

# Big Data Analytics Conundrums Analysis: The need for Information Management collaborations between Universities and Corporations

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## ABSTRACT

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Given the utility of big data analytic tools for Information systems in corporate decision making, there are growing concerns about the dearth or paucity of t-shaped graduates in the discipline. Thus, there is a need for effective information management collaboration between corporations and universities in producing adequate t-shaped business and data analytics (DA/BA) graduates. The current study examines attitudes and perceptions of four groups (i.e., t-shaped graduates, corporate leaders, supervisors and college instructors) on the need for information management collaborations between universities and corporations to achieve readiness of graduates to fill DA/BA jobs. Using a structured online questionnaire, a random sample of 100 respondents provided data about their perceptions, attitudes, and experiences on collaborative DA/BA training. Data collected were analyzed using descriptive statistics and principal component analysis. Findings showed a need to have training relationships between DA/BA employers and universities in order to promote trainees' attitudes on the job (i) organizational culture, (ii) skills required and (iii) business and data analytical duties using an effective information management structure. The corporate leaders indicated that the training responsibilities should not be the sole role of the Universities and there is a need to promote interdisciplinary information systems, management, and training between companies and universities.

**Keywords:** Data Analytics training, T-shaped graduates, DA/BA, Data & Business Analytics, Information Management, Job productivity

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## I. BACKGROUND AND INTRODUCTION

Big data analytics tools have become an effective approach for gaining insights into improving strategic business to consumer (B2C), and business to business (B2B) decision-making for corporations (Elliott, 2012). Business or data analytics is the science of using statistics to create models that can explain or predict customer behavior and guide the management of company operations (Davernport & Harris, 2007). Big data analytics have the potential to lead to faster decision making by stakeholders, which in turn saves time and energy (Chiang et al., 2012). The increased use of improved technology and computer systems in business management has resulted in growing demand among businesses to utilize DA/BA graduates (Sharif & Nazir, 2016). Data analytics is also closely associated with the growth of information technology and digital data resulting in the expansion of digital communications technologies, such as fiber optic technology, vast phone technology, mobile networks, the internet, and radio frequency identification devices (Manyika et al, 2011). Given the utility of DA/BA, there are growing concerns regarding the paucity of t-shaped graduates in business and data analytics (Wixom et al 2011). Generally, t-shaped graduates possess deep knowledge and skills in an area of information management specialization, but also have soft skills. However, Wixom et al (2011) wondered the great disconnect between the DA/BA training in universities and colleges and work demand for the DA/BA graduates. Crossman (2013) also observes that there is a need for universities and companies to work together to address the gap in DA/BA skills training with informal and formal partnerships. These disconnects and gaps between universities and the job market need to be addressed by studying identifiable emerging trends in DA/BA curriculum development (Shizha & Kariwo, 2012). Therefore, the current study examines how universities and businesses can join together to better understand the meaning of DA/BA and create an applicable curriculum relevant to the DA/BA jobs that graduates will experience in employment.

## II. RELATED WORK

Researchers have closely associated data analytics (DA) with business analytics (BA). Scholars like; (Scott, 2014 & Elliot, 2012) have cited that data and business analytics have been used interchangeably to refer to the science of using statistical models to describe business situations, explain business outcomes to predict

and forecast on possible future business results. Cotter (2014) explains that business analytics is comprised of solutions used to build analysis models and simulations to create scenarios, understand realities and predict future states. The differences in this analogy were propounded on the context of the implementation of analytics roles and theoretical use of data. While the business analyst tends to be more process-oriented and functional in analyzing data, cleaning, visualizing and assessing data with requirements towards the company's goals for decision making, the data analyst collects, manipulates, analyzes data to forecast, simulate and solve problems within the specific terms of reference. Mukesh K. et al., (2017) explained that data analytics deals with both predictive and descriptive data analyses using observed patterns to predict future outcomes. To further exemplify this explanation, Acharjya D. & Ahmed, (2016) explained that because large dataset requires more computational complexities, it may be "difficult to establish a comprehensive mathematical system that is broadly applicable to big data" leading to the dire need of DA/BA experts that could understand the complexities. The DA/BA is therefore charged with collecting, manipulating, analyzing a large amount of semi-structured and unstructured data in a reasonable amount of time and then apply data mining algorithms to extract knowledge for decision making (Asplund, 2011).

Wixom et al. (2011) noted that universities should provide a broader range of business intelligence skills within DA/BA programs. Cotter (2014) explained that universities should train and produce graduates with a broader range of DA/BA skills using an interdisciplinary approach and that corporations could help by providing trainers of t-shaped graduates with needed software or teaching resources and equipment. Finally, Cotter (2014) concurred with Asplund (2011) that academic DA/BA curriculum should be better aligned with the needs of the job market and real-world practices. Scott (2014) observed that to achieve better business productivity and impacting data analysis, a business company needs to hire and develop the right analytic talent. It is important that the talent not only possess analytic skills, but also business experience in order to make informed decisions. Asplund (2011) also observes that analytics by training and experience can solve the problems and reap better business rewards, unlike analytics by knowledge and skills alone.

Wixom et al. (2011) note that much of the discussion relating to defining the present corporate desire of DA/BA trainees is understandable, but business and educational leaders can collaborate to identify analytics talent and build a business and academic partnerships. Since this study examines attitudes and perceptions of four groups (i.e. t-shaped graduates, corporate leaders, supervisors and college instructors) on the need for collaborations between universities and corporations to achieve readiness of graduates to fill DA/BA jobs, the study addresses four research questions:

1. What are the perceptions, attitudes, and experiences of business leaders concerning the interdisciplinary approach to the development of DA/BA skills as needed in addressing the DA/BA training gap?
2. What are the relevant skills and DA/BA program experiences that are most conducive to the success of t-shaped graduates on the job?
3. What are the perceptions, attitudes, and experiences of t-shaped graduates recently hired to positions involving DA/BA on gaps in training?
4. What are the perceptions, attitudes, and experiences of the faculty and corporate supervisors of recent graduates hired into positions involving DA/BA?

### **III. RESEARCH METHODOLOGY**

To address the research questions, a structured online questionnaire was used to examine attitudes and perceptions of four groups (i.e., t-shaped graduates, corporate leaders, supervisors, and college instructors) on the need for collaborations between universities and corporations to achieve readiness of graduates to fill DA/BA information management jobs. Data collected using the questionnaire was organized using tabular forms and then analyzed to generate the study inferences.

The descriptive survey design was used to test; perceptions, attitudes, and experiences of corporate leaders, college graduates, immediate supervisors of fresh t-shaped graduate recruits as well as the university faculty concerning DA/BA training with respect to the broad-based analytic skills in job productivity. The online questionnaires are faster, reliable and valid in data collection. The online questionnaires were structured into sections depending on the objectives of the study.

Study variables were grouped into three broad categories: response variable, explanatory variables, and moderating variables. The response variable of the study was the DA/BA job productivity by t-shaped graduates. The explanatory variables included the perceptions, attitudes, and experiences of the four study group participants concerning DA/BA job productivity. The relevant skills and DA/BA program experiences that would steer the DA/BA job productivity were also considered. The intervening variables included personal profiles and demographic attributes such as age, gender, and level of education.

**Data collection**

The study targeted all t-shaped graduate recruits, their immediate supervisors, corporate stakeholders, and university faculty. The online questionnaires had questions with choices scaled using the 5-point Likert scale: Strongly disagree (SD=1), Disagree (D=2), Moderate (M=3), Agree (A=4) and strongly agree (SA=5). The data concerning the research objectives were analyzed using descriptive statistics and ANOVA tests. The descriptive statistics, Pearson’s correlation, and principal component analysis were used to answer the research questions.

**Data Analysis and Results of the Study**

This section presents the results and findings of data analysis of the socio-demographic factors of respondents and the responses to the study variables addressing the study objectives. The results are presented using tabular formats and discussions.

**Socio-Demographic Factors**

**Table 1: Descriptive statistics of socio-demographic factors of respondents**

Variable	Attribute	Frequency	Percent	Mean	Standard Deviation
Age	16-20	12	12.2	35.32	7.74
	21-30	14	14.3		
	31-40	26	26.5		
	41+	46	46.9		
	<b>Total</b>	<b>98</b>	<b>100.0</b>		
Gender	Male	51	52.0	1.64	0.60
	Female	41	41.8		
	Partners/Others	6	6.1		
	<b>Total</b>	<b>98</b>	<b>100.0</b>		
Education Level	Under Graduate	51	52.0	2.45	0.52
	Graduate	42	42.9		
	Advanced Degree	5	5.1		
	<b>Total</b>	<b>98</b>	<b>100.0</b>		

Results showed that majority of the respondents in the study were over 41 years old, with a relative frequency of 46.9%. The mean age of respondents was 35.32 with a standard deviation of 7.74 ( $\mu=35.32$  and  $\sigma=7.74$ ). There were slightly more male respondents than female respondents. The male respondents were 52.0% while female respondents were 41.8%. In addition, 6.1% of the respondents neither belonged to male gender nor female gender; therefore, they were classified as partners or others in this study. Concerning education levels of business leaders/owners, university faculty and employees of corporations that hire DA/BA, majority of respondents had an undergraduate level of education with the relative frequency of 52.0% followed by graduate level (42.9%) and lastly advanced degree level (5.1%). The research also sought information concerning the rate of DA/BA job productivity, the results are shown in Table 2 below.

**Table 2: Level of the rating of DA/BA training and job productivity**

Level of Productivity	Frequency	Percent	Cumulative Percent
Low	13	13.3	13.3
Moderate	24	24.5	42.9
High	45	45.9	88.8
Very High	16	16.2	100.0
<b>Total</b>	<b>98</b>	<b>100.0</b>	

The majority of respondents identified previous training as highly related to DA/BA job productivity with a relative frequency of 45.9%, followed by those who rated it as moderately important with a relative frequency of 24.5%. These findings indicated that a greater proportion of study respondents rated DA/BA job productivity as either moderately or highly related to previous training.

The perceptions, attitudes, and experiences of corporations, college graduates, immediate supervisors and college professors concerning DA/BA job productivity were analyzed using principal component analysis (PCA; see Table 3).

The insights about how employers and universities should partner to achieve readiness of recent graduates were analyzed by evaluating the perceptions, attitudes, and experiences of business leaders, college graduates, immediate supervisors and college Lecturers concerning DA/BA job productivity were using Principal Component Analysis (PCA). The results are presented in table 3 below.

**Table 3: Principal Component Analysis Results**

Factors investigated	T-shaped graduates	College professors	Corporate supervisors	Corporate leaders
Perception in DA/BA job performance, appraisal process	.685			
Attitudes, strengths, and weaknesses in jobs	.370			
Perception in constructive feedback in DA/BA duties	.517			
Attitude in DA/BA job organizational culture	.351			
Experience friendly DA/working environment	.639			
Perception when DA/BA job is recognized	.648			
Confidence in a DA/BA training partnership with universities		.637		
Perception in training partnership on DA/BA roles		.766		
The attitude of interdisciplinary training with corporations		.439		
Perception of job performance monitoring by supervisors			.675	
Perception of improved performance			.681	
Attitude towards job satisfaction			.397	
Experience, Skills and Training development			.341	
Experience, Career development, Information management			.485	
The Attitude in personal skills in job			.244	
Experiences in unfulfilled needs in the job market				.562
Experience in DA/BA internship opportunities and planning				.447
Achieving DA/BA job targets during recruitments				.554
Innovativeness, and University information management collaboration/partnership				.344
Experience in Results/productivity in the job				.360

In assessing the perceptions, attitudes, and experiences of t-shaped graduates recently hired into positions involving data analytics and information management, the PCA results indicated that perception in the job performance appraisal process ( $r=0.685$ ), perception in constructive feedback in jobs ( $r=0.517$ ), experiencing a friendly working environment ( $r=0.639$ ) and perception of when your job is recognized ( $r=0.648$ ) were strongly associated with readiness of recent graduates to fill (DA/BA) jobs (see table 3). The results also indicated a need for provisional relationships between DA/BA employers and universities that promote trainees' attitudes on job organizational culture ( $r=0.351$ ) and attitudes on the identification of strengths and weaknesses in jobs ( $r=0.370$ ). The study also found that confidence in a DA/BA training partnership with universities ( $r=0.637$ ) and perception in training partnership on DA/BA roles and responsibility ( $r=0.766$ ) can promote the readiness of t-shaped graduates to fill the analytics jobs. On the other hand, the results also portrayed that attitudes of interdisciplinary training with corporations ( $r=0.439$ ) was weakly associated with the readiness of t-shaped graduates to fill these analytics jobs. The study also sought to establish the perceptions, attitudes, and experiences of the t-shaped graduates' supervisors. Supervisors perceived job productivity and readiness of recent graduates as associated with job performance monitoring ( $r=0.675$ ) and perception of improved DA/BA performance ( $r=0.681$ ). On the other hand, the study found that attitude towards customer satisfaction ( $r=0.397$ ), experiences with training development ( $r=0.341$ ), experiences with career development ( $r=0.485$ ) and attitudes regarding personal skills in the job ( $r=0.244$ ) were lowly associated with DA/BA job productivity and readiness of t-shaped graduates.

#### IV. CONCLUSIONS

The study found that the readiness of t-shape graduates to fill DA/BA jobs was influenced by the perception of t-shaped graduates in the job performance appraisal process, constructive feedback in jobs, a friendly working environment, and recognition of job performance. In addition, study findings indicated that in order to promote job productivity among t-shaped DA/BA graduates, there is a need to have mutual training collaborations between DA/BA employers and universities to promote the trainees' attitude, skills and responsibilities towards job productivity. Other findings also indicated that corporate supervisors need to create confidence in leadership on the job by providing effective communication with the t-shaped graduates they hire. This would foster increased skills, promote interdisciplinary training, and increase job productivity. College professors concluded that job performance monitoring and a simplified curriculum tailored towards corporation needs will improve performance, readiness and job prospects for the t-shaped graduates. Both corporate leaders and college professors agreed that DA/BA training collaborations with corporations, which increase internship opportunities for students will enhance t-shaped graduates' readiness for the job market.

#### V. FUTURE DIRECTIONS

Implications of study results can be transformed into a framework for developing effective partnerships between corporations and universities. It will be important to relate research results to the cause of the shortage of DA/BA talent in the first place. It is necessary to ascertain the number of DA/BA jobs available in the

employment market or numbers needed to fill future DA/BA positions. This would help in bridging the gap or disconnectedness in the information management training cohesion between universities and corporations. University curricula should be aligned with the knowledge-based system requirements of corporations, which would help provide access to DA/BA jobs.

Due to increased emphasis on the need for analytical skills, there should be an agreement on academic modeling and business values between the universities and corporations on exactly how these skills are defined and developed. This would reduce pedagogical changes needed by DA/BA programs to fulfill the needs of corporations and would put some responsibility for training t-shaped graduates on corporations (e.g., internships and professional development opportunities). Universities should ensure that relevant tools or software are adopted that would tailor the curriculum towards the types of data analytics programs needed by corporations. Whereas, corporations should provide the type of effective partnerships that allow the provision of relevant software technology tools in classes. Providing potential solutions to the challenges identified in producing t-shaped graduates could encourage corporate leaders to develop training partnership with universities.

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