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Digital Integration a Competency for Human Resource Professionals in Industrial Revolution 4.0

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Abstract: Industrial Revolution 4.0 was promoted by Klaus Schwab at the World Economic Forum in 2015, given the fast change in technology, social examples, and cycles because of the expanded use of technology, interconnectivity, and intelligent automation. The changing manner by which the organization functions in the industrial revolution 4.0 has pushed how the human resource capabilities function, thus pushing an adjustment of the competency for human resource professionals to take care of expanding requests. In the future, digital tools will coordinate with how the human resource department works and will be coordinated evenly, spreading out to all functions in human resource management. This will prompt much better HR service delivery and unmistakable chances better to deliver HR methodologies with excellent and significant information. This paper looks at digital integration, also referred to as digital capability, as a significant competency for human resource professionals in the era of industrial revolution 4.0. Digital Integration includes three perspectives: technology awareness of human resource proficiency, embedding technology with different cycles of human capital management process, and lastly, constructing the digital culture. The paper further leads to a proposal for a predictive model for the performance of Human Resource Professionals in the software industry in India based on the measures of digital integration competency.

Index Terms **- competency, competency mapping, competency model, performance, strategies, digital integration, the industrial revolution.**

1. INTRODUCTION

In the fourth industrial revolution era, digitalization is one of the significant organizational changes. The term "Industrial Revolution 4.0" refers to creating a context in which tumultuous technologies and trends dynamically influence how we typically live and work. It is constructed on the pillars that the preceding three industrial revolutions laid. Through the emergence of more extraordinary technical advancements, the digital, physical, and biological worlds are coming together in the fourth industrial revolution. These intelligent systems should interface with businesses and other individuals. The World Economic Forum's founder and executive chairman, Klaus Schwab, coined the phrase "fourth industrial revolution," which he describes as a society where people switch between reality and digital domains using connected technology.

The way an organization operates has altered due to the new methods for more prominent data and information exchange and for reaching the largest population. HR practitioners must adapt to the growing competition for cutting-edge HR technologies and global digital transformation. Future HR practises will need new technical knowledge, skills, and capacities to deal with the new technology the organization or business has acquired. This process can begin with the management's strategic efforts to enable the organization through planning, recruiting, selecting, training, and developing employees to meet the shared goals of the company and the person to bridge the generational gap.

In modern HRM practices, digitalization is regarded as the most crucial competency. Utilizing social networking websites for HRM practices is more cost-effective than traditional practice methods. This real revolution is taking place in the hiring and job-searching world. With digitalization, many businesses now utilize social media sites like Facebook, LinkedIn, Glassdoor, and Skype (video conferencing). Because of the COVID-19 pandemic during the lockdown, many businesses began conducting interviews through Google Meet, Zoom Platform, and Microsoft Team, which is the most up-to-date tool for HRM practices like GD and PI, which are possible through the platforms mentioned above.

By enhancing one of an organization's most important assets—its people—digital technology helps it become more profitable. "An umbrella term covering all possible integration mechanisms and contents between HRM and IT going for creating value inside and across association for targeted employees and management," says one definition of digital HRM, "is a path by which strategies, policies, and practices can be effectively implemented." The vast bulk of tasks related to human resources is outsourced.

Integrating digital technology, which consists of technological awareness, enculturation, and embedding is one of the critical competencies that comes with it. To construct a validated predictive model for performance, the research aims to determine the

validity of the metrics used to assess digital integration competencies. Understanding what is occurring with technology outside of the corporation is what is meant by "technology awareness." It encompasses unrelated technologies at random and technology specifically relevant to human resources. To increase effectiveness and process efficiency, HR professionals must be able to integrate technology into their HR operations. Thus, enabling HR professionals to not only do HR in a faster way (more efficiency) but also in a more goal-oriented way (more HR effectiveness). As an HR professional, one needs to build a digital culture within HR and the broader organization.
The research aims to determine the reliability of the measures of the competency of digital integration and lead to the development of a validated predictive model for performance.

2. Review of Literature

The purpose of the study of allied literature is to provide a theoretical foundation relevant to developing a conceptual model for this study. The literature review is based on the critical evaluation of various studies ranging from phenomenal studies and articles to books focused on the aspect of competency and related attributes identified for the study.

2.1 Understanding Competencies

Competency has its origin in the Latin word '*competentia*,' which signifies "is authorized to judge" just as "the right to speak" **[Caupin et al. (2006)].** The English word reference characterizes 'competence' as being adequate or fit.
Competency signifies an individual's essential attributes, like knowledge, abilities, or capacities. **Boyatzis (1982)** characterized capability as an essential quality of an individual which results in the successful or potentially prevalent execution of a task'. An underlying characteristic could incorporate a thought process, quality, ability, a part of a mental self-portrait, social job, or knowledge group. Spencer and Spencer, who advanced Boyatzis' unique work, characterize competency as a 'hidden attribute of a person that is causally connected with measure referred to viable and additionally unrivaled execution in a task or circumstance' **[Spencer and Spencer (1993)].** The utilization of this definition emphasizes people's necessary contributions to produce competent performances [**Hoffman (1999)].**
To summarize, competency is depicted as "a group of knowledge, abilities, capacities, practices, and mentalities connected with work success and failure" **[Byham and Moyer (2000); Cooper (2000); Green (1999); Lucia and Lepsinger (1999); Parry (1996)].**
Competency is the capacity to apply or utilize knowledge, abilities, capacities, practices, and individual qualities to effectively perform critical work tasks, explicit capacities, or work in a given position. Competencies are, accordingly, essential attributes of individuals that show approaches to acting or thinking, which sum up across a broad scope of circumstances and endure for extensive periods. Individual qualities might be mental/scholarly/mental, social/passionate/attitudinal, and physical/psychomotor characteristics essential to play out the job **[Dubois (1993); Lucia and Lepsinger (1999)].**
The individuals who spend endeavors in inspecting competency are quickly struck by the absence of uniform definitions, compositions, and techniques, which leads to misconception, meandering, and waste **[Cooper (2000); Dalton (1997)]. Strebler et al. (1997)** attested that the term generally had not acknowledged a single definition. Its implications, characterized by standard word references, are broad, unclear, and surmised, subject to various understandings.
In any case, since early spearheading examinations, it is, for the most part, concurred that capability can be clinically characterized as "an individual's hidden qualities that are connected with successful or unrivaled execution in a task or circumstance**" [Boyatzis (1982, 1996); Klemp (1980); Spencer and Spencer (1993)].**

2.2 Understanding Digital HR

The need to adjust to the new states of the worldwide business climate and the development of advanced advancement prompts organizations to alter or totally change approaches to working and afterward reshape their plan of action. The execution of coordinated techniques that pay attention to observing new gifts, proficient turn of events, and maintenance of current representatives in the organization are critical to the progress of the computerized change of human resources. In this sense, HR is turning into an essential accomplice of the organization to guarantee a drawn-out upper hand of the organization in the period of digitalization **(Ulrich and Dulebohn, 2015).**
The term Digital HR can be perceived as incorporating social, portable, analytics, and cloud (SMAC) innovations pointed toward computerizing various areas of HR for better efficiency, reclassifying how HR processes are conveyed, and further developing a balance between fun and serious activities zeroing in on continuous access, direction, and results (**Stephan et al., 2016**). The fundamental thought behind this idea is to modernize representative preparation and expertise improvement, looking for gifts, and to smooth out by and considerable human resources the executives' arrangements and capacities by using ongoing intuitive stages, portable first applications, and coordinated analytics **(Galgali, 2017**). **Molotkova et al. (2019)** distinguish digital HR as an adaptable way to deal with staff improvement with an active job of digital space in invigorating changes and a viable utilization of representatives' abilities and experience. As opposed to customary faculty the board, digital HR is centered around the execution of imaginative arrangements and staff efficiency improvement. It sees workers as ventures that ought to be upheld.
The rise of the digital HR idea is the aftereffect of essential changes in how to deal with HRM throughout the long term. During the 60s and 70s, the primary objective of HR administrators was to process and break down worker data and computerize their daily exercises. During the 80s, staff divisions began to give professional consultancy and respond to the necessities of individual representatives. From the mid-90s to the start of the 21st century, HR capacities have zeroed in on the ability of the executives and the execution of new electronic frameworks to help enrolment, learning, execution of the board, and representative compensation **(Volini et al., 2017).** In the 21st century, HR has had the option to upset the experience of workers with the change of HR processes through the utilization of new digital stages, applications, and strategies for giving HR administrations, including digital correspondence **(Stephan et al., 2016).**

3. Objective

The objective of the research is as under.
Primary Objective: To establish the relationship between Technological Awareness, Technological Embedding, and Technological Digital Culture, Building the three sub-competencies defined under the competency Digital Integration with Performance Improvement of HR Professionals in the Software Industry in India.

Secondary Objective: To propose a predictive model for performance based on Technological Awareness, Technological Embedding & Technological Digital Culture Building

4. Data and Methodology

The core competency of Digital Integration was subdivided into three sub-competencies. A competency dictionary was designed to include definitions and each sub- competency's professional performance level. This set of sub-competency dictionaries was shared with 15 Human Resource Heads of an organization in the software industry for reliability. Cronbach's alpha was calculated, and accordingly hierarchy of the sub-competencies was made. A further survey was conducted with a sample size of 487 Human Resource professionals at different hierarchy levels, and their performance level was identified.

The hypothesis was designed for the various sub-competencies. The data were analyzed using multivariate regression analysis, and the confirmation was made based on the *p-value* and the R^2 value. The hypothesis was validated by taking into consideration the value of the *p-value* to be less than 0.05. Student *t*-test was checked at 0.05

Hypothesis:

Hypothesis 1

$H1_0$ = Technological Awareness has no impact on Performance Improvement

$H1_1$ = Technological Awareness has no impact on Performance Improvement

Hypothesis 2

$H2_0$ = Technological Embedding has no impact on Performance Improvement

$H2_1$ = Technological Embedding has no impact on Performance Improvement

Hypothesis 3

$H3_0$ = Technological Digital Culture Building has no impact on Performance Improvement

$H3_1$ = Technological Digital Culture Building has no impact on Performance Improvement

5. Results and Discussion

5.1 Reliability Analysis

The goal of the reliability test was to look at the characteristics of the measuring scales and the items in order to determine the scales' overall index of internal consistency [Hair et al. (2006)]. The most popular indicator of internal consistency (or "reliability") is Cronbach's alpha. It is most frequently used to test the validity of a survey questionnaire that has several Likert questions that together create a scale.

The dataset used for the factor analysis's reliability analysis is shown in the table below. It displays the dataset's Cronbach's alpha values.

Table 1: Reliability Statistics

Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	N of Items
.767	.749	15

Source: Author's own calculations

The reliability test α (alpha) of the entire data set used for factor analysis is 0.767, which exceeds the standard threshold value recommended by Nunnally (1978).

All variables were subjected to reliability analysis to assess the dimensionality of the measurement scale. The test results show that all constructs exhibited high reliabilities, as Cronbach's alpha exceeded the acceptable level of 0.70 [Hair et al. (2006)]. These results are given in the table below, depicting the reliability of the dataset.

Table 2: Reliability of the Constructs

Code	Constructs	Cronbach's Alpha
TA	Technological Awareness	.892
TE	Technological Embedding	.883
TDCB	Technological Digital Culture Building	.793
PER	Performance Improvement	.877

Source: Author's own calculations

The value of Cronbach's alpha between ±.41 and ±.70 denotes moderate reliability, while alpha more significant than ±.71 denotes high reliability **[Sekaran (2006)].** All measures exhibited high reliabilities with coefficient alphas ranging from 0.7 to 0.9, exceeding the acceptable level of 0.70 **[Tabachnick and Fidell (2007)].** It reveals an acceptable level of reliability of the five-point scale and thereby allows further analysis. Therefore, the measurement model in this research shows satisfactory reliability, convergent validity, and discriminant validity.

5.2 Correlations Analysis

Correlation measures the degree to which the change in one variable follows the pattern of change in the other variable. It cannot be said that one variable caused the change in the other; in the sense that it can be guaranteed that a change in one thing will invariably produce another result.

The rule of thumb for interpreting the correlation coefficient is to divide the range of possible scores into five intervals: 0 to 0.20 corresponds to a fragile relationship; 0.21 to 0.40 corresponds to a weak relationship, 0.41 to 0.60 corresponds to a moderate relationship, 0.61 to 0.80 corresponds to a strong relationship, and 0.81 to 1.00 corresponds to a very strong relationship. These rules apply whether the sign of the correlation coefficient is positive or negative.

The result of the Correlation statistics of the variable with the performance of the human resource professionals are depicted in the table below.

Table 3: Correlation Statistics

	TA	TE	TDBC	PER
TA	1			
TE	0.641147231	1		
TDBC	0.627962298	0.625515142	1	
PER	**0.745178555**	**0.7810897**	**0.750891666**	**1**

Source: Author's own calculations

5.3 ANOVA Analysis

Table 4: ANOVA Output

ANOVA					
	df	SS	MS	F	Significance F
Regression	3	1355.492	451.8308	929.4606	3E-268
Residual	853	414.6617	0.486122		
Total	856	1770.154			

Source: Author's own calculations

5.4 Hypothesis Testing:

The hypothesis was tested using a student's *t*-test at a significance level of 0.05. The output from *t*-Test: Paired Two Sample for Means run on excel using data analysis toolpak is as below—the degree of freedom 856 (Sample 857).

Table 5: *t*-Test: Paired Two Sample for Means for Technological Awareness (TA)

	TA	*PER*
Mean	3.0315	2.904317386
Variance	1.6147	2.067936946
Observations	857	857
Pearson Correlation	0.7452	
Hypothesized Mean Difference	0.0000	
df	856	
t Stat	3.8016	
P(T<=t) one-tail	0.0001	
t Critical one-tail	1.6466	
P(T<=t) two-tail	0.0002	
t Critical two-tail	1.9627	

Source: Author's own calculations

Table 6: t-Test: Paired Two Sample for Means for Technological Embedding (TE)

	TE	*PER*
Mean	2.9522	2.9043
Variance	2.0246	2.0679
Observations	857	857
Pearson Correlation	0.7811	
Hypothesized Mean Difference	0.0000	
df	856	
t Stat	2.4795	
P(T<=t) one-tail	0.0697	
t Critical one-tail	1.6466	
P(T<=t) two-tail	0.1394	
t Critical two-tail	1.9627	

Source: Author's own calculations

Table 7: t-Test: Paired Two Sample for Means for Technological Digital Culture Building (TDBC)

	TDBC	*PER*
Mean	3.1214	2.9043
Variance	1.8170	2.0679
Observations	857	857
Pearson Correlation	0.7509	
Hypothesized Mean Difference	0.0000	
df	856	

t Stat	6.4383	
P(T<=t) one-tail	0.0000	
t Critical one-tail	1.6466	
P(T<=t) two-tail	0.0000	
t Critical two-tail	1.9627	

Source: Author's own calculations

Table 8: The comparison of t-Test values as below:

	t Stat	t Critical one-tail	t Critical two-tail
Technological Awareness (TA)	3.8016	1.6466	1.9627
Technological Embedding (TE)	2.4795	1.6466	1.9627
Technological Digital Culture Building (TDBC)	6.4383	1.6466	1.9627

Source: Author's own calculations

As since. the t-test value is greater than the critical value, the null hypothesis is rejected, and the alternate hypothesis is accepted.

5.4 Multiple Regression Analysis

The multiple regression analysis was performed on the survey data, which shows the value of R^2, Adjusted R^2, and the standard error of the estimate.

Table 9: The output of the regression analysis run on excel using data analysis toolpak is as below.

SUMMARY OUTPUT								
Regression Statistics								
Multiple R	0.87507							
R Square	0.765748							
Adjusted R Square	0.764924							
Standard Error	0.697224							
Observations	857							
ANOVA								
	df	*SS*	*MS*	*F*	*Significance F*			
Regression	3	1355.49	451.83	929.46	0.00			
Residual	853	414.66	0.49					
Total	856	1770.15						
	Coefficients	***Standard Error***	***t Stat***	***P-value***	***Lower 95%***	***Upper 95%***	***Lower 95.0%***	***Upper 95.0%***
Intercept	-0.3394	0.0670	-5.0640	0.0000	-0.4710	-0.2079	-0.4710	-0.2079
TA	0.3290	0.0264	12.4572	0.0000	0.2771	0.3808	0.2771	0.3808
TE	0.3971	0.0235	16.8825	0.0000	0.3510	0.4433	0.3510	0.4433
TDBC	0.3441	0.0245	14.0533	0.0000	0.2960	0.3922	0.2960	0.3922

Source: Author's own calculations

6 Conclusion

The Cronbach's Alpha value confirms that all three measures exhibited high reliabilities with coefficient alphas ranging from 0.7 up to 0.9, exceeding the acceptable level of 0.70. The alternate hypothesis was accepted as the t-stat value was more than the critical values. The *p-value* is also less than 0.05 for all three variables taken into consideration. The values of R Square, 0.765748, confirm that the model devised based on data collected in the survey meets the threshold forecasting. The predictive model for performance based on three measures under the competency of digital integration is as under

$$\boldsymbol{PER = --0.3394 + 0.3290 \times TA + 0.3971 \times TE + 0.3441 \times TDBC}$$

TA Technological Awareness
TE Technological Embedding
TDCB Technological Digital Culture Building
PER Performance Improvement

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