A Technical Competencies Inventory of select Technology Management and Business Administration Students in Higher Education Institution in Metro Manila, Philippines

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Abstract: *The underlying success of the country's workforce, companies and organizations heavily rely on employee competencies. This paper will presents the Technical Competencies inventory of selected university students under the College of Technology Management and the College of Business and Financial Science of a local university in the Philippines using the Hudson Performance Driver Model. The researchers utilized a Quantitative Descriptive research design. On the basis of the results of the study, it can be gleaned that in the 5-tiers of the competencies, most of the respondents are competent on the Industry- Sector tier, however, on the other areas and tiers of the competencies, it can be concluded that the respondents are not competent. The researchers recommend that the curricular changes and redesign should be done to address the competencies needed as essentials skills in the workplace, and would help our graduates a successful mainstay in their employers. Other studies are recommended with focus on the areas of the 5-tiers to carefully investigate the bottlenecks in the curriculum and learning environment.*

Keywords: *automation, competencies, Industry 4.0, Industry-Sector Technical Competencies, Industry-Wide Technical Competencies, technical competencies*

I.   Introduction

In today's corporate and industrialized world, the ramification of the Internet of Things, and proliferation of Industry 4.0 has reshaped the ways of doing things, and how the corporate and technical world demands. According to the study [1], the industrial modifications as part of economic reforms have become highly mechanized and automated. In the works of [2], they have exemplified the recent advances in the corporate and manufacturing industries have deployed systems which paved the way to competitive advantages and market positions [22]. With the inception of Industry 4.0, the systemically deployment of Cyber-Physical Systems (CPS) has been adopted by companies in the developed and developing economies in the world.

In this milieu of Industry 4.0, the cyber-physical systems demystified the industrial activities and enabled collaborative communities [3, 15, 22]. These communities have provided service innovations and shared best practices to continually survived in the most challenging and competitive global business environment [4, 16]. The global and developing economies are constrained to the fact that academia has a pivotal role in developing the competitive talents of this age [26], and that fundamentally, Industry 4.0 should be primarily tackled and instituted in the colleges and universities which produces technically and technologically competent professionals [5, 16, 23].

The graduates' job-ready skills are heavily associated with the curriculum and university learning experience. The graduates' practical exposure to a challenging business environment and workspaces and the company culture are among the particular interest of talent acquisitions specialists, and recruitment teams [6, 26, 27]. Technical and technological competencies of graduates are amongst the primary requisites in the workspaces. Technical and technological competencies are even more than the demands, but the organizational factor to be considered to maintain the companies' successes [7, 18, 23] as well as the employees' performance driver.

Technical and technological competencies refer to a skill or area of knowledge used in the occupations of a specific industry. In the work of [10, 19], a competency framework was defined as a set of knowledge, skills, and behaviors that professionals must have to excel in their careers while [8] has identified the technical and technological competencies in the universities and colleges to allow an effort to refocus the curricular changes when deemed needed. The work of [9, 19, 23, 24] has also exemplified how to turndown attrition rates when there is lower job skills mismatch.

Because of job skills mismatch, unemployment has remained high in the Philippines [11, 20] because of job-skills mismatch, at almost twice the level of neighboring countries, this is despite the fact that there has been relatively fast employment growth in the past decade. The underemployment in the country is the most important problem that needs to be addressed by the government, and by its industrial sector [12, 20, 21]. The higher the underemployment, the higher its poses risks and indicates that the national economy is weak, hence its country's economy weaknesses can also be attributed to underemployment rates [13, 23, 25]. Researches have shown that the obsolence of the curriculum and the poor learning environment are the factors as to why job mismatch is prevalent in the Philippines and in the world.

II.   Background of the Study

The underlying success of the country's workforce, companies and organizations heavily relies on the employees. This paper will present the Technical and Technological Competencies inventory of selected university students under the College of Technology Management and the College of Business and Financial Science of a local university in the Philippines. In this study, the Hudson Performance Driver Model was utilized. This model provides the company's Talent Acquisitions team with a comprehensive analysis of their applicant's strengths and suitability around the roles they will be working with when they joined the company [15, 21, 22]. The model utilized data-driven and best practice talent profiling and assessment techniques, our solutions minimize the risk in hiring decisions and ensure you select high performers who will stay and grow [15, 20, 22, 24].
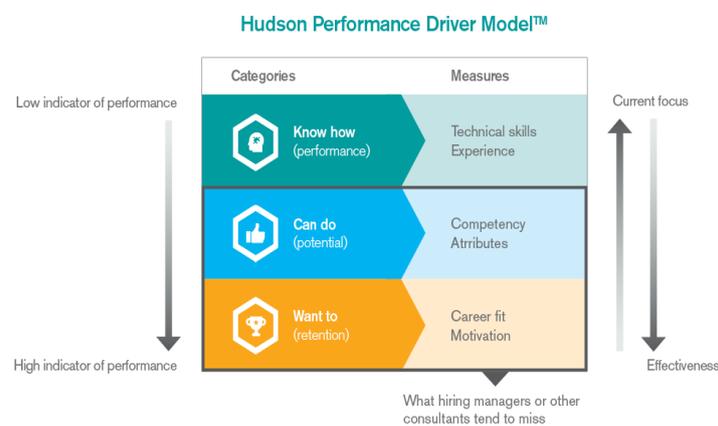
Fig 1. Hudson Performance Driver Model [15]

This model as described in Figure 1 also provides the opportunity for the recruitment teams to uncover the applicants technical and technological skills including the essentials skills needed for a successful placement and mainstay in the company which includes the Industry-Sector Technical Competencies, Industry-Wide Technical Competencies, Workplace Competencies, Academic Competencies, Personal Effectiveness Competencies. It will also allow looking at the following: What will they bring to my existing team? Is the candidate a strong fit for the role? How quickly will they get up to speed? How can I best manage them?
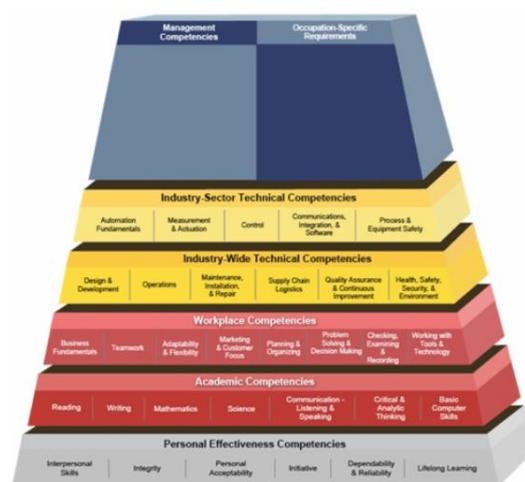
Fig 2. Technical Competency Model [16]

The model described in Figure 2 has a five-tier level which includes the Industry-Sector Technical Competencies, Industry-Wide Technical Competencies, Workplace Competencies, Academic Competencies, and Personal Effectiveness Competencies. It's the upper technical, industry-specific tiers, 4 and 5 which elevate a competency model to the status of a technical competency model [16]. This kind of model can be implemented as collective best practices of government and private companies in the world.

III. Methodology

The researchers utilized a Quantitative Research Design using Descriptive Statistics. An online researcher-designed survey questionnaire was utilized and floated online using the Online Survey Tool "SurveyMonkey" during the School Year 2018- 2019 to more than 150 college students in the College of Technology Management and College of Business and Financial Sciences. The Survey Questionnaire was designed to gather the students' level of competencies on the following areas: Industry-Sector Technical Competencies, Industry-Wide Technical Competencies, Workplace Competencies, Academic Competencies, and Personal Effectiveness Competencies [16] with 5-point Likert items with 5 being Highly-Competent and 1 as Not Competent. One hundred online responses were gathered and statistically treated using the Weighted Mean.

IV. Results and Discussion

The following subsections present the results of the competency inventory understudy.

A. The Respondents Demographic Profile

Based on the analysis of the data gathered, 45% of the respondents are Male, and 55% are Female as described in Table 1, and Figure 3.

Table 1. The Distribution of the Respondents According to Gender

Gender	No. Respondents	Percentage
Male	45	45%
Female	55	55%
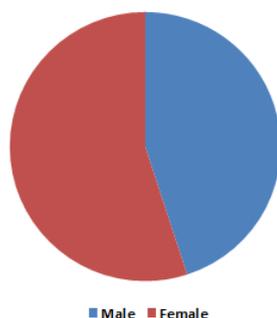
Fig 3. The Distribution of the Respondents According to Gender.

On the basis of the data gathered, 25% of the respondents were coming from the College of Technology Management, and 75% of the respondents were coming from the College of Business and Financial Sciences.

Table 2. The Distribution of the Respondents According to College

College	No. Respondents	Percentage
CTM	25	25%
CBFS	75	75%
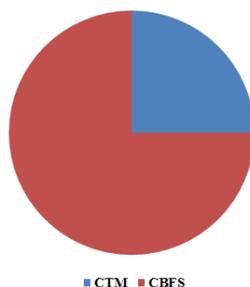
Fig 4. The Distribution of the Respondents According to College

B. Industry-Sector Technical Competencies

This Industry-Sector Technical Competencies inventory includes the Automation Fundamentals, Management and Actuation, Control, Communications, Integration and Software, and Process and Equipment Safety. Based on the results, the respondents from the College of Technology Management are competent, and only few are highly competent as shown in Table 3.

Table 3. The Industry-Sector Technical Competencies of the respondents from the College of Technology Management

Industry-Sector Technical Competencies	College of Technology Management					Total
	5	4	3	2	1	
Automation Fundamentals	3	5	12	2	3	25
Management and Actuation	2	2	12	5	4	25
Control	3	4	15	1	2	25
Communications, Integration and Software	3	5	10	6	1	25
Process and Equipment Safety	6	6	9	1	3	25

On the other hand, the respondents from the College of Business and Financial Science have a high number of highly competent in the Industry-Sector Technical Competencies as presented in Table 4.

Table 4. The Industry-Sector Technical Competencies of the respondents from theCollege of Business and Financial Science

Industry-Sector Technical Competencies	College of Business and Financial Science					Total
	5	4	3	2	1	
Automation Fundamentals	4	12	30	25	4	75
Management and Actuation	15	15	11	20	14	75
Control	13	20	15	20	7	75
Communications, Integration and Software	20	20	22	5	8	75
Process and Equipment Safety	9	28	25	10	3	75

C. Industry-Wide Technical Competencies

The Industry-Wide Technical Competencies tier includes the Design and Development, Operation, Maintenance, Installation and Repair, Supply Chain Logistics, Quality Assurance and Continuous Improvement, and Health, Safety, Security and Environment. Based on Table 5 and Table 6, most of the respondents are Competent, but some of the respondents are not competent in which this competencies are the core of the future works and requisites in their future workspaces.

Table 5. The Industry-Wide Technical Competenciesof the respondents from the College of Technology Management

Industry-Wide Technical Competencies	College of Technology Management					Total
	5	4	3	2	1	
Design and Development	4	3	12	3	3	25
Operation	5	4	10	2	4	25
Maintenance, Installation and Repair	12	10	3	0	0	25
Supply Chain Logistics	3	4	12	2	4	25
Quality Assurance and Continuous Improvement	3	3	12	2	5	25
Health, Safety, Security and Environment	15	3	4	1	2	25

Table 6. The Industry-Wide Technical Competenciesof the respondents from the College of Business and Financial Science

Industry-Wide Technical Competencies	College of Business and Financial Science					Total
	5	4	3	2	1	
Design and Development	20	10	30	5	10	75
Operation	15	12	12	23	13	75
Maintenance, Installation and Repair	11	15	17	19	13	75
Supply Chain Logistics	40	30	5	0	0	75
Quality Assurance and Continuous Improvement	35	30	8	1	1	75
Health, Safety, Security and Environment	34	23	15	3	0	75

D. Workplace Competencies

Another competencies tier under inventory is the Workplace Competencies. It includes the Business Fundamentals, Teamwork, Adaptability and Flexibility, Marketing and Customer Focus, Planning and Organizing, Problem Solving and Decision Making, Checking, Examining and Recording, and Working with

Tools and Technology. Table 7 and Table show that most of the respondents are Highly Competent and Competent.

Table 7. The Workplace Competenciesof the respondents from the College of Technology Management

Workplace Competencies	College of Technology Management					Total
	5	4	3	2	1	
Business Fundamentals	1	2	5	10	7	25
Teamwork	10	12	1	2	0	25
Adaptability and Flexibility	15	9	1	0	0	25
Marketing and Customer Focus	1	3	15	3	3	25
Planning and Organizing	2	3	5	7	8	25
Problem Solving and Decision Making	7	8	7	3	0	25
Checking, Examining and Recording	15	8	2	0	0	25
Working with Tools and Technology	17	5	3	0	0	25

Table 8. The Workplace Competencies of the respondents from the College of Business and Financial Science

Workplace Competencies	College of Business and Financial Science					Total
	5	4	3	2	1	
Business Fundamentals	40	30	5	0	0	75
Teamwork	35	30	7	3	0	75
Adaptability and Flexibility	40	25	9	1	0	75
Marketing and Customer Focus	55	9	9	2	0	75
Planning and Organizing	40	32	3	0	0	75
Problem Solving and Decision Making	20	20	25	9	1	75
Checking, Examining and Recording	36	2	20	9	8	75
Working with Tools and Technology	45	12	12	4	2	75

E. Academic Competencies

The Academic Competencies tier inventory includes the Reading, Writing, Mathematics, Science, Communication, Listening and Speaking, Critical and Analytic Thinking, Basic Computer Skills. Based on the study, the respondents are not competent as described in Table 9 and Table 10; although the program offered in the colleges of the respondents is not language specific, the academic competencies are heavily needed to succeed in their future employment.

Table 9. The Academic Competencies of the respondents from the College of Technology Management

Academic Competencies	College of Technology Management					Total
	5	4	3	2	1	
Reading	0	0	5	10	10	25
Writing	0	0	15	9	1	25
Mathematics	0	0	0	15	10	25
Science	0	0	0	20	5	25
Communication	0	0	0	15	10	25
Listening and Speaking	0	0	0	18	7	25
Critical and Analytic Thinking	0	0	3	12	10	25
Basic Computer Skills	1	5	7	12	0	25

Table 10. The Academic Competencies of the respondents from the College of Business and Financial Science

Academic Competencies	College of Business and Financial Science					Total
	5	4	3	2	1	
Reading	0	1	55	10	9	75
Writing	0	10	45	11	9	75
Mathematics	0	15	35	20	5	75
Science	0	0	50	15	10	75
Communication	0	5	50	20	0	75
Listening and Speaking	0	0	55	12	8	75
Critical and Analytic Thinking	0	0	64	8	3	75
Basic Computer Skills	5	14	50	4	2	75

F. Personal Effectiveness Competencies

The Personal Effectiveness Competencies tier inventory includes the Interpersonal Skills, Integrity, Personal Acceptability, Initiative, Dependability and Reliability, and Lifelong Learning. Based on the study, the respondents from the College of Business and Financial Science are highly competent in the Personal Effectiveness Competencies as shown in Table 12.

Table 11. The Personal Effectiveness Competenciesof the respondents from the College of Technology Management

Personal Effectiveness Competencies	College of Technology Management					Total
	5	4	3	2	1	
Interpersonal Skills	0	0	15	9	1	25
Integrity	10	15	0	0	0	25
Personal Acceptability	5	5	10	4	1	25
Initiative	5	5	15	0	0	25
Dependability and Reliability	6	4	12	0	3	25
Lifelong Learning	0	0	19	4	2	25

Table 12. The Personal Effectiveness Competencies of the respondents from the College of Business and Financial Science

Personal Effectiveness Competencies	College of Business and Financial Science					Total
	5	4	3	2	1	
Interpersonal Skills	50	10	15	0	0	75
Integrity	59	7	9	0	0	75
Personal Acceptability	0	0	15	50	10	75
Initiative	45	13	10	7	0	75
Dependability and Reliability	50	10	14	1	0	75
Lifelong Learning	0	0	55	4	16	75

V.   Conclusion and Recommendation

On the basis of the results of the study, it can be gleaned that in the 5-tiers of the competencies, most of the respondents are competent on the Industry- Sector tier, however, on the other areas and tiers of the competencies, it can be concluded that the respondents are not competent. The researchers recommend that the curricular changes and redesign should be done to address the competencies needed as essentials skills in the workplace, and would help our graduates a successful mainstay in their employers. Other studies are recommended with focus on the areas of the 5-tiers to carefully investigate the bottlenecks in the curriculum and learning environment.

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