

**E-COMMERCE APPLICATIONS:**

A NEW PERSPECTIVE WITH SPECIAL REFERENCE TO HIGHER EDUCATION INSTITUTIONS IN UNITED STATES OF AMERICA

Dr. Daniel Okunbor\*

Dr. Shivani Arora\*\*

Dr. Wilhelmina Djoletto\*\*\*

**ABSTRACT**

E-Commerce has been instrumental in changing the way of life for people-the way we connect with each other, conduct business, streamlining business operations, and also Education. The mainstay of this paper is the applicability and success of E-commerce solutions at Higher Education Institutions, as perceived by the users of the same, including the students, administrators and the academicians in the US. The overall objective is to study the e-commerce applications in historically black colleges and universities (HBCUs) and evaluate the perception of respondents as to whether there has been increase in productivity, aid in leadership, impact on social communication and administrative environment, customer relation, student satisfaction and administration.

**Keywords:** E-Commerce, Leadership, Higher Education, Mixed Research Approach.

**INTRODUCTION**

Electronic Commerce (or E-Commerce) has substantially changed all the facets of our existence-our life through social networking websites; our businesses by providing the revolutionary online platform to serve the customers; streamlining the business operations through Electronic data interchange(EDI), Supply chain management (SCM), etc; and also Education especially Higher Education Institutes(HEIs) using the web to glean information, emails to get the queries answered and other e-commerce applications for research and studies. The ambit of research for this paper is E-commerce in Higher Education Institutes (HEIs) and hence it is imperative to discuss that Internet originated for the purpose of research in academic areas and government (military) organizations, in order to provide secure and free flow of data between the users. The offshoot of Internet origin was the business using the platform for their own convenience, widely referred to as E-commerce. E-Commerce for business has been more in discussion but nowadays e-commerce and its

applications are being used extensively to provide and manage Higher education Institutions and hence in this particular paper we discuss its impact on Higher Education Institutions in US.

**Chart 1: Brief list of E-commerce solutions applied in Higher Education Institution****Brief list of E-commerce solutions applied in Higher Education Institution**

**Step 1:** Prospective student looks for and finds a Higher Education Institution of his/her choice through Higher Education Institution's websites

**Step 2:** Prospective student applies to the university online (Reference check online)

**Step 3:** Administrative staff at the Higher Education Institution receives the applications, queries, requests, etc. through E-commerce applications

**Step 4:** Once admitted, students and the teachers exchange assignments, queries, feedback online.

**Step 5:** Administrative staff keeps busy, accepting fee online, new queries, applications, verifications, alumni donations, etc.

\*Fayetteville State University, Fayetteville, North Carolina, E-mail: diokunbor@uncfsu.edu

\*\*Shaheed Bhagat Singh College, University of Delhi, New Delhi, E-mail: dr.shivani.research@gmail.com

\*\*\*The Culritzwil Co., Salisbury, Maryland, E-mail: naa\_dagain@yahoo.com



E-commerce has become a universal tool for all aspect of organizational operations, including businesses conducted at higher education institutions (HEIs). Chart 1 enlists a few steps to give a broad overview of the E-commerce solutions in the area concerned. Prospective students glean for relevant information on the institutions of choice online through the respective websites. They send across their queries and geographical distances are dissolved; finally they apply online. The reference checks are also undertaken online. The Administrative departments of the higher educational institutions are the ones whose work has revolutionized with E-commerce solutions, from receiving loads of applications online, handling queries, requests, and verification to accepting fees, alumni donations and much more. The students and the teachers exchange assignments, queries and feedback through E-commerce applications.

Leaders in higher education have come to realize that e-commerce solutions are an indispensable tool for their role in providing visionary direction and strategic planning for their institutions. E-Commerce has gained momentum from the design, development and deployment of software systems supporting them and their applications. With a tremendous growth in Internet-based applications in the commercial and industrial sectors, higher educational institutions (HEIs) and government establishments, in US, have revisited the ways they conduct business and have fully embraced the infusion of Information Technology into their normal business operations. In this respect, a significant amount of their investment has been channeled to a variety of e-commerce solutions, in anticipation of improving the effectiveness and efficiency of the institutions' operations. Lately, the efficacy of such approach has been called to question, that is, have e-commerce solutions added any value to the business management at these institutions? Is the return in investment in e-commerce solutions significant using various important measures, such as, student enrollment; the usage volume; increase in revenue; and effective and efficient business operations?

E-commerce has become a driving force for higher education in a fairly short period of time, helping students and staff with a myriad of tasks and functions

- from streamlining paperwork, paying bills online, and gathering alumni donations, to more accurately forecasting future cash flow. A growing number of schools are reaping big benefits in terms of cost savings; new revenue opportunities; greater administrative efficiencies; and enhanced service and support for students, families, faculty and staff, and others.

## REVIEW OF LITERATURE

E-Commerce has been defined in a number of ways. E-business and e-commerce are used interchangeably but 2013 Workshop on E-Commerce, Development and SMEs WTO, Geneva, Switzerland, the two have been defined as E-business is to facilitate business processes e.g. by communicating with governments, suppliers and clients ; purchasing or selling goods and services on line (e-commerce); automate business processes , manage resources and implement business policies (in marketing, HR, finance, etc.) Working definition of e-commerce, OECD: An e-commerce transaction is the sale or purchase of goods or services over computer mediated networks (broad definition) the Internet (narrow definition). Payment and delivery of the good or service can be offline. Orders received/ placed by telephone, fax or normal mail are excluded. Simon Avenell,(2001), in his paper "Some lessons for higher education from the economics of E-commerce", shares that four lessons emerge from the nexus of higher education and e-commerce, viz., First, campus education is probably a normal good in that demand for it increases with income. Second, electronic commerce alone does not provide grounds for significant changes to university offerings. Third, new partnerships and delivery mechanisms will emerge but not dominate. And fourth, there will be pressure from a variety of sources to enhance campus education in light of the new information technologies and practices. In the book by Shelly, Cashman and Vermaat (2001), E-Commerce was defined as a financial business transaction that occurs over an electronic network. Kalakota and Robinson (2000) in the Encyclopedia of Computer Science defined E-Commerce as an execution of transactions between two or more parties using interconnected networks. This definition was expanded by a detailed explanation of the term "transaction" to mean exchanges that occur when one economic entity sells product or service to another



entity. More importantly, a transaction links consumer (client) to the producer (server).

Stergon(2012) talks of The University of Notre Dame (Ind.), which boasts no less than 36 storefronts offering magazine subscriptions, laundry services, white papers, conference registrations, campus photos, apparel, vending machine snacks for staff, and the golf course pro shop. In the article, "5 Things Administrators Must Know About E-Commerce Now", the author says that campus e-commerce sites actually have a marketing edge over retailers' online stores, but only if departments and IT pay attention to the back end.

Goral (2003b), wrote about how college admissions have made national headlines on the upsurge of student applications and how difficult a task it has become for university admissions offices to carry out their operations; thus, like many Internet-age innovations, online college applications have moved into the realm of out-sourcing thereby contracting services to external vendors through services such as those offered by the College Board. Components of E-Commerce such as E-payment systems are gaining acceptance at schools across the country (Goral 2003a). The web-based solution, according to Goral enables students and parents to receive tuition bills online and pay them using their checking or savings account. Branch (2002) explained E-Payment as a credit card transaction process involving payment of tuition and billing payment for students and parents over the Internet. According to Branch the cost of implementing E-Payment is estimated to be between \$25,000.00 and \$150,000.00.

Also, E-procurement has gained popularity in institutions of higher education. Several universities are already reaping tremendous benefits from the implementation of E-procurement systems, (Goral, 2003c). Goral further described E-Procurement as an online process that includes online purchases, online banking thereby reducing the need for advance paperwork involved with these transactions. These are just a few of the benefits of E-Commerce systems.

The citations in the preceding paragraphs have demonstrated that the results of E-Commerce on the

institutions are positive. Although these results are expository, there is no data demonstrating how the conclusions were arrived at. Cited in the literature, are increases in enrollment and efficiency in procurement process as a result of E-Procurement (Olsen, 2000), faster and efficiency in tuition and bill payments due to E-Payment (Branch, 2002), increased flexibility in course delivery as a result of E-Learning (Chanpko, 2002) and flexibility in event scheduling due to E-Calendaring (Sherman, 2003).

## **OBJECTIVES**

The overall objective is to study the e-commerce applications in historically black colleges and universities (HBCUs) and evaluate the perception of respondents as to whether there has been

- (a) increase in productivity
- (b) aid in leadership
- (c) impact on social communication and administrative environment
- (d) customer relation, student satisfaction and administration.

## **DATA METHODOLOGY**

This research surveys high ranking administrators from a sample of 55 historically black colleges and universities (HBCUs). As reported by the U.S. Department of Education, Office of Postsecondary Education, White House Initiative on Historically Black Colleges and Universities, HBCUs were established to cater for the educational needs of black Americans during the period in which blacks were generally denied admission to traditionally white higher educational institutions. The report also indicated that there are 105 HBCUs, divided into 2- private and public colleges and universities. There are 49 4-year and 4 2-year privately controlled institutions and 41 4-year and 11 2-year public colleges and universities. Reported by the Princeton Review, in an article entitled "Is Historically Black College or University Right for You", HBCUs are categorized as "historically black" or colleges, "predominantly black" colleges or colleges, "having plurality of black students." "Historically black" colleges were established specifically to serve black students and yet open to many white students. "Predominantly black" colleges have more than 50% black population. Colleges "having plurality of black



students" although, comprise a large segment of black students do not necessarily have blacks as majority. The student enrollment at these colleges and universities has been increasing significantly within the past decade and half. This growth in student enrollment may be attributed to a variety of factors, including the rise in the number of electronic commerce solutions at HBCUs. It is imperative, therefore, to study the extent of E-Commerce implementation at HBCUs.

High ranking administrators surveyed included presidents or chancellors, vice presidents or vice chancellors, assistant or associate vice presidents or chancellors, college or school deans, registrars, relevant program directors, and department chairs. Survey participants included also relevant program directors, such as directors for admissions and enrollment, information technology, library, retention, human resources, business and finance, procurement, physical facility and public safety. These managers will have first-hand knowledge of the different E-Commerce solutions at the institution.

## ANALYSIS AND CONCLUSION

### Quantitative/Bivariate Analysis

The integration of qualitative and quantitative approaches in a research study is regarded as a mixed research model (Creswell, 1994; Rocco, Bliss, Gallagher & Pérez-Prado, 2003; Tashakkori & Teddlie, 1998). This new paradigm combines the qualities of both research techniques to produce a more holistic and detailed analyses (Spratt, Walker & Robinson, 2004). The application of mixed research model requires a careful understanding of the goals of the research (Johnson & Onwuegbuzie, 2004). Although new, numerous successes of the application of mixed model are available in the literature.

A total of 53 out of the 55 HBCUs that were surveyed responded. A total of 153 (21.399%) responses from administrators at 53 HBCUs were received. This is acceptable considering the size of the sample. Senior administrators in some of the respondent HBCUs worked together to submit a single completed survey questionnaire to avoid unnecessary duplications and to ensure that someone with appropriate expertise or knowledge actually completed the survey. The

quantitative analysis uses a bivariate Pearson Correlation approach to determine the relationship between dependent and the independent variables described in the tables below.

Dependent Variables	
NoECS	Average number of E-Commerce solutions
NaECS	Average number of years of adoption of E-Commerce solutions
InECS	Estimated average investment in E-Commerce solutions
IaECS	Impact assessment of E-Commerce solutions

Independent Variables	
INVIMPENROLL	Level that investment in E-Commerce solutions impacted student enrolment
POSCUSTREL	The usefulness of E-Commerce solutions in sustaining positive customer relations
STUSATISF	The usefulness of E-Commerce solutions in sustaining students' satisfaction
STULEARN	The usefulness of E-Commerce solutions in sustaining student learning
NOSTUEPAY	Number of students making electronic payments for services provided by the institution
IMAGEREPUT	The usefulness of E-Commerce solutions in sustaining your institution's positive image and reputation
IMPTIMEBUDG	The level of E-Commerce solutions impact on time spent on budget planning
IMPTIMREPGEN	The level of E-Commerce solutions impact on time spent on report generation
IMPEELEADER	The level of E-Commerce solutions impact on effective or efficient leadership
IMPCONFLRESOLSTU	The level of E-Commerce solutions impact on conflict resolutions among students
IMPCONFLRESOLFAC	The level of E-Commerce solutions impact on conflict resolutions among faculty and staff
IMPEFFFACSTAFFEVA	The level of E-Commerce solutions impact on promoting efficient faculty and staff evaluation



From Pearson correlation matrix below, we see that NoECS correlates positively with INVIMPENROLL (R=0.271, P=0.001), NOSTUEPAY (R=0.309, P=0.0001), IMPTIMEBUDG (R=0.409, P=0.0001), IMPTIMREPEN (R=0.363, P=0.0001), IMPEELEADER (R=0.240, P=0.005), IMPCONFLRESOLSTU (R=0.269, P=0.012), IMPCONFLRESOLFAC (R=0.415, P=0.0001), and IMPEFFACSTAFFEVA (R=0.247, P=0.014). InECS correlates positively with INVIMPENROLL (R=0.216, P=0.018), NOSTUEPAY (R=0.294, P=0.001), IMAGEREPUT (R=0.245, P=0.009), IMPTIMEBUDG (R=0.349, P=0.0001), IMPTIMREPGEN (R=0.243, P=0.008), and IMPEELEADER (R=0.322, P=0.0001). IaECS correlates positively with INVIMPENROLL

(R=0.480, P=0.0001), POSCUSTREL (R=0.341, P=0.0001), STUSATISF (R=0.308, P=0.0001), STULEARN (R=0.225, P=0.011), NOSTUEPAY (R=0.417, P=0.0001), IMAGEREPUT (R=0.366, P=0.0001), IMPTIMEBUDG (R=0.516, P=0.0001), IMPTIMREPGEN (R=0.511, P=0.0001), IMPEELEADER (R=0.433, P=0.0001), IMPCONFLRESOLSTU (R=0.421, P=0.0001), and IMPCONFLRESOLFAC (R=0.523, P=0.0001).

It is observed that NaECS did not show any significant correlation with any of the independent variables. This is because the period of adoption is certainly immaterial and is unaffected by the any of the independent variables. Similarly, there were no

		NoECS	NaECS	InECS	IaECS
INVIMPENROLL	Pearson Correlation	.271**	.066	.216*	.480**
	Sig. (2-tailed)	.001	.435	.018	.000
POSCUSTREL	Pearson Correlation	.168	-.078	.117	.341**
	Sig. (2-tailed)	.055	.377	.219	.000
STUSATISF	Pearson Correlation	.117	-.118	.146	.308**
	Sig. (2-tailed)	.182	.176	.127	.000
STULEARN	Pearson Correlation	.151	-.150	.063	.225*
	Sig. (2-tailed)	.091	.095	.520	.011
NOSTUEPAY	Pearson Correlation	.309**	-.002	.294**	.417**
	Sig. (2-tailed)	.000	.979	.001	.000
IMAGEREPUT	Pearson Correlation	.166	-.071	.245**	.366**
	Sig. (2-tailed)	.061	.421	.009	.000
IMPTIMEBUDG	Pearson Correlation	.409**	.040	.349**	.516**
	Sig. (2-tailed)	.000	.646	.000	.000
IMPTIMREPGEN	Pearson Correlation	.363**	.095	.243**	.511**
	Sig. (2-tailed)	.000	.268	.008	.000
IMPEELEADER	Pearson Correlation	.240**	-.005	.322**	.433**
	Sig. (2-tailed)	.005	.957	.000	.000
IMPCONFLRESOLSTU	Pearson Correlation	.269*	-.086	.194	.421**
	Sig. (2-tailed)	.012	.434	.098	.000
IMPCONFLRESOLFAC	Pearson Correlation	.415**	-.062	.163	.523**
	Sig. (2-tailed)	.000	.583	.174	.000
IMPEFFACSTAFFEVA	Pearson Correlation	.247*	.055	.127	.398**
	Sig. (2-tailed)	.014	.592	.237	.000

\*\* . CORRELATION IS SIGNIFICANT AT THE 0.01 LEVEL (2-TAILED).

\* . CORRELATION IS SIGNIFICANT AT THE 0.05 LEVEL (2-TAILED).



noticeable significant inverse or negative correlations. It must be noted that, a significant number of respondents (about 62%) indicated that the investment on E-Commerce solutions has an impact on student enrolment (INVIMPENROLL) with a mean impact level of 4.85. In a similar vein, as noted earlier, NoECS correlates significantly positively with NSEP, NSER, and NOSTUEPAY, suggesting that the number of E-Commerce solutions is a significant catalyst of student enrolment if they are able to register for classes and make payment faster electronically.

Slightly more than 68% of the respondents say that E-Commerce solutions have an impact on the effectiveness and efficiency of institutional leadership (IMPEELEADER) at a level equal to or greater than 5 (on a scale of 1-9) with a mean impact level of 5.19 and standard deviation of 2.329. The Pearson Correlation shows a statistically close relationship between number of E-Commerce solutions (NoECS) and their impact of effective institutional leadership ( $R=0.240$ ,  $P=0.005$ ).

Examining STUSATISF factor, about 60% of the respondents say that E-Commerce solution was useful in sustaining students' satisfaction at an average impact level of over 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. On scale of 1 to 5, the respondents indicated that E-Commerce solutions bolstered the image and reputation of the institution with an average impact level of 3.84 and standard deviation of 0.994. The impact of E-Commerce on positive customer relations and students' satisfaction was not as strong with average impact levels of 3.75 and 3.74, respectively. The fact that these average impact levels for POSCUSTREL and STUSATISF is a clear indication of the validity and reliability of the data. As expected, all three factors POSCUSTREL, STUSATISF and IMAGEREPUT correlate positively with the IaECS. As described previously in this chapter, the NCECS did not correlate with any of the dependent variables. It is likely that the institutions do not maintain records or any form of database of complaints from user of its E-Commerce solutions and therefore, the values given by the respondents may be extraneous. Conversely, institutions regularly

document customers' satisfaction of their of the E-Commerce solutions. As a consequence, the CSEC correlate positively with NoECS, InECS and IaECS. It is believed that clientele satisfaction of E-Commerce solutions impact the image and reputation.

From the Pearson Correlation Matrix, IMPTIMEBUDG and IMTIMEREPGEN correlates positively with NoECS, InECS, IaECS, suggesting that E-Commerce solutions have significant impact on time spent on budget planning and report preparations. Examining the variables IMPTIMEBUDG and IMPTIMEREPGEN separately, it is observed that on a scale of 1 to 9, many of the respondents indicated that E-Commerce solutions contribute to the reduction in time spent on budget planning and time spent the preparation of important administrative reports with average impact levels of 4.69 and 5.36, respectively.

The average impact levels on a scale of 1 to 9 for IMPACONFLRESOLSTU and IMPCONFLRESOLFAC are 3.58 and 3.77, respectively. The average impact levels seem a little low; however, the calculated Pearson Correlation R values show a significant correlation of IMPCONFLRESOLSTU and IMPCONFRESOLFAC with NoECS and IaECS. The number of E-Commerce solutions affects the conflict resolutions among student, faculty and staff. The implication is that E-Commerce solutions facilitate and promote faster and more effective conflict resolutions at all levels of the administration. It is noteworthy that IMPCONFRESOLSTU and IMPCONFLRESOLFAC did not correlate with InECS at an acceptable level of  $P<0.05$ , the computed P values 0.098 for IMPCONFLRESOLSTU and 0.174 for IMPCONFLRESOLFAC.

To address the issue as to whether or not E-Commerce solutions promote effective and efficient faculty and staff annual evaluations, respondents were asked to rank on a scale of 1 to 9, the impact of E-Commerce solutions on effective and efficient faculty and staff evaluations. The average impact level of IMPEFFFACSTAFFEVA was 4.65, indicating that many of respondents felt that E-Commerce solutions have a significant impact on the evaluation process at HBCUs. This is further supported by that fact that IMPEFFFACSTAFFEVA correlates significantly with NoECS and InECS with R values of 0.247 ( $P=0.014$ ) and 0.127 ( $P=0.001$ ), respectively.



As indicated earlier, E-Commerce solutions have penetrated virtually every segment of an organization, whether it is a private enterprise, government sector, non-for-profit establishment, small scale business, large scale business, or higher education institution. To say that E-Commerce has improved the efficiencies of administrative activities within an organization may be an underestimation to some and exaggeration to others. The effect of E-Commerce solutions on administrative activities has not been fully studied. Some researchers have developed tools to analyze the impact of enterprise E-Commerce solutions on organizational structures. However, it has not been examined whether or not E-Commerce solutions affect the efficiency in the conduct of administrative activities within an organizational structure. Consequently, we examined the relationship between investment in E-Commerce solutions and efficiency in the conduct of administrative activities using the variables IMPEELEADER and InECS. On a scale of 1 to 9, the respondents claimed with a high average impact level of 5.19 that E-Commerce solutions promote efficient leadership. Variable IMPEELEADER significantly correlates positively with InECS with  $R=0.433$ ,  $P=0.0001$ , suggesting a strong relationship between the variables. It was also found that IMPEELEADER also correlates significantly with NoECS and IaECS with R values 0.240 and 0.322, respectively.

## **QUALITATIVE/CONTENT ANALYSIS**

Participants were requested to comment on the following questions:

1. Please describe briefly your overall perception of E-Commerce solutions. Indicate whether there has been increased/decreased job productivity, increased/decreased usage of E-Commerce solutions, increased/decreased student learning due to E-Commerce solutions at your institution.
2. Please describe briefly your overall perception of the effect of E-Commerce solutions on organizational leadership at your institution. Indicate whether E-Commerce solutions have had any positive impact on social (communication), cultural, and administrative atmosphere at your institution.

Comments from these two open-ended questions were coded and re-coded according to institutions and states,

collapsing common terms and associating with them frequencies. Results showed that the content analyses complemented the quantitative results.

Out of the 53 institutions from 22 states that participated, 24 or 45.28% of all participating institutions (47 Administrators overall) were either at initial stages of E-Commerce implementation or had not acquired or invested adequately in E-Commerce. These institutions are yet to experience full impact of E-Commerce solutions in their daily administrative functions.

Also, 34 or 64.15% of the institutions (80 Administrators overall) of the indicated higher investment in E-Commerce and increased job productivity of administrators due to E-Commerce solutions. There was an indication that E-Commerce solutions bolster satisfaction among administrators, faculty and students.

Analyses from the second open-ended question revealed that 83 administrators from 34 or 64.15% of participating institutions perceived E-Commerce as a positive impact on leaders' global view; enhanced decision-making and increased communications amongst faculty, staff and students; improved cultural and administrative atmosphere; and improved overall organizational leadership. On the other hand, 23 administrators from 14 or 24.41% of the participating institutions perceived the need for increased implementation, the need for cultural shifts to experience full benefits across campus at all levels of administration and the need for assessment to measure social and cultural impact. In addressing the questions, "What impact do the identified applications and implementations have on organizational leadership hierarchies and management at the HBCUs?" 29 (or 54.71%) institutions (60 Administrators overall) reported perceived increased adherence to policy and guidelines pertaining to E-Commerce ethical, legal, social, diversity and accountability issues; increased security measures on networks; and leadership able to analyze situations more effectively. However, 16 or 30.18% of participating institutions (22 Administrators overall) revealed that there is more room for improvement because leaders lack full understanding of E-Commerce; training programs in place; and lack of full implementation of E-Commerce solutions.



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