Adoption of Cloud Computing in the Universities in Kenya

A CASE OF USIU-AFRICA

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Introduction

Kenyan education background:
- Traditional learning in schools and colleges
- Growing number of Private universities
- Human and Structural Resource based strategies
- Spread of Wireless Technology Services - ISPs
- High competition for university educations

Have lead to:
- Open Distant Learning (ODL) solutions
- Loss of monopoly in Education sector
- Education as a Service (EaaS)
- More consumer choices
- Improved quality of Education
Study Objectives

To examine factors that may influence successful adoption and use of Cloud Computing as an alternative to infrastructure based and instructor-led training models in the Universities in Kenya.
Specific Objectives

1. To determine user acceptance and technology appropriateness influences on the adoption of Cloud Computing in the universities

2. To define barriers to the adoption of Cloud Computing in the universities

3. To establish benefits of using of Cloud Computing Education in Kenya
A model of computation and data storage based on “pay as you go” access to “unlimited” remote data center capabilities.

A cloud infrastructure provides a framework to manage scalable, reliable, on-demand access to applications.

Cloud services provide the “invisible” backend to many
Types of Cloud Computing

- **Public cloud** – *that is a* shared Internet infrastructure
- **Private cloud** – *a type that is* run exclusively for organization
- **Community cloud** – *this is a* multi-tenancy community based
- **Hybrid cloud** – provides a combination of two or more
- **Software as a Service** (SaaS) – low cost for good Web-Browsers
- **Infrastructure as a Service** (IaaS) is firm based models
- **Platform as a Service** (PaaS) features highly scalable & convenient
- **Education as a Service** (EaaS) offers Software Storage as a Service (STaaS) i.e. Kenya Education Network data centers
Motivation of Cloud for Universities

• The growing number of students population that is supported by freed education, thus, more and more space is required.

• Instead of continuously expanding the physical space, the virtual space learning concepts can be implemented at much lower costs (Furber, 2013).

• The lessons learned from study may be applied in leveraging educational benefits to less advantaged and geographically dispersed population in different counties in Kenya.
Technology Acceptance Model

Appropriateness
- Currency
- Assistance
- Accessibility
- Ease of Use
- Reliability
- Mobility

Usage

Performance impacts

User Acceptance
- Performance Expectancy
- Social Influence (Enabling Business Environment)

Barriers
- Security and Privacy Risks
- Affordability
- Performance Risks

(Source: Wamuyu & Maharaj, 2011)
Cloud Computing for Universities

THE CONCEPT

Students

SaaS Cloud

Admin. Staff & Lecturers

Developers

IaaS Cloud

Researchers

Paas Cloud

“CLOUD COMPUTING”
Quality of Service (QoS)

In order to support demand:
Either limit use of information services
Or, increase efficiency and effectiveness

Available Resources
Performance, Availability, Capacity, Energy = PACE

E.g. Store and process more data in a denser footprint

QoS, Service Levels
Response Time, Availability

Unit Cost of Resource
$/Capacity, $/per IOP
Capacity per watt, IOP per watt

Leverage improved densities
Remove IT footprint constraints

Boost efficiency, lower unit costs
Improve performance

Do more with what you have
Avoid compromise of QoS
Enable agility and flexibility

Note: Innovation = Do and enable more with less without compromising customer service

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Barriers to Adoption

- Few number of users in the institutions
- Technological appropriateness and the user acceptance
- Cloud computing security controls – network cryptology, interoperability and standards
- Lack of effective cloud education policy – i.e. PaaS
- Self-service provisioning – require Service Level Agreements (SLA)
The Study Population

<table>
<thead>
<tr>
<th>Element Categories</th>
<th>Group Description</th>
<th>Frequency</th>
<th>Percentage %</th>
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</thead>
<tbody>
<tr>
<td>1</td>
<td>Students</td>
<td>15</td>
<td>75</td>
</tr>
<tr>
<td>2</td>
<td>Teaching Staff</td>
<td>3</td>
<td>15</td>
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<tr>
<td>3</td>
<td>Suppliers and Contractors</td>
<td>2</td>
<td>10</td>
</tr>
<tr>
<td>4</td>
<td>Total</td>
<td>20</td>
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</tr>
</tbody>
</table>

Questionnaire Triad

Personal Components
1. User acceptance
2. Ease of Use
3. Appropriateness
4. Accessibility

(Source: Nabil, 2010)
A 5-point Likert-Scale was applied to analyze effects of implicit (negative) against the emergent (positive) poles.
Analysis cont.

"CLOUD COMPUTING"
Adoption in the Universities

(Source: Yadav, 2014)

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Conclusions

• The adoption of Cloud Computing in the universities in Kenya, **would be quite limited due high cost of sustainability.**

• Since there is **high poverty index across the Kenyan population,** Cloud Computing in the Kenya may not yield enough revenue for universities.

• 75 per cent of students **rely on Higher Education Loan Board (HELB),** a condition that may be difficult to change in the near future.

• The **future research** in Cloud Computing, therefore, should focus how **the cost of running Cloud Computing** can be reduced to accommodate a large number of users.