

Effect of eBusiness Solutions and eLeadership: Impact Analyses on Higher Educational Institutions and Their Organizational Leadership

Wilhelmina Djoletto

Abstract— Enterprise eBusiness solutions have exploded in leaps and bounds in recent years. Literature has shown a significant surge in the investment in Electronic Business (eBusiness) solutions by Higher Educational Institutions (HEIs) globally and these HEIs are interested in having a lucid understanding on the returns on their investments. However, there exists little or no research on the successes and failures of these eBusiness solutions at these institutions, especially Historically Black Colleges and Universities (HBCUs). Furthermore, no known research has been conducted on the effect of these eBusiness solutions on organizational leadership/hierarchies at HEIs, especially, when this is considered to be vital to institutions' strategic mission and planning. We present, in this paper, a comprehensive impact analysis of eBusiness solutions at Historically Black Colleges and Universities. We reconnoitre the effects of eBusiness solutions on different operational constructs of the institutions. HBCUs were chosen for their uniqueness and their numerous roles in providing education for minorities. We utilized cross-sectional quantitative approach, surveying a significant spectrum of such institutions in the United States of America. The impact of eBusiness solutions on institutional leadership including efficiency and effectiveness of leadership, student enrolment, investment, image and reputation, student's

satisfaction, student learning and other optional activities, are delineated in this paper. The sample contained higher level administrators including presidents/chancellors, vice presidents/chancellors, associate/assistant vice presidents/chancellors, deans and associate/assistant deans.

Keywords— eBusiness, eCommerce, Enterprise, HBCUs, HEIs, TWIs.

I. INTRODUCTION

While the birth of eBusiness was due to the need to minimize paper-based transactions and to improve the accuracy of business operations, more benefits of eBusiness solutions have emerged. There have been better business administrative activities, improvement in an organization's reputation, image and marketing [13], [36]. The literature is replete with enormous case studies of the impact of Enterprise eBusiness solutions [14]. In some instances, revenues have skyrocketed for enterprises that adopted eBusiness solutions for all of their operations [14], [20], [34], [35]. The positive impact of eBusiness has also been felt in parastatals and institutions of higher education. As such, the rapid expansion in Information Technology witnessed in the late twentieth century and the commencing of the twenty-first century heightened the penetration of eBusiness in every facet of business organization [38], [15], [25], [47], [10]. To say that a significant number of business transactions are conducted through the Internet and other Telecommunication channels is an understatement; eBusiness solutions underscore the way business organizations, whether public or private, engage in their day-to-day business operations [1], [17], [34], [36]. Organizations that have not yet clinched to eBusiness struggle to compete in the competitive global market. [25] enumerates various benefits of eBusiness, including increases in profits, improvements in communications and understanding of information requirements, development of test beds for system evolution, and gauging cost reductions. She posits that eBusiness solutions support decision making in the organization through the identity and provision of improvements for areas in the organization that requires

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F. A. Author is with the National Institute of Standards and Technology, Boulder, CO 80305 USA (corresponding author to provide phone: 303-555-5555; fax: 303-555-5555; e-mail: author@boulder.nist.gov).

S. B. Author, Jr., was with Rice University, Houston, TX 77005 USA. He is now with the Department of Physics, Colorado State University, Fort Collins, CO 80523 USA (e-mail: author@lamar.colostate.edu).

T. C. Author is with the Electrical Engineering Department, University of Colorado, Boulder, CO 80309 USA, on leave from the National Research Institute for Metals, Tsukuba, Japan (e-mail: author@nrim.go.jp).

change.

Albeit the significant surge in investment in eBusiness solutions at Higher Educational Institutions globally, little or no research exists on their successes and failures [15], [16]. Report on the benefits HBCUs have reaped vis-à-vis eBusiness, have been mostly anecdotal. eBusiness connotes business transactions conducted over the Internet and other telecommunication networks [43], [6], [22], [24], [36], [37], [40]. According to [13] and [35], many HEIs are interested in gaining a clear understanding on the returns amidst their investments. Additionally, government agencies and other organizations contributing financially to HBCUs in these efforts generally demand accountability [2].

Research on the impact of eBusiness on the administrative hierarchy and corporate leadership is minimal [27], [36]. The same applies to the impact of eBusiness solutions on organizational leadership/hierarchies at HEIs, particularly, Historically Black Colleges and Universities (HBCUs). Designated by the U.S. Congress, Historically Black Colleges and Universities were originally designed for underrepresented blacks who were denied education at traditionally white dominated HEIs in the middle of the twentieth century and have grown to “have majority population of African American/Underrepresented Minority students.” The U.S. Congress Higher Education Act of 1965, created federal recognition of HBCUs for the first time, allowing HBCUs to receive federal financial support for their advancement. According to [48], HBCUs serve as a source of accomplishment and pride not only in the African America community, but also in the whole nation. Up until now many African Americans have relied on HBCUs for their higher education. While there is still room for improvement, up until ten years ago, HBCUs have been known to lack support from the government for necessary Information Technology infrastructure in order to provide competitive quality education and respond to the needs of its increased student population [46]. Like the Traditionally White Institutions (TWIs), HBCUs have witnessed an upsurge in eBusiness solutions in many facets of their business operations [2], [46].

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Over the years, several definitions of Enterprise eBusiness have evolved. In this paper, a comprehensive definition of eBusiness will be the execution of transactions between two or more parties using interconnected networks [24], [40], [37].

eBusiness solutions at HBCUs in the context of this research include E-Learning including distance education, E-Procurement, E-Admissions/Registration, E-Enrolment, E-Payroll, E-Advising, E-Conferencing/Meeting, E-Payment and E-Budget. It is worthy to point out that, for the purpose of this paper, eBusiness and eBusiness are used interchangeably to mean the same entity [41].

It is well documented that factors that attribute to the success and failures of eBusiness solutions at organizations and institutions include legal, ethical, social and cultural issues. As such, in investigating the impact of eBusiness solutions on organizational leadership at HBCUs, it is to be noted that it was deemed necessary to reconnoitre how judiciously HBCUs enforce security, ethical, legal, social and cultural measures as these factors or attributes are vital to eBusiness solutions, pertaining to augmenting their image and reputation [23], [30], [33], [39] and [40]. It is of the essence that higher institutions understand legislation governing eBusiness systems, particularly legislation relating to privacy and property rights [30], [39] and [40]. [45] stated that for organizations to take advantage of eBusiness, the organizations must be heedful and be willing to invest money and time learning how to apply eBusiness technologies to their operations. Furthermore, organizations that do not take measures in overcoming cultural issues as discussed by [33] might be overshadowed by their competitors because the only constant with eBusiness is change and many organizations have difficulty dealing with change because some organizations are ill-equipped to deal with change.

II. PROBLEM BACKGROUND

The impact of Enterprise eBusiness solutions has been studied extensively from the perspectives of revenue generation, profit realization and customers' impression regarding the image and reputation of the organization. According to [9], Enterprise eBusiness solutions are always almost driven by the desire to increase profit margins. For non-profit organizations, image, reputation and quality of service are a driving force for eBusiness integrations [25]. Therefore, the impact of eBusiness on organizational leadership/hierarchies which is the core of this research stems from the fact that in all cases, the need for proper leadership in promoting eBusiness solutions for the organization cannot be over-emphasized.

Report on the benefits HBCUs have reaped vis-à-vis eBusiness, have been mostly anecdotal. And the myriad expository reports are on the positive impact of eBusiness solutions at HEIs, yet, there is no known research that has been conducted on the effect of these eBusiness solutions on organizational leadership/hierarchies at HEIs, considering that this is critical to their strategic mission and planning. Moreover, existing research on the impact of Enterprise eBusiness solutions focuses mainly on returns on investment culminating from sales volume and profit maximization. However, there is no data demonstrating how the conclusions

were derived. [27] and [36] postulate that, research on the impact of eBusiness on the administrative hierarchy and corporate leadership is minimal. This is also true for the impact of eBusiness solutions on organizational leadership/hierarchies at HEIs, particularly, Historically Black Colleges and Universities (HBCUs). According to [29] the study of the impact of eBusiness on business operations at HEIs vis-à-vis the magnitude of investment is a difficult problem. An even more difficult problem is ascertaining the degree of the impact of eBusiness on administrative hierarchy and organizational leadership. In this paper, the focus is on eBusiness solutions at HBCUs and their organizational leadership/hierarchies with the goal of investigating their impacts on organizational leadership and flow of information.

Many HBCUs have strategically embarked on online course offerings and eBusiness based academic activities to boost student enrollment and improve student academic performance while providing quality education [2]. As reported by the US Dept. of Commerce, HBCUs are catching up with many Traditionally White Institutions (TWIs) in their eBusiness solutions for human resources, procurements, account receivables and payables, admissions, registrations, alumni database, and capital campaign. Where will all these eBusiness solutions lead HBCUs from both customer and business perspectives? How successful and effective are these HBCU eBusiness solutions? It is tempting to conclude that all eBusiness solutions achieve the expected returns on investment without considering the implementation strategies and the targeted customers. The underlying issue here is how effective is eBusiness at HBCUs? What are the views of all stakeholders on eBusiness at HBCUs?

Given the underlying issues in the previous paragraph, it is prudent to state that government agencies and other organizations contributing financially to HBCUs in these efforts generally demand accountability [2]. The study of the impact of eBusiness on business operations at HEIs vis-à-vis the magnitude of investment is a difficult problem [29]. A more difficult problem is ascertaining the degree of the impact of eBusiness on administrative hierarchy and organizational leadership. In this research, the focus is on eBusiness solutions at HBCUs and their organizational leadership/hierarchies with the goal of investigating their impacts on organizational leadership and flow of information.

III. GOAL

The raison d'être of this research was to study the impact of eBusiness solutions on organizational leadership at Historically Black Colleges and Universities (HBCUs) because of their uniqueness and of their numerous roles in providing education for minorities. It is hoped that this study will serve to spur research interests in this field and thereby create significant awareness in this field both nationally and globally.

IV. CONSEQUENCE ON ORGANIZATIONAL LEADERSHIP

In order to implement eBusiness at HBCUs, approval must be obtained from higher level administrators within the institution. The process of such decision-making has critical impact on organizational leadership and effectiveness and efficiency of organizational leadership. Key individuals in such decision-making processes are, for example, Presidents, Vice Presidents and IT personnel. Impact on eBusiness on HBCUs and their organizational leadership therefore, measures the correlation between, for example, increase in quality job productivity and eBusiness solutions, increase in revenue and eBusiness solutions, increased student enrollment and eBusiness solutions and increase in higher quality education and eBusiness solutions at HBCUs. Cited in the literature, are increase in enrollment [18], efficiency (reduction of paperwork) in procurement process as a result of E-Procurement [19], [34], efficiency in tuition and bill payments due to E-Payment [5], increased flexibility in course delivery as a result of E-Learning [7] and flexibility in event scheduling due to E-Calendaring [44].

According to [21] eBusiness has been a driving force for most of the operations in institutions of higher education, including admissions, registration, procurement, scheduling, fund-raising, retention, budgeting, technology, physical plant, meeting, evaluation, and distance education. Institutions of higher education, including Historically Black Colleges and Universities, can no longer ignore the implementation of eBusiness [21], [26] and [34]. Hence, studying the impact of eBusiness on the organizational leadership/hierarchies and management at selected Historically Black Colleges and Universities is vital to organizational leadership. Additionally, it is apparent, considering the ever-increasing growth in Information Technology and the astronomical rise in the use of the Internet and World Wide Web, the operations and survival of institutions of higher learning is indisputably dependent on eBusiness [21], [26]. This is in congruence with [41] notion of organization which he described as a learning place and that an organization cannot be any greater than the individuals in the organization. While according to [35], college officials may be sceptical of money saving claims, made by eBusiness companies, it is imperative that institutions of higher education have leaders who will fully embrace eBusiness [32].

Leaders at HEIs must possess leadership qualities that fit the context of their institutions. As contended by the classic management theorist [10] that the most important single determinant of working behaviour is technology. In defining technology, [10] uses two major phases, with the first phase comprising the tools, instruments, machines and technical formulas basic to the performance of the work and the second phase comprising, the body of ideas which express the goals of the work, its functional importance and the rationale of the methods employed. As such, HBCUs need transformational leaders who possess effective communication and influential qualities as stated by [4]. Fidler's contingency theory states that leaders' style of leadership must fit the context of the organization. In contingency theory, leadership style is either

task motivated or relationship motivated [8]. In task-motivated leadership, the leader's interest is centred by the accomplishment of the stated goals, whereas, the relationship leader is concerned with the development of a close rapport with subordinates or followers, building appropriate interpersonal relationships [8], [12].

V. RESEARCH METHOD

To carry out this study, we employed a cross-sectional approach using a self-designed survey instrument to collect data. Using Cochran's sampling formula discussed in the article by [3], a random cluster sample of 55 HBCUs out of 105 HBCUs across the United States of America was surveyed. A total of 715 higher level administrators, such as presidents/chancellors, vice (presidents/chancellors), associate vice (presidents/chancellors), assistant vice (presidents/chancellors), deans, associate/assistant deans, chairs, directors and associate/assistant directors from the 55 HBCUs were sent the instrument and a letter of consent via U.S. mail. Data was e collected via U.S. mail, custom-designed website and e-mail a website. Statistical analyses performed on the data included univariate, bivariate and multivariate statistical analyses.

Analyses were based on the extent of E-Commerce patronage at the selected Historically Black Colleges and Universities. The patronage involves the extent of the of eBusiness installations; user satisfaction of the eBusiness installations at these institutions; and the impact of eBusiness on the institutions with the primary focus on higher level administrative and academic personnel.

VI. RESULTS

Response rate is considered to be high. Approximately 96% of or 53 out of the 55 HBCUs participated in the research. See figs. 1 and 2. This signified clearly, a good representation of the number of HBUCs surveyed. About 21.4% of administrators participated in the study. The univariate statistics showed indication of the central tendency variability and dispersion of the collected data for both dependent and independent variables. The value of the standard error of the mean σ_{μ} for each variable was clearly reasonable and did not show any apparent strong variation of the estimated mean from the actual mean. This and the fact that for most of the variables, 95% of collected data fall within 2 standard deviations (2σ) from the mean, μ , $[\mu-2\sigma, \mu+2\sigma]$ demonstrate significant clustering of the data.

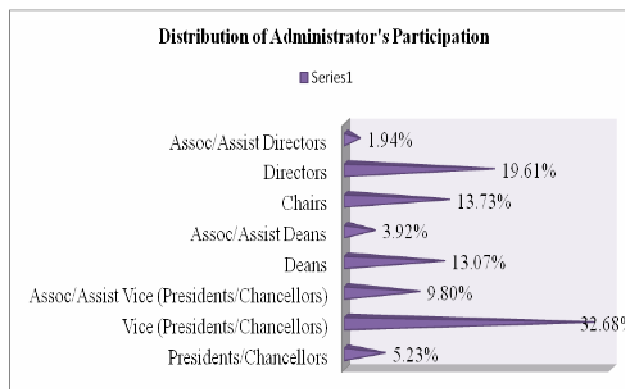


Fig. 1. Percentage Distribution HBCUs Administrators' Participation

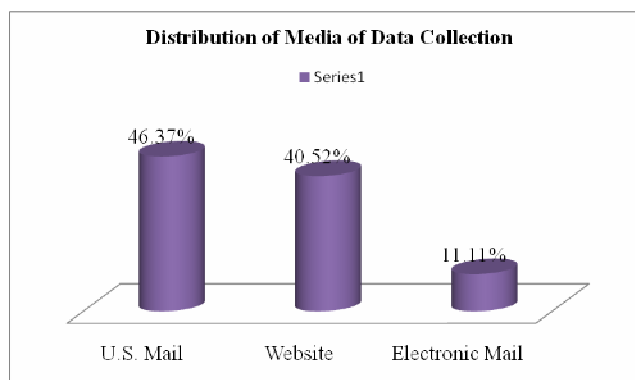


Fig. 2. Distribution of Media of Data Collection

Four dependent variables, namely NoECS or the average number of eBusiness solutions, NaECS or the average number of years of adoption of eBusiness solutions, InECS or the average investments in eBusiness solutions and IaECS or the average impact assessment of eBusiness solutions were regressed the independent variables which will be described in the following paragraphs. NaECS was found not to correlate significantly with any of the independent variables.

The investment in eBusiness solutions at HBCUs showed positive relation to efficiency in the conduct of administration. The variables IMPEELEADER or the level of eBusiness solutions impact on effective or efficient leadership and InECS are used to measures the efficiency and effectiveness for the purpose of this research in terms of time reduction in flow of information, improved administrative, social and cultural atmosphere, legal and ethical issues. On a scale of 1 to 9, the respondents claimed with a high average impact level of 5.19 that eBusiness solutions promote efficient leadership. The data for IMPEELEADER resembles that of normal distribution based on the skewness and kurtosis values. Variable IMPEELEADER significantly correlates positively with InECS with $R=0.433$, $P=0.0001$. It was also found that IMPEELEADER also correlates significantly with NoECS and IaECS with R values 0.240 and 0.322, respectively. See fig. 3.

Using the average number of clientele complaints about eBusiness solutions (NCECS) and the clientele satisfaction of

eBusiness solutions (CSEC) and other impact assessment variables, namely, the usefulness of eBusiness in sustaining positive customer relations (POSCUSTREL), the usefulness of eBusiness solutions in sustaining student satisfaction (STUSATISF) and the usefulness of eBusiness in sustaining an institution's positive image and reputation (IMAGEREPUT) were used to measure clientele satisfaction of eBusiness solutions at the HBCUs. The findings showed, on a scale of 1 to 5, that eBusiness solutions bolstered the image and reputation of the institution with an average impact level of 3.84 and σ of 0.964. See figure 6. The impact of eBusiness on positive customer relations and students' satisfaction was not as strong with average impact levels of 3.75 and 3.74, respectively. These average impact levels for POSCUSTREL and STUSATISF are a clear indication of the validity and reliability of the data. All three factors POSCUSTREL, STUSATISF and IMAGEREPUT correlated positively with the IaECS.

The results showed that NCECS did not correlate with any of the dependent variables. It is likely that the institutions did little to maintain records or any form of database of complaints from users of its eBusiness solutions, thus, the values given by the respondents may be extraneous. On the other hand, institutions document customers' satisfaction of their of the eBusiness solutions regularly. As a consequence, the CSEC correlate positively with NoECS, InECS and IaECS. The β coefficients are 1.023, 0.326 and 9.882 respectively. The intercepts are 3.584, 1.373 and 6.481 respectively. It is believed that clientele satisfaction of eBusiness solutions impact the image and reputation.

Leadership effectiveness and efficiency was measured in terms of quality of education programs and increased online and degree course offerings for the purpose of study. From the Pearson Correlation and regression, it was shown that NoECS significantly correlates positively with CSEC and the number of students using E-Registration (NSER). The β coefficient of 1.023 and 3.584 intercept are an indication how initial investment needed in eBusiness solutions for positive impact to be realized in NoECS vis-à-vis CSEC. NOC and NSOC showed significant relation with InECS and IaECS. Examining STUSATISF factor, about 60% of the respondents say that eBusiness solution was useful in sustaining students' satisfaction at an average impact level > 4 (on a scale of 1 to 8). Although the Pearson Correlation between NoECS and STUSATISF was computed, it was found to be unimportant in this analysis since impact level is already determined by STUSATISF factor. As mentioned in the earlier sections, NCECS did not correlate significantly with any of the independent variables.

While not statistically significant at $p < 0.5$, based on the results, NoECS had a direct relationship with the number of student enrolment (NSE). This could be due largely to the value ranges provided for response options. Many of the institutions have enrolment did not span the ranges provided. The enrolment growths, computed based on the responses,

were generally within one range and therefore, did not result in major differences. This explanation is supported by the descriptive statistics for NSE (mean = 0.1307, median = 0, mode = 0, std. dev = 0.48249, skewness=-1.081, kurtosis=11.570). The data skewed negatively with high kurtosis. Importantly, a significant number of respondents (about 62%) indicated that the investment on eBusiness solutions has an impact on student enrolment (INVIMPENROLL) with a mean impact level of 4.85. See fig. 4. In similar vein NoECS correlated significantly positively with the number of students making electronic payments (NSEP), the number of students selecting courses using E-Registration (NSER), and the number of students making electronic payments for services provided by the institution (NOSTUEPAY). These findings suggest that the number of eBusiness solutions is significant booster of student enrolment if they are able to register for classes and make payment faster electronically. The β coefficients of NSEP and NSER are 0.831 and 1.127 with intercepts of 5.622 and 5.643 respectively.

NoECS					
	Coeff	Std. Err	R	t-statistic	Sig
NSEP	.831	.240	.306	3.458	.001**
(Constant)	5.622	.561		10.019	.000

NoECS					
	Coeff	Std. Err	R	t-statistic	Sig
NSER	1.127	.346	.283	3.255	.001**
(Constant)	5.643	.606		9.013	.000

InECS					
	Coeff	Std. Err	R	t-statistic	Sig
NSEP	.386	.116	.294	3.317	.001**
(Constant)	1.787	.271		6.581	.000

InECS					
	Coeff	Std. Err	R	t-statistic	Sig
NSEP	8.968	1.768	.402	4.734	.000**
(Constant)	26.120	4.126		6.330	.000

InECS					
	Coeff	Std. Err	R	t-statistic	Sig
NSER	.602	.165	.314	3.657	.000**
(Constant)	1.615	.288		5.602	.000

InECS					
	Coeff	Std. Err	R	t-statistic	Sig
NSER	10.272	2.586	.388	3.973	.000**
(Constant)	26.478	4.826		5.850	.000

NoECS					
	Coeff	Std. Err	R	t-statistic	Sig
LECS	1.230	.596	.215	2.064	.042*
(Constant)	4.158	1.553		2.677	.009
InECS					
	Coeff	Std. Err	R	t-statistic	Sig
LECS	.557	.274	.212	2.031	.045*
(Constant)	1.138	.715		1.593	.115
IaECS					
	Coeff	Std. Err	R	t-statistic	Sig
LECS	13.897	4.214	.332	3.298	.001**
(Constant)	9.239	10.979		.842	.402

NoECS					
	Coeff	Std. Err	R	t-statistic	Sig
CSEC	1.023	.281	.349	3.634	.000***
(Constant)	3.384	1.116		3.212	.002

NoECS					
	Coeff	Std. Err	R	t-statistic	Sig
CSEC	.559	.271	.207	2.063	.042*
(Constant)	3.820	1.075		3.552	.001

IaECS					
	Coeff	Std. Err	R	t-statistic	Sig
CSEC	.326	.144	.226	2.256	.026*
(Constant)	1.373	.572		2.401	.018

IaECS					
	Coeff	Std. Err	R	t-statistic	Sig
CSEC	9.882	2.062	.441	4.792	.000***
(Constant)	6.481	8.177		.793	.430

InECS					
	Coeff	Std. Err	R	t-statistic	Sig
NOC	.472	.137	.301	3.446	.001**
(Constant)	1.903	.235		8.080	.000

IaECS					
	Coeff	Std. Err	R	t-statistic	Sig
NOC	5.020	2.180	.207	2.303	.023*
(Constant)	35.244	3.744		9.414	.000

InECS					
	Coeff	Std. Err	R	t-statistic	Sig
NSOC	.536	.182	.261	2.950	.004**
(Constant)	1.821	.290		6.277	.000

IaECS					
	Coeff	Std. Err	R	t-statistic	Sig
NSOC	7.456	2.843	.234	2.622	.010**
(Constant)	32.183	4.544		7.083	.000

Model		Coefficients		R Square	t	Sig
		B	Std. Error			
1	(Intercept)	3.263	1.570		2.079	.042
	CSEC	.993	.400	.102	2.480	.016
2	(Intercept)	2.572	1.576		1.632	.109
	CSEC	.808	.409		2.004	.060
	NSEP	-.696	.367	.159	-1.894	.064
3	(Intercept)	2.914	1.586		1.837	.072
	CSEC	.912	.408		2.237	.030
	NSEP	.926	.404		2.295	.026
	NSEAA	-.499	.374	.187	-1.333	.189
4	(Intercept)	2.444	1.628		1.501	.140
	CSEC	.937	.407		2.305	.025
	NSEP	.635	.471		1.348	.184
	NSEAA	-.657	.396		-1.660	.105
	NSER	.871	.732	.209	1.190	.240
5	(Intercept)	2.366	1.626		1.468	.149
	CSEC	.896	.408		2.198	.033
	NSEP	.492	.490		.983	.330
	NSEAA	-.694	.397		-1.749	.086
	NSER	.882	.730		1.208	.233
	ARI	.352	.323	.227	1.092	.280
6	(Intercept)	2.782	1.656		1.680	.099
	CSEC	.899	.406		2.211	.030
	NSEP	.527	.490		1.074	.288
	NSEAA	-.669	.396		-1.689	.098
	NSER	1.184	.773		1.531	.132
	ARI	.381	.323		1.181	.245
	NSOC	-.768	.664	.248	-1.156	.258

Table 1. Bivariate Regression Models

Further shown by these findings, InECS correlated significantly with NSEP and NSER at 0.294 and 0.314 (p=0,001) respectively. IaECS correlated significantly with NSEP and NSER at 0.417 and 0.332 (p=0.001) respectively.

Additionally, the findings suggested that eBusiness solutions overall, impact organizational leadership on a very positive note. By these findings, the relationship of the variables will help leadership to determine level of allocation of investments in their institution's eBusiness solutions.

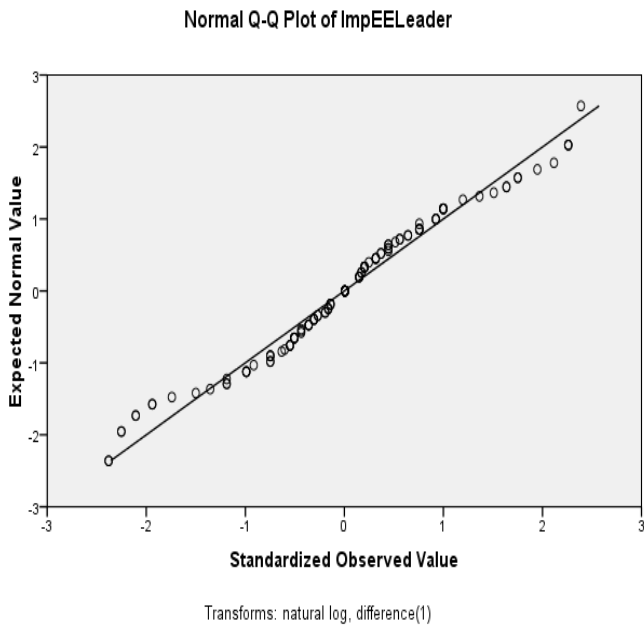


Fig.3. Q-Q Plot of IMPEELEADER

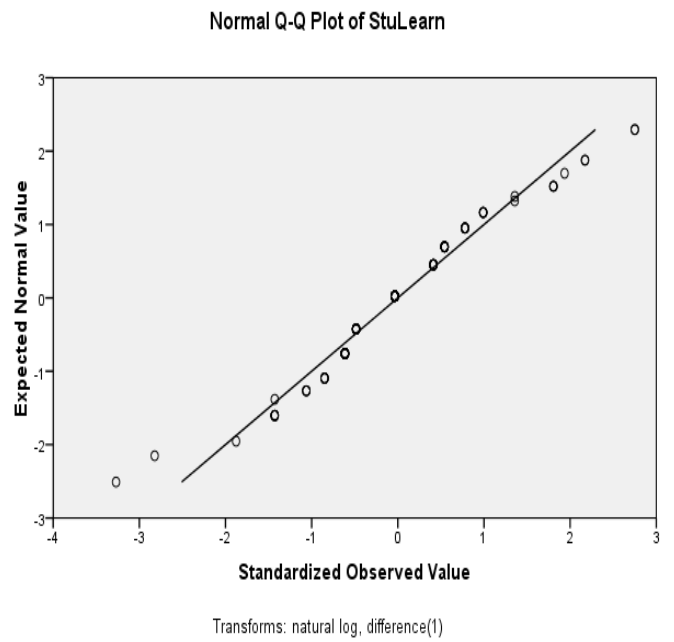


Fig. 4. Q-Q Plot of STULEARN

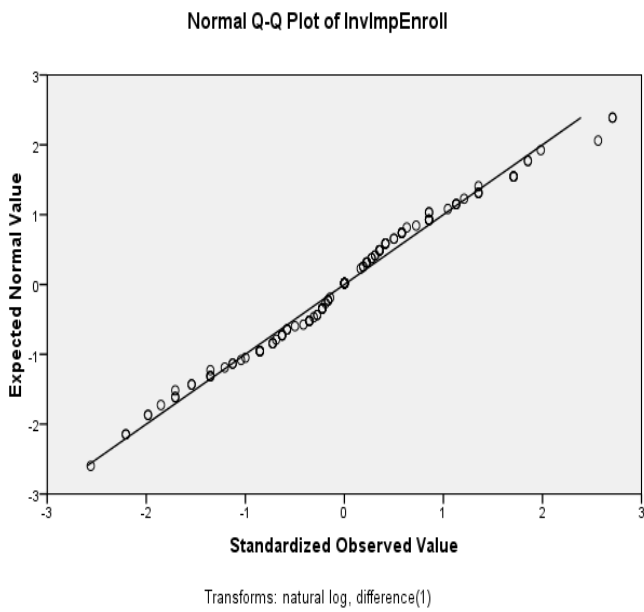


Fig.4. Q-Q Plot of INVIMPENROLL

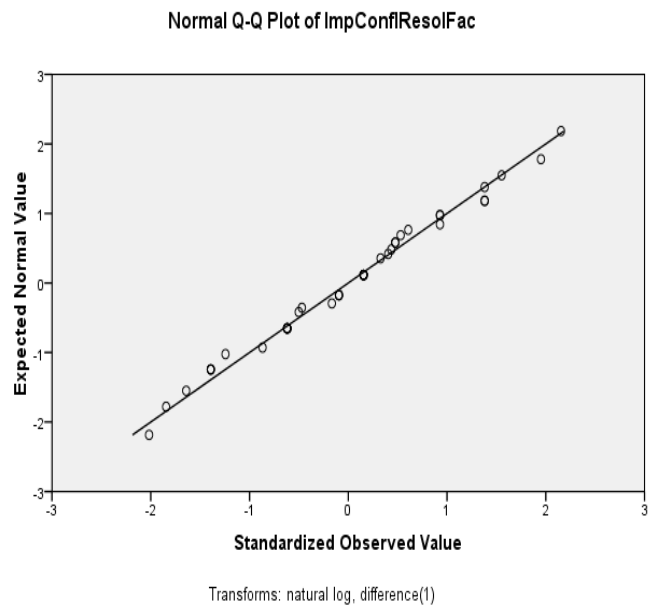


Fig. 5. Q-Q Plot of IMPCONFLRESOLFAC

VII. CONCLUSION

The purpose of this study was to address the underexplored area in E-Commerce, by reconnoitring the impact of E-Commerce/E-Business at Historically Black Colleges and Universities and their organizational leadership/hierarchies. Statistical analyses performed included univariate, bivariate, and multivariate analyses with the objective of identifying the

specific impact of eBusiness solutions at HBCUs. It is argued that if adequately installed, eBusiness solutions, improves effectiveness and efficiency of organization leadership at HBCUs. Additionally, not only do these new findings reveal factors that impact the success of eBusiness at HBCUs, but also show the level of investment that must be allocated to the acquisition various components of eBusiness solutions at these institutions. This is critical in leadership decision-making process. As shown by this study, the number of years of adoption of eBusiness solutions, on the other hand, is not affected by any of the independent variables. These results show that institutions must critically take into consideration their organizational fabric and invest in the appropriate and suitable eBusiness solutions; else the length of time eBusiness solutions are put to use at institutions will not impact positively on these institutions.

This study findings, in addition to serving as expository that E-Commerce solutions have positive impact in HBCUs, also provide detailed information factors leadership vis-à-vis level of investment in E-Commerce solutions, transaction cost, revenue generation, budget increase, increased E-Commerce solutions, student enrollment growth, quality of educational programs, increased online courses and degree offerings, increased employee and student morale, reduction in time in flow of information at these HBCUs. The results provide level of initial investments and β coefficients necessary to impact positive change at their institutions. These new findings are vital to leadership decision-making process in the implementation and maintenance of E-Commerce solutions at HBCUs. This level of positive impact, varied on various the components of E-Commerce solutions.

Divulged from the analyses is the fact that while NoECS, InECS and IaECS correlated with the dependent variables or indicators, NaECS did not show any correlation with the indicators. Univariate statistics revealed a central tendency variability and dispersion of collected data for both dependent and independent variables.

The motivation for this research was galvanised as a result of the colossal surge in E-Commerce or E-Business solutions at Higher Educational Institutions globally as hailed in recent literature. The majority of the research on E-Commerce solutions effects at organizations has focused on revenue generation, profit realization and customers' impression regarding image and reputation of organizations (Cherian, 1999; Kopp, 2000). Further, without data demonstration of how the expository results were arrived at and with a focus on non-HBCUs, literature has inferred positive outcomes of E-Commerce on these non-HBCUs (Branch, 2002; Chnapko, 2002; Goral b; Goral c; Olsen, 2000; Sherman, 2003). Conversely, research on their successes and failures has been minimal (Gil-Garcia, 2005; Gil-Garcia, 2006). Moreover, there has been no known research has been conducted on the effect of these E-Commerce solutions on organizational leadership/hierarchies at HEIs, which is vital to their strategic mission and planning. Lee, Park and Ahn (1992) posited that

studying the impact of E-Commerce with respect to the magnitude in investment is a difficult problem. A more difficult problem is the problem of establishing the degree of the impact of E-Commerce on administrative hierarchy and organizational leadership. HEIs are interested in having a clear understanding of the returns on their investments (Fraumeni, 2001; Olsen, 2002).

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REFERENCES

- [1] Aird, A. (2001). eCommerce in higher education: can we afford to do nothing? *Aridne* 26.
- [2] Armstrong, B., (2002), A virtual assessment of historically black colleges and universities. *Technical Report: Public Administration Program, Applied Research Projects, Texas State University.*
- [3] Bartlett II, J.E., Kotrlik, J. W., & Higgins, C. C. (2001). Organizational research: Determining appropriate sample size in survey research. *Information Technology, Learning and Performance Journal* 19(1), 43-50.
- [4] Bass, B. M., (1995). The meaning of leadership. In J. L. Wren (Ed.) *The leader's companion: Insights on leadership through the ages.* The Free Press New York, NY.
- [5] Branch Jn., A. (2002). E-payment solutions, online remittance, anytime, anywhere: It's the solution students and parents want now. *University Business.* 31.
- [6] Carey, J., (2000). Potential impact of e-commerce on regional australian communities. *Hutchinson Software Web Database E-Business Customers Software Solution.* Retrieved on September 1, 2004 from www.hutchinsonsoftware.com/articles/rural.html
- [7] Chnapko, A. (2002, April). Guide to e-learning, *University Business*, 35-37.
- [8] Chemers, M.M., (1995). Contemporary leadership theory. In J. L. Wren (Ed.). *The leader's companion: Insights on leadership through the ages.* The Free Press New York, NY.
- [9] Cherian, E.J. (1999). Electronic commerce changes organizational structures. *Working Paper.*
- [10] Djoletto, W. (2008). eCommerce and eLeadership: Impact Analyses on Historically Black Colleges and Universities and Their Organizational Leadership. *Proceedings of WSEAS on Applied Computer Science, Venice, Italy, 351-359.*
- [11] Dubin, R. (1959). "Working union-management relations." *The sociology of industrial relations.* Englewood Cliffs, NJ: Prentice Hall.
- [12] Fiedler, F. E., Chemers, M. M. & Mahar, L. (1977). *Improving leadership Effectiveness: The leader match concept.* John Wiley & Sons, Inc. New York, NY.
- [13] Fraumeni, B. M., (2001). E-commerce: Measurement and measurement issues. *The American Economic Review*, 91(2), 318-322.

- [14] Fusilier, M. & Durlabhji, S., (2003). No downturn here: Tracking e-business programs in higher education. *Decision Sciences Journal of Innovative Education*, 1(1), 73-98.
- [15] Gil-Garcia, J.M. (2005), Exploring the success factors of state website functionality: An empirical investigation. *Proceedings of the National Conference on Digital Government Research, Atlanta, Georgia. Digital Government Research Center. Also ACM International Conference Proceedings*, 87, 121-130.
- [16] Gil-Garcia, J.R., (2006). Enacting Websites: A Mixed Method Study Exploring E-Government Success in Multi-Organizational Settings. *IEEE Proceedings of the 39th Hawaii International Conference on System Sciences*.
- [17] Goral, T. (2000). Intelligent admission. *University Business*, 38-41.
- [18] Goral, T. (2003). E-Commerce: Your business solution for solving problems across multiple areas of campus business, e-commerce is unbeatable - Online. *University Business* 40-41.
- [19] Goral, T. (2003c). Taking the pain out of purchasing: E-procurement trends enhance the end-user experience. *University Business*, 56-57.
- [20] Green, K. C., (2001). The 2001 national survey of information technology in us higher education: Ecommerce comes slowly on the campus. *The Campus Computing Project, October 2001*, www.campuscomputing.net
- [21] Gressel, J. (2000). Schools cash in on e-philanthropy. *Book Report*, 19(2), 49-53.
- [22] Hecker, D.E. (2001). Employment impact of electronic business. *Monthly Labor Review, MLR, Washington*, 124(5), 3-16.
- [23] Johnson, C. E. (2001). *Meeting the ethical challengers of leadership: Casting light or Shadow*. London, UK: Sage Publications.
- [24] Kalakota, R., & Rohinson, M. (2000). Electronic commerce. In *Encyclopedia of Computer Science (4th Ed.)*, 628-634. London: Nature Publishing Group.
- [25] Karake-Shalboub, Z., (2002). *Trust and loyalty in electronic commerce: An agency theory perspective*. Westport, Connecticut: Quorum Books.
- [26] Kennedy, M. (2000). The road to e-commerce. *American School & University*, 72(11), 14-18.
- [27] Kraemer, K.L. & King, J.L., (2003). Information technology and administrative reform: Will the time after e-government be different? [Electronic version]. *Heinrich Reinermann Schrift, Postgraduate School of Administration, Spreyer, Germany*. www.crito.uci.edu.
- [28] Kopp, K. (2000). Nonprofits and electronic commerce. *Digital Beat Extra*. Retrieved on September 1, 2004, from www.benton.org/News/Extra/ec062000.html
- [29] Lee, D., Park, J. & Ahn, J., (2000). On the explanation of factors affecting e-commerce adoption. Working Paper.
- [30] Maury, M.D. and Kleiner, D.S. (2002). E-commerce, ethical commerce? *Journal of Business Ethics*, 36(1/2). 21-31.
- [31] Molla, A. & Licker, P.S., (2001). E-commerce systems success: An attempt to extend and specify the delone and maclean model of is success. *Journal of Electronic Commerce Research*, 2(4), 131-141.
- [32] Northouse, P. G., (2004).). *Leadership theory and practice (3rd ed.)*. Thousand Oaks: Sage Publications .
- [33] Okunbor W., & Okunbor D. (2005). Internet and e-business cultural dynamics. *Proceedings of the WDSI 34th Annual Meeting, Vancouver, British Columbia, Canada, 2005*, 258-261.
- [34] Olsen, F. (2000), E-commerce may help colleges cut costs and paperwork. *Chronicle of Higher Education*, 46(33), A45-46.
- [35] Olsen, F. (2002). E-commerce starts to pay off. *Chronicle of Higher Education*, 48(46). 35-38.
- [36] Periasamy, K.P., Ho, W.M. & Bok, C.W., (2002). Organization structure for electronic commerce: a qualitative investigation. *Proceedings of 10th European Conference on Information Systems, Gdańsk, Poland*, 596-610.
- [37] Price Waterhouse, 1997. *Technology forecast*, Price. Menlo Park, California: Price Waterhouse World Technology Centre.
- [38] Ralston, G., Burke, K., Nakayama, D. & Tolani, A. (2000). Electronic mail. In *Encyclopedia of Computer Science (4th Edition, pp. 637-642)*. London: Nature Publishing Group.
- [39] Sarathy, R. and Robertson, C.J. (2003), Strategic and ethical considerations in managing digital privacy. *Journal of Business Ethics*, 46(2). 111-126.
- [40] Schneider, G. P. (2003). *Electronic commerce*. Boston, MA: Thomson Learning Inc.
- [41] Senge, P. (1990). *The fifth discipline: The art and practice of the learning organization*. New York, NY: Doubleday.
- [42] Settoon, R. P. & Wyld. D. C. (2004). The leader of the band: The pivotal role of the academic department head in the pursuit of continuous improvement and innovation in business education. *College Student Journal*, 38(3). 339-349.
- [43] Shelly, G. B., Cashman, T. J., & Vermaat (2001). *Discovering computer concepts for a digital world*. Boston, MA: Course Technology, Thompson Learning.
- [44] Sherman, A. (2003, August). Campus calendaring systems help the college community involved, informed. *The Journal of Technological Horizons in Education*, 34-37.
- [45] Slyke & Belanger. (2003). *E-business technologies supporting the net-enhanced organization*. Danvers, MA: John Wiley & Sons, Inc.
- [46] Sullivan, L. (2002). Written testimony before U.S. senate commerce, science and transportation committee, Retrieved on April 2, 2006, from <http://commerce.senate.gov/hearings/022702sullivan.pdf>
- [47] Technology Forecast (2003). *Enterprise applications: Enterprise suites*. Menlo Park, California: PriceWaterHouseCoopers Technology Center.
- [48] The White House Initiative Office on Initiative on Historically Black Colleges and Universities. *National aeronautics and space administration (NASA) fiscal year 1999 annual performance report to the white house initiative office on historically black colleges and universities (HBCU)*. [Electronic Version]. Retrieved on March 2, 2006.

Wilhelmina Djoletto, Place of birth, Accra, Ghana. PhD.in Organizational Leadership (2008), University of Maryland Eastern Shore, Princess Anne, MD. M.S. in Applied Computer Science (2000), University of Maryland Eastern Shore, Princess Anne, MD. BSc in Computer Science (1998), University of Maryland Eastern Shore, Princess Anne, MD.

She is an ADJUNCT FACULTY at Bowie State University. Previous positions held are Lecturer, Database Manager/Administrator and Instructor. Previous publications include Transient Stability Analysis Using Symplectic Integrators, eCommerce Solutions and eLeadership: Impact Analyses on Historically Black Colleges and Universities and Their Organizational Leadership. Current research interests include E-Commerce solutions at institutions and organizations. Previous research interests include Symplectic Integration and Power Systems..

Dr. Djoletto is a member professional societies including the Golden International Honour Society.