and focus groups. All the respondents (from seven countries) used for generating the initial items were purposively selected based on their awareness of graduate work-readiness issues, and on the basis of their position and experience in academia, industry and government. This ensured that the list of chosen items/competencies was robust enough and represented the true work-readiness dimensions needed by the employers.

4.1 Item generation

The first phase comprised the generation of items as per Churchill (1979), based on an extensive review of the literature concerning work-readiness studies from 2006-2016. Five research databases, namely, ProQuest, Informit, Emerald journals, together with internet resources (Google and Google Scholar), were searched for publications related to work-readiness. The terms, 'work-readiness competencies', 'graduate competencies', 'work-ready graduates' and 'work-readiness skills' were searched for to ensure coverage of relevant studies. Only those studies that focused on the work-readiness/employability or unemployability of graduates were used for finding skills associated with work-readiness.

The second phase comprised conducting semi-structured interviews and focus group discussions in Australia during March and April 2016, to reveal the specific work-readiness skills deemed necessary for entering the workforce. In total, nineteen participants were purposively sampled from academia (higher and vocational education), employers/industry, policy-makers and graduates from Australian universities. There were seven individual interviewees (four from Sydney and three from Perth), and twelve participants who participated in focus group discussions in Melbourne, Australia. The participants were selected on the basis of their position and experience in academia, industry and government. All interviews and

focus groups were recorded and transcribed, analysed, and converted into items. Based on these two phases more than 100 items were short-listed for graduate work-readiness skills.

Further extensive thematic analysis was conducted by using an iterative process that involved moving between the different items, and an emerging structure of corresponding themes following three key steps (Locke, 2001; Miles and Huberman, 1999). In the first step, provisional categories and first-order codes were developed via open coding (Locke, 2001). As theoretical categories were created, data were checked to determine whether the codes fitted the emerging abstractions. Where this was not apparent the 'discrepant data' was reviewed and categories were revised accordingly. This process was continued until all authors agreed on the thematic categorisation. The second step involved refining the first order categories/codes, that allowed for the identification of the second order themes that were non-overlapping (Gioia and Thomas, 1996). The second order themes were created based on existing literature around similar ideas, issues or observations on graduate work-readiness skills/competencies. Lastly, to provide a coherent picture, all the second order items were merged into ten aggregated competencies.

In the final third phase, the conceptualisation of the WRICM model with probable alignment of 100 short-listed skills/items along the ten sub-dimensions of the model, was presented in a workshop of regional researchers in Vietnam in 2016. The workshop comprised graduate work-readiness stakeholder participants from seven countries (namely, Australia, India, Vietnam, Singapore, Malaysia, Indonesia and Taiwan). Based on the stakeholders' discussion and expert comments, a total of 93 items was shortlisted and aligned with the ten sub-dimensions of the WRICM model.

4.2 Questionnaire formulation and content validity

The objective of this step was to formulate a questionnaire and ensure its content validity. In total, 93 graduate work-readiness skills items (GWRS) were shortlisted based on the above-mentioned phases. A review of these final items shortlisted under the ten sub-dimensions was undertaken to avoid redundancy among items as well as exceptionally lengthy items, multiple negatives, double-barrelled items, colloquialisms, and jargon (DeVellis, 2016). This process resulted in retaining a total of 77 items and these items were subsequently transformed into statements in the form of a questionnaire. All items were coded on a seven-point Likert scale ranging from strongly disagree (1) to strongly agree (7). The survey was pilot tested with ten experts from industry, academia and government to validate the instrument. For best possible results, due care was taken to select experts who were well placed to provide expert commentary on the current state of graduates. Theyj were required to comment on the meaningfulness, relevance, and clarity of the scales. Based on the experts' observation various statements in the questionnaire were refined and improved to accurately address a work-readiness skill.

4.3 Item purification, reliability and validity assessment

To determine the factor structure of GWRS items and purify the measurement tool, this research collected data from 362 HR executives/middle level management executives with the

help of research partners from respective country partners in the seven countries (Australia, India, Vietnam, Singapore, Malaysia, Indonesia and Taiwan). Table 1 shows the demographic information of the 362 responses generated:

Insert Table1 here

Further, the factorability of each data set was established by examining the correlation matrix, the Kaiser-Meyer-Olkin measure of sampling adequacy, and the Bartlett test of sphericity (Coakes, 2013). The Kaiser Meyer-Olkin measure verified the sampling adequacy for the analysis, KMO = .822, which was well above the acceptable limit of .5 (Field, 2013). The Bartlett test of sphericity tests the null hypothesis to check that the original correlation matrix is an identity matrix. Although the sample size was smaller, it was still found to be significant (<0.001). This proved that the data set was suitable for factor analysis.

In order to transform the graduate work readiness skills (GWRS) items into linear components, and to extract a small number of latent variables (factors) from many observed variables (77-GRWS items), *Principal component analysis (PCA)* with varimax rotation was conducted using IBM SPSS 20. PCA serves well for minimising correlation across factors and maximising within the factors (Hair et al. 1998). Thirteen factors were extracted as per the MINEIGEN criterion, which means that the eigenvalues of all the factors should be greater than 1. Further, output was examined for communality score for 77 items and the items that had less than .50 communality score were eliminated. A total of seven items were removed. Factor analysis was conducted on the remaining items. The resultant factor loadings were examined for low factor loading and high cross loadings. Items with factor loading < .50 were removed, and items loading on more than one factor were supposed to have a difference loading of at least .20 to be considered distinctive. The choice regarding factor loadings of greater than ±0.5 was not based on any mathematical proposition but related more to practical significance (Abdullah, 2006). As per Hair et al. (2006, p. 152), factor loadings of 0.5 and above were considered significant at P = 0.05 with a sample size of 120 respondents (n = 362 in this study). Items were included in the factor with the highest loading only if the items were distinctive (Hair et al., 1998), otherwise variables were removed from the subsequent analysis. The series of exploratory factor analysis were conducted until there were no items left with ambiguous loadings. The final analysis resulted in a ten-factor solution, accounting for 70.784% of the

variance shared among the remaining 53 items (See Appendix 1). Table 2 summarises the ten-factor solution along with loadings and uniqueness of the items that measure each factor.

Insert Table 2 here

4.4 Dimension and reliability

To validate the dimensionality of the WRICM, this study performed confirmatory factor analysis using IBM Amos 20. The results confirm the dimensionality of the 53-item, ten-dimension scale (CMIN = 3069.387), relative chi-square (CMIN/df = 2.40), root mean square error of approximation (RMSEA = 0.06), and comparative fit index (CFI = 0.86). Further, the validity and reliability were examined to check the psychometric properties of the individual constructs (DeVellis, 2016; Reise et al., 2000). The reliability of each scale was assessed by calculating Cronbach alpha composite reliability and average variance extracted. Reliability analysis revealed that the overall scale had good internal consistency, with a Cronbach alpha value of .770. The ten factors had good internal consistency with a Cronbach alpha value between .86-.94. All constructs surpass the critical levels of 0.70 and 0.50 for composite reliability and AVE respectively (See Table 3).

4.5 Construct Validity

All factor loadings were statistically significant and were greater than.7, indicating convergent validity. Discriminant Validity is attained if the square root of average variance extracted for each factor is greater than the correlation between that construct and other constructs in the model (Chau, 1997; Fornell and Larcker, 1981). This study satisfied this criterion.

Insert Table 3 here

5. Discussion

The objective of this study was to develop a theory-based model for graduate work-readiness and a scale to measure it. To achieve this objective, the study extended and refined the theoretical framework of Finch et al. (2016) and developed the WRICM. The proposed WRICM comprised four main dimensions: intellectual, personality, meta- skill and job-specific. These dimensions were further categorised into ten sub-dimensions comprising multiple work-readiness skills based on an extensive review of the literature together with the interviews and focus group discussions. The intellectual dimension includes foundation and cognitive skills; personality resources involved innovation and creativity, leadership and self-management skills; meta-skills consists of information technology, team work and political, communication and systems thinking skills; whereas job-resources contains core business skills. A series of tests suggests that the scale exhibits internal consistency, reliability and construct validity. Overall the WRICM scale appears to be conceptually sound and psychometrically valid.

This investigation explored the multi-dimensional nature of graduate work-readiness and proposes it as an integrated dynamic competence that requires the reconfiguration, synthesis and integration of four dimensions - namely, intellectual, personality, meta-skill and job-specific - that need to be channelled by graduates into a holistic, compelling and personal narrative that appeals to potential employers. The WRICM proposed in this study overcomes two of the key limitations of previous work-readiness models, namely the absence of a multi-dimensional model based on sound theoretical underpinnings, and the observed disparities regarding the stakeholders of graduate work-readiness across different competencies mentioned in the literature. Firstly, it is based on the resource-based view of strategic management theory; and secondly, its ten sub-dimensions situated under four main dimensions outline the 53 most important reported skills/competencies that are required by graduates to be work-ready. This model has the potential to assess the work-readiness of graduates across different nationalities, as it has been framed based on inputs form seven country stakeholders, although cross-cultural validation might be necessary to establish its currency.

6. Implications

The WRICM has implications for education, industry, professional associations, policy-makers and for graduates themselves. The refinement of existing work-ready skills in the literature through qualitative methodology, and further development of the WRICM and the associated WRICM scale has the potential to guide practitioners, and rule out existing variations in how the competencies/skills that produce work-ready graduates are envisaged by administrators, taught by teaching staff, and understood by graduates (Barrie 2006; Curzon-Hobson 2004; Green, Hammer, and Star 2009; Tymon 2011). These stakeholders can further adapt the scale in assessing the work-readiness of graduates in different disciplines and educational streams. Given that the WRICM serves as a diagnostic tool at different levels of analysis, graduate work-readiness can be assessed at the third order, second order and first order levels. The use of WRICM-based course curriculum and subsequent assessment of graduates at different levels through performance-based assessment has the capacity to identify competence levels and

deficiencies. The assessment of WRICM-based competencies (i.e. personality, intellectual, meta-skills or job–specific) at different levels of education can encourage its stakeholders to review courses including the review of salient competency outcomes and interactive learning strategies, and can help in establishing solid competency performance assessments and other evaluations. Moreover, employers can identify the work-readiness of graduates at entry levels with the help of WRICM-based assessment, and if needed they can design specialised skills training programs for improving GWR.

7. Limitations and conclusion

There are number of limitations of this study which are relevant for future research. The first limitation of this research pertains to the fact that the WRICM is supported by a solid literature review and qualitative methodology, but the development of the WRICM scale is based largely on the perspectives of industry/employers. The authors recognise that the development of a graduate work-readiness measurement scale will be useful for GWR stakeholders, but understand that further assessment instruments based on the ten competencies of WRICM accompanied by actual work performance situations will be needed in order to validate its practical value. Further research in exploring the options for developing sound performance-based methods for assessing the requisite competencies of WRICM is necessary for more concrete assessment of the work-readiness of graduates.

Placing graduates in different performance situations pertaining to each competency of WRICM, at different levels (pre-graduation and post-employment) will ensure the effectiveness of the proposed model. However, it should be noted that both educational and industry stakeholders will need to enhance their capacity-building processes so as to accurately assess the graduates' requisite competencies in practical performance situations. Another possible limitation stems from the fact that graduate competencies in this research have been measured based on the perceptions of the HR executives/middle level executives. The development of an appropriate assessment instrument based on actual work performance situations reflecting the WRICM competencies can overcome this limitation.

Future research should concentrate on a more comprehensive scale that includes the perspectives of all concerned stakeholders of graduate work-readiness (for example, educators, policy-makers, graduates and even parents in some cases). Secondly, future studies might consider developing this scale based on specific industries to measure graduate work-readiness levels more accurately in different disciplines and workplace contexts.To conclude, graduate work-readiness is a crucial factor in facilitating the transition of graduates from education to work. This study offers a refined, focused, and theoretically-sound multi-dimensional graduate work-readiness model that offers researchers and practitioners a solid foundation upon which further studies can be based. The study also presents a conceptually sound and psychometrically valid WRICM scale.

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Figure 1: Work-readiness integrated competence model (WRICM)

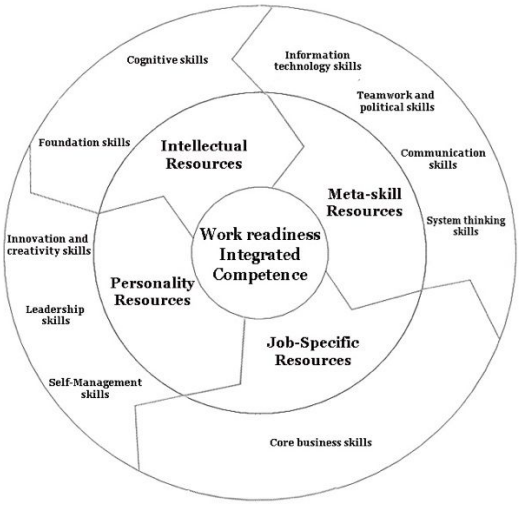

Table1: Demographic information

No. of respondents (Country wise)			Nature of respondents' organisation		
Country	**Number**	**Percentages**	Public	58	16%
Australia	52	14.33	Private	274	76%
India	56	15.43	Multi-Nationals	30	8%
Indonesia	50	13.77		**362**	
Malaysia	51	14.05	**Experience of respondents**		
Singapore	52	14.33	0-5 Years	84	23%
Taiwan	50	13.77	5-10 Years	213	59%
Vietnam	51	14.05	10-15 Years	42	12%
			15 and Above	23	6%
	362	**99.72452**		**362**	

Table 2: Factor loadings and communalities

Rotated Component Matrix											
Variable	Component										
	1	2	3	4	5	6	7	8	9	10	Communalities
CBS_2	0.815										0.722
CBS_1	0.814										0.700
CBS_4	0.802										0.662
CBS_6	0.796										0.666
CBS_10	0.791										0.668
CBS_3	0.781										0.663
CBS_7	0.781										0.662
CBS_8	0.780										0.665
CBS_5	0.755										0.612
CBS_9	0.735										0.632
CS_2		0.866									0.780
CS_1		0.860									0.787
CS_3		0.836									0.749
CS_4		0.795									0.659
CS_5		0.776									0.625
CS_6		0.759									0.667
CS_8		0.747									0.600
CS_7		0.743									0.596
CS_9		0.678									0.527
ICS_1			0.906								0.878
ICS_3			0.885								0.838
ICS_2			0.871								0.779
ICS_4			0.867								0.799
ICS_5			0.849								0.781
SMS_3				0.810							0.679
SMS_1				0.792							0.662
SMS_5				0.787							0.645
SMS_9				0.782							0.643
SMS_4				0.708							0.551
SMS_7				0.688							0.503
LS_1					0.849						0.761
LS_2					0.837						0.764
LS_4					0.788						0.753
LS_3					0.781						0.677
LS_5					0.686						0.519
STS_3						0.886					0.797
STS_1						0.866					0.780

STS_2						0.853					0.776
STS_4						0.850					0.775
TPS_4							0.881				0.832
TPS_2							0.837				0.744
TPS_5							0.803				0.682
TPS_6							0.786				0.657
CMS_1								0.810			0.813
CMS_2								0.809			0.768
CMS_3								0.768			0.729
CMS_4								0.717			0.641
ITS_1									0.906		0.834
ITS_2									0.861		0.771
ITS_3									0.853		0.813
FS_1										0.866	0.811
FS_2										0.847	0.757
FS_3										0.811	0.724
Eigenvalues	8.653	6.574	4.206	3.889	3.334	2.508	2.420	2.264	1.988	1.740	
% age of variance	13.076	10.986	7.779	6.850	6.497	5.966	5.485	5.107	4.825	4.329	
Extraction Method: Principal Component Analysis. Rotation Method: Varimax with Kaiser Normalization.											

Table 3: Measurement Model: Construct Reliability, Average Variance Extracted, and Correlation Matrix

Construct	No. of Items	Cronbach	CR	AVE	CBS	CC	SM	TPS	IC	STS	GC	ITS	FS	LA
Foundation skills	3	0.833	0.841	0.640	**0.800**									
Core business skills	10	0.939	0.939	0.608	-0.312	**0.780**								
Cognitive skills	9	0.925	0.926	0.584	0.126	-0.070	**0.765**							
Self-management skills	6	0.860	0.861	0.511	0.003	-0.032	-0.099	**0.715**						
Innovation & creativity	5	0.940	0.940	0.758	0.127	-0.067	0.290	-0.081	**0.871**					
System thinking skills	4	0.90	0.900	0.693	-0.130	0.146	0.073	-0.055	0.034	**0.833**				
Teamwork & political skills	4	0.864	0.867	0.624	-0.001	0.089	-0.077	-0.246	0.079	0.139	**0.790**			
Communication skills	4	0.862	0.864	0.615	0.092	-0.525	0.154	0.086	0.083	0.004	-0.128	**0.784**		
Information Technology Skills	3	0.876	0.876	0.702	0.007	0.054	0.035	0.016	0.222	0.205	0.033	0.043	**0.838**	
Leadership skills	5	0.876	0.878	0.593	0.169	-0.360	0.122	-0.067	-0.071	-0.163	-0.127	0.178	-0.211	**0.770**

*Value on the diagonal of the correlation matrix is the square root of AVE.
CR=Construct Reliability
AVE= Average Variance Extracted.

Appendix 1: Final skills list/items and statements for WRICM

Dimensions	Sub-dimensions	S No.	Code	Skills list/items	Statements
Job-specific	*Core business skills*	1	CBS_10	Working under pressure	Ability to cope up with work pressure
		2	CBS_1	Commercial awareness	Understating of the industry (in which graduates intend to work)
		3	CBS_2	Organisational awareness	Understanding of people-organization relationship, and the social systems that exist and develop in an organisation
		4	CBS_3	Knowledge of industry operations/prior exposure	Prior understanding/awareness of nature of industry
		5	CBS_4	Adaptability	Ability to change or be changed to fit or work better in different situations
		6	CBS_5	Attitude/Aptitude	Tendency to respond positively towards a certain idea/situation
		7	CBS_6	Management skills	Ability to manage, inspire, motivate and engage
		8	CBS_7	Professional ethics	Ability to demonstrate corporate standards of behavior
		9	CBS_8	Multi-tasking	Ability to perform more than one task/activity over a short period
		10	CBS_9	Goal/Task Management	Capacity of successfully managing a goal/task through its life cycle
Meta-skills	*Communication skills*	11	CMS_1	Written communication	Ability to write clearly, concisely, accurately and logically
		12	CMS_2	Verbal communication	Proficiency in face-to-face conversations, telephone conversations, ability to participate and give presentations
		13	CMS_3	Language skills	Ability to understand and make the most effective use pf language
		14	CMS_4	Giving and receiving feedback	Capacity to provide useful information to other people and receiving information that will help to learn more effectively
	Information technology skills	15	ITS_1	ICT literacy	Ability to use digital technology, communication tools, and/or networks to define access, manage, integrate, evaluate and create value
		16	ITS_2	Ethical issues surrounding the use of technology	Ability to use digital technology ethically and legally to function in a knowledge organisation
		17	ITS_3	IT hardware knowledge	Knowledge about general networking, operating systems, new hardware, web based technologies and wireless technology
	System thinking skills	18	STS_1	Big picture	Ability to view a broad, overall view or perspective of an issue or problem
		19	STS_2	Out of the box thinking	Ability to think differently, unconventionally, or from a new perspective.
		20	STS_3	Socio-technical system awareness	Awareness of both social and technical aspects of a system

		21	STS_4	Social/Psychological outcomes	Understanding that work systems produce both physical products/services and social/psychological outcomes
	Team work and political skills	22	TPS_2	People/Interpersonal skills	Ability to moderate responses, empathizing, building relationships of and productive interactions
		23	TPS_4	Social skills/intelligence	Able to network and get along well with others
		24	TPS_5	Negotiating/Conflict resolution skills	Ability to compromise or agreement while avoiding argument and dispute
		25	TPS_6	Emotional intelligence	Capacity to be aware of, control, and express one's emotions, and to handle interpersonal relationships judiciously and empathetically
Intellectual	*Cognitive skills*	26	CS_1	Problem-solving	Using generic or ad hoc methods, in an orderly manner, for finding solutions to problems
		27	CS_2	Critical thinking	Skillfully in conceptualising, applying, analysing, synthesizing evaluating information gathered from, or generated by, observation, experience, reflection, reasoning, or communication, as a guide to belief and action
		28	CS_3	Analytical abilities	Ability to visualise, articulate, conceptualise or solve both complex and uncomplicated problems by making decisions that are sensible given the available information
		29	CS_4	Decision-making skills	Ability to make a good decision based on weighing the positives and negatives of each options/alternatives
		30	CS_5	Learning skills	Ability to use language, numbers, images and other means to understand and use the dominant symbol systems of an organisation
		31	CS_6	Evaluation skills	Skills to make critical judgement and coming to reasoned conclusions based on available evidence
		32	CS_7	Convergent reasoning	Ability to find a single best solution to a problem
		33	CS_8	Diagnosing capabilities	Knowledge and experience required in identifying and understanding cause-and-effect relationships between symptoms and their underlying sources
		34	CS_9	Lateral thinking	Solving problems through an indirect and creative approach, using reasoning that is not immediately obvious and involving ideas that may not be obtainable by using only traditional step-by-step logic
	Foundation skills	35	FS_1	Numeracy	Ability to reason and to apply simple numerical concepts
		36	FS_2	Literacy	Ability to access, understand, analyse and evaluate information, make meaning, express thoughts and emotions, present ideas and opinions
		37	FS_3	Formal qualifications	Basic qualifications necessary for an employment
Personality	*Innovative & creativity skills*	38	ICS_1	Innovative & creativeness	Ability to use imagination or original ideas to produce something new for organisation
		39	ICS_2	Enterprising	Ability to show initiative and resourcefulness for accomplishing different tasks/activities
		40	ICS_3	Change management	Ability to accept, adapt and sustain change quickly

		41	ICS_4	Willingness to learn new things	Always ready to learn, grasp new approach/ways of doing things
		42	ICS_5	Idea generation	Ability of creating, developing, and communicating ideas which are abstract, concrete, or visual
	Leadership skills	43	LS_1	Logical thinker	Ability to clearly move from one thought/idea to another
		44	LS_2	Visionary	Ability to envision and plan for future
		45	LS_3	Influencing others	Ability to change minds, shape opinions and move others to act
		46	LS_4	Relationship management	Ability to supervise and maintain relationships in internal organisation as well as with external stakeholders
		47	LS_5	Initiative	Ability to assess and initiate things independently
	Self-management skills	48	SMS_1	Personal presentation	Ability to convey a positive image to organisation members and to the stakeholders
		49	SMS_3	Positive self-esteem	Ability to portray a healthy self-esteem and notion of high self-value
		50	SMS_4	Self-motivation	Ability to do what needs to be done without influence from other people or situations
		51	SMS_5	Self-confidence	A sense of belief or trust in own ability
		52	SMS_7	Time-management	Ability to exercise conscious control of **time** spent on specific activities, especially to increase effectiveness, efficiency or productivity
		53	SMS_9	Self-regulation	Ability to monitor and control own behaviour, emotions, or thoughts, and altering them in accordance with the demands of the situation