



COMMUNITY COMPUTER CENTRE “DEVELOPMENT AND STANDARDIZATION OF SOFTWARE”

RESEARCH PROJECT PROPOSAL

1. APPLICANT INFORMATION

1.1. Applicant's name			
Surname	Ogunyemi		
First name	Abiodun		
Middle name	Afolayan		
1.2. Applicant's institution and postal address			
Institution	Tallinn University		
Institute	Informatics		
County	Harju		
City/ rural municipality	Tallinn		
Street/ house and postcode	Narva mnt, 25, EE-10120		
Telephone	+37258443025		
E-mail	abnogn@tlu.ee		
Position	Doctoral student and principal investigator		
1.3. Applicant's head of institute			
Surname	Normak	First name	Peeter
Position	Director of Informatics, Professor	E-mail	Peeter.normak@tlu.ee
1.4. Applicant's research supervisor			
Surname	Lamas	First name	David
Position	Professor of Interaction Design	E-mail	drl@tlu.ee
1.5. Person(s) involved in the project			
Surname	Olimpio da Rosa	First name	Isaias

Position	Commissioner for Information and Communication Technology (ICT), ECOWAS	Role	Research co-supervision
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2. PROJECT CONSOLIDATED INFORMATION

2.1. Project data			
Project title	Uptake of HCI practices implementation in software development industry: A comparative investigation of Nordic European states and the ECOWAS (UPHSIDI)		
Project start date	01.09.2013	Project end date	31.08.2017
Project implementation locations (county, city/rural municipality)	Estonia and Nigeria		
2.2. Themes supported from the application round			
<ul style="list-style-type: none"> • Information and Communication Technology (ICT) For Development (ICT4D) <ul style="list-style-type: none"> ○ Regional ICT policy ○ Open source initiative ○ Development and standardization of software 			
2.3. Activities supported			
Fundamental research			
2.4. Project goals			
2.4.1. General goals of the project			
<p>The main goal of UPHSIDI is twofold:</p> <ul style="list-style-type: none"> • First, the goal is to identify the pressing areas of challenge in transferring HCI practices to Software Engineering Processes as the issue of HCI-SE integration has been age-long. To this end, the project is aimed at advancing knowledge in HCI and SE integration. • Secondly, the project is aimed at facilitating the uptake of HCI practices implementation in the software development industry of the Nordic Europe and the ECOWAS. To this effect, the goal is to develop a conceptual framework to enhance the implementation of HCI practices in software application design, and development. <p>The increasing growth in information technologies has caused users' expectations to have greatly increased (Rogers, 2009). Computing applications, systems and services have become pervasive and now dictate how people live, interact, and conduct their businesses (Rogers, 2009). Computer applications, systems, and services are now developed and released on a rapid basis (Harper, Rodden, Rogers, & Sellen, 2008). Thus, the information society is constantly undergoing some sort of technology-push (Steen, 2011). The frequency of development and release of computer applications, systems, and services, and increased users' expectation, also brought couple of</p>			

challenges (Harper et al., 2008).

The human-computer interaction (HCI) field is concerned with the design, evaluation and implementation of interactive computing systems for human use and with the study of major phenomena surrounding them (Hewett et al., 1996). Since inception in 1980s, HCI has a broad goal of ensuring information technology products, systems, and services are easy and safe to use (Memmel, Gundelsweiler, & Reiterer, 2007; Svanæs & Gulliksen, 2008).

The information society has also been challenged by the pervasiveness of software application products, systems, and services, as the need to process, store, disseminate, and retrieve information becomes vital to social, cultural, political, and economic activities of the society (Lytras, 2011; Sasvari, 2012; Webster, 2005). The information society, also called networked society, or information age in some schools of thought is characterized by various e-systems, such as e-health, e-business, e-banking, e-commerce, e-government which are driven by web-based software systems and services.

However, the information society continues to witness failed software projects by the software development industry, partly because software products, systems, and services are created without end-users involvement, which makes such products, systems, and services irrelevant to users' needs or hard to use (Steen, 2011). On the other hand, HCI experts are not involved in the development lifecycle (Myers, 1994).

In order to ensure software products are usable, it is important for the software industry to implement HCI practices in the software development lifecycle. HCI practices are the various design methods, and usability evaluation and have brought lots of improvements to software use. HCI values place huge emphasis on human-centredness in interactive systems (Cockton, 2004).

However, despite many HCI research that have been undertaken and results delivered to the software industry as evident in recent technology innovations such as swiping, speech recognition, eye authentication, touch screen, pattern recognition, zooming, icons, pointing devices, etc, there still exists clear slow uptake of HCI values, and practices as most software designs, services and system still fall short of considerations of HCI.

The UPHSIDI project is aimed at developing a HCI-SE integration model that takes considerations of context, culture, and other social constructs which existing models have failed to integrate. This is important for the developing regions as they appear to be omitted in the software development lifecycle. The goal of this project also aligns with the broad goal of the Community Computer Centre of the ECOWAS which strives to "promote inter best practices in software development within the ECOWAS Secretariat".

2.4.2. Compliance of the project with the development plans of the institutions participating in the project

Information and Telecommunication Technology is one of the Tallinn University's research and development areas as specified in the Research and Development (R&D)

Strategy for 2012 – 2016. The topic of this research is well-situated in the focus of the University’s R&D programme and the Institute of Informatics research programmes.

The research is also relevant to development and standardization of software research agenda of the ECOWAS’ Community Computer Centre.

2.4.3. Compliance of the project with the supported themes set out in the Regulation

The project UPHSIDI is strongly situated in the Community computer centre’s goal of promoting inter-best practices in software development within the ECOWAS. The field of Human-computer interaction since its inception in the 1980s has helped the development of usable software products by recommending value-based practices to software development lifecycle. However, most developing regions have yet to benefit from the contributions of HCI to software development lifecycle, because issues such as context, and culture have yet to be considered largely, when developing software for use in this set of region (Winschiers, 2006).

2.4.4. Project effect on economic development

The software industries of the ECOWAS are expected to play key roles in national and economic development of the member states. The Economic Community of West African States (ECOWAS) has a continuous commitment to achieve the success of the top 31 software industry of the world (India, Ireland and Israel, among the rest). The challenge facing the software industries in the ECOWAS remains the inability “to make inroads into the global software industry”, despite “efforts of both government and industry players” (Abdulai, Kwon, & Rho, 2010). It is expected that the UPHSIDI project would provide a major breakthrough, in terms of what should be the approach to global software development.

2.5. Description of the project research group and its activities

2.5.1. Research group members

-  Abiodun Afolayan Ogunyemi, MCom (Doctoral student and principal investigator)
-  David Lamas, PhD (Professor of interaction design)
-  Isaias Olimpio da Rosa, PhD (Commissioner for ICT, ECOWAS)

2.5.2. The main objectives and methods of the research group

Human Computer Interaction (HCI) as an approved field has been investigated successfully by academics for decades and various findings have been discussed in notable conferences and published in conference proceedings such as CHI, Nordic CHI, OzCHI, BCSHCI, and INTERACT, and in top journals such as ACM TOCHI. Although these results are made available to the software development industry, there are still host of software products, systems, and services that are not unusable. To this end, it is important to describe the transfer process of HCI practices to software engineering processes, and also to describe inherent challenges with HCI techniques and methods.

The identification of factors (obstacles) hindering the uptake of HCI practices by the software development industry is also worthy. As several efforts have been utilized in

developing conceptual models of integration of HCI and SE, it would be important to use these existing models and concentrate more on areas such as culture, context, and other social constructs which have not received much attention and use the findings for the final model in this research.

Considering the stated objectives, the questions we seek to answer are:

- ✚ To what extent are HCI practices being implemented in software engineering processes?
- ✚ What factors enable or inhibit uptake of human computer interaction practices by the software development industry?

In order to answer the two research questions, the research will be adopting mixed methods approach. Mixed methods research is defined as “the class of research where the researcher mixes or combines quantitative and qualitative research techniques, methods, approaches, concepts or language into a single study”(Johnson & Onwuegbuzie, 2004).

Mixed methods research takes a middle position between quantitative and qualitative research and offers a practical and outcome-oriented method of inquiry, based on action, leading creatively to further action and elimination of doubt (Creswell, 2006; Johnson & Onwuegbuzie, 2004).

Mixed methods research is pluralistic, and improves communication among research of different paradigms(Creswell, 2006; Fischler, 2012; Johnson & Onwuegbuzie, 2004). In this way, mixed methods research is considered relevant to investigate the persisting and systemic nature of HCI and Software Engineering integration. It is important to know that due to the multidisciplinary background of HCI, it has been challenging to transfer suggested practices from HCI to software engineering (Memmel et al., 2007; Müller-Prove, 2003). Software Engineering is based on Computer Science. Both fields have different orientations to software development. HCI is informal with most of its methods and techniques and SE is formal and functional in its approach (Phillips & Kemp, 1998).

Considering the human-centredness of HCI values, and practices, the mixed methods research has been chosen to provide some qualitative insights into the research. The research project is divided into three stages. During the first stage, an online pilot survey of software companies in Estonia will be conducted. The survey will be repeated for software companies in Nigeria.

In the second stage, qualitative case studies of one software development company each in Estonia and Nigeria will be conducted. The results in the two stages will be triangulated with literature survey results and be used to prepare the final stage, in which an online survey of selected NORDIC and ECOWAS software companies will be carried out. The results from each region would be used in finalizing the integration model.

2.5.3. The track record of the research group members in R&D and their scientific potential

- ✚ Abiodun is a doctoral student of Information Society Technologies at the Institute

of Informatics, Tallinn University and is doing a research on Uptake of HCI implementation by Software Development Industry.

His research effort is to identify the gaps between the HCI and Software Engineering fields and understand how and why these gaps have affected human software design and development over time. His overall goal is to identify factors that facilitate or hinder HCI values and approaches implementation in software design and development.

Abiodun has backgrounds in Computer Science, Information Systems and information Technology. Abiodun is a Microsoft certified systems engineer, a Cisco certified network associate, and an ITIL V3 (Information Technology Infrastructure Library Version 3) foundation certified. He is a member of the COST Actions IC0904 (TwinTide) and has seven years of expertise in information technology and infrastructure management. He has worked both in government service and multinationals. Abiodun is proficient with structural equation modeling and developed and validated a conceptual framework for determining organisation's readiness for emerging technologies. His research interests include human-computer interaction, interaction design, usability engineering, innovation adoption and diffusion, management information systems, emerging technologies, and cloud security. Abiodun currently has four scientific publications

✚ Professor David Lamas heads Tallinn University's Interaction Design Laboratory as well as the international master programme on Interactive Media and Knowledge Environments. He participates in national and international research projects and tutors several master and doctoral level students as well as post-doc researchers. He concluded his post-doc research at Michigan State University as a member of the team developing the Mobile Infosphere at the Media Interfaces & Network Design Laboratory. David holds a doctoral degree in Computer Sciences by Portsmouth University, United Kingdom, and a MSc degree in Computer Sciences by Universidade do Minho, Portugal. He is a member of the COST Actions IC0904 (TwinTide), IC1002 (MUMIA) and IC1203 (ENERGIC) management committees. David published over 50 articles and earned two best paper awards (5th International Conference on Theory and Practice of Electronic Governance, ICEGOV 2011 and World Conference on Educational Multimedia, Hypermedia & Telecommunications, Ed-Media 2000). David Lamas is a member of the ACM SIGCHI and the IEEE Computer Society having recently co-founded the Estonian Professional Chapter of the ACM SIGCHI. His research interests are Human-Computer Interaction (Interaction Design) and Technology Enhanced Learning.

✚ Dr Isaias Olimpio da Rosa is currently the commissioner for information and communication technology (ICT) for the Economic Community of West African States (ECOWAS). Isaias holds a licentiate degree in Computer Science (by the Faculty of Science University of Lisbon, Portugal), a Master degree in Management Development (by the Euro-Arab Management School, Granada Spain), an Advanced Studies Diploma and a PhD degree in Education and

Human Development (by the University of Santiago de Compostela, Spain). Isaias is a Cisco instructor for CCNA and IT essentials, by the University of Central England in the United Kingdom and Nelson Mandela Metropolitan University in South Africa. Has worked as Software developer for the Center of Information Problems Studies at the Portuguese Catholic University. Was responsible for the management of the whole IT infrastructure of the University Jean Piaget of Cape Verde, from 2001 and 2006. In the same period of time, coordinated the Information Systems Engineering BA degree, at the University, where works as lecturer since 2001. From 2008 to 2012 he headed the Unit (department) of Science and Technology and has been coordinating the Cisco Regional Academy (since 2002), and the Digital Education Lab (since 2007), at University Jean Piaget of Cape Verde. Before his current appointment, Isaias was a post-doctoral researcher at the Institute of Informatics of the Tallinn University. Isaias has over fifteen academic publications.

2.5.4. Research group activities and expected results

The principal investigator of the UPHSIDI project is involved with conducting all the stages of the research. He meets with the main supervisor weekly to discuss progress, present challenges, and create a roadmap for subsequent activities. The project supervisor liaises with the co-supervisor and instructs the principal investigator what and when to discuss with the co-supervisor. The co-supervisor provides field support to conduct the pilot survey and case study of the ECOWAS region. The main supervisor directs the research activities and oversees the pilot survey and case study of the Nordic region. All the parties are involved with the main surveys. The principal investigator launches the survey, collects and analyses the data, and provides the draft reports to both the main and co-supervisors for their feedbacks. The principal investigator prepares and defends the final report.

The expected results are thus:

- Description of HCI techniques and the challenges of implementing them;
- Identification of the obstacles in transferring HCI practices to Software Engineering Processes;
- Establishment of the extent of HCI practices implementation in the Nordic region of Europe and ECOWAS Software Industry;
- Development of a conceptual framework to enhance the transfer of HCI practices to Software Engineering Processes

2.5.5. Existence of the infrastructure connected with the research group activities and a plan for development of this infrastructure

The UPHSIDI project would be using existing facilities at the Institute of Informatics such as the Interaction Design Laboratory (IDLAB), the Centre for Educational Technology (CET), and Community Computer Centre, Abuja, Nigeria. In addition, the following items are imperative:

- ✚ One laptop
- ✚ One Smartphone
- ✚ Two voice recorders
- ✚ Nvivo software license (for audio transcriptions of recorded interviews)

2.5.6. The expediency of the cooperation between the research group members, scientific novelty of the project undertaken by the research group, expected results and added value

The principal investigator and the research supervisor has been constantly holding weekly meetings, discussing the research progress and brainstorming on further tasks and how to accomplish those tasks. Isaias has only recently been included in the team. The principal investigator, since he commenced his studies in September, 2013 has been sponsored to notable HCI workshops namely:

- ✚ TwinTide Autumn Training School in Bled Slovenia,
- ✚ World Usability Day in Tallinn, Estonia,
- ✚ Winter School for Experimental Interaction Design in Tallinn, Estonia.

The UPHSIDI project is expected to provide the following outcomes and contributions:

- Description of HCI techniques and the challenges of implementing them;
- Identification of the obstacles in transferring HCI practices to Software Engineering Processes;
- Establishment of the extent of HCI practices implementation in the Nordic region of Europe and ECOWAS Software Industry;
- Development of a conceptual framework to enhance the transfer of HCI practices to Software Engineering Processes
- ✚ The outcome of this project would enhance HCI practices implementation in software engineering processes in the Nordic region of Europe and ECOWAS, and create a widening of knowledge in the domain of HCI and SE integration.

2.5.7. Anticipated importance of the results of the research group to science and economic development in the EU and Estonia

The UPHSIDI project is considered important to the Nordic states and the ECOWAS. In the Nordic region for example, there is the need to grow the Estonian software industry as the focus of the Western software companies, such as Oracle, Microsoft, in Estonia is limited “to selling and servicing software, and, to some extent, to localization” (Kalvet, 2004). The same notion goes for the ECOWAS whose software industries continue to strive for a placement on the global software industry scale (Abdulai et al., 2010).

2.5.8. Use of project results and reporting on them

In order to share and disseminate the results of this project various top HCI and SE conferences have been targeted. The conferences targeted for the year 2014 are:

✚ **MIDI 2014**

MIDI Conference provides an interdisciplinary forum for academics, designers, developers and practitioners to discuss the challenges and opportunities for enriching human interaction with digital products and services.

(<http://www.midi.pjwstk.edu.pl/index.html>)

✚ **CISTI 2014**

CISTI is a technical and scientific event which brings academic and practitioners together, whose purpose is to present and discuss knowledge, new perspectives, experiences and innovations in the Information Systems and Technologies field.

(<http://www.aisti.eu/cisti2014/>)

✚ **NordiCHI 2014**

NordiCHI is a biennial conference which targets the Nordic region for HCI research. NordiCHI brings together professionals from the academia and industry. This

<p>conference will be quite helpful as it brings designers, educators and practitioners together to brainstorm on the current trends in designs and interactive technology. (http://www.nordichi.org)</p> <p>The results from the pilot survey of Estonia software industry are targeted for this conference.</p> <p>Top HCI journals such ACM TOCHI and IJHCI are also targeted. Furthermore, conference participation in the African region and ECOWAS sub-region are also being considered.</p>
<p>2.5.9. Use of intellectual property</p> <p>The intellectual property of this project will be the creative common framework in order to facilitate widespread implementation of the project results and use of its model in software development lifecycle.</p>
<p>2.5.10. Explain the incentive effect of the project to a partner according to article 8:2 of the General Block Exemption Regulation No 800/2008 in the event that a project partner is an SME (article 2.14 of the Regulation) or according to article 8.3 in the event that a project partner is a large enterprise (article 2.15 of the Regulation).</p>
<p>N/A</p>
<p>2.6. Application and effect of the project results</p>
<p>2.6.1. Effect of the project on the development of science and technology at the national and European/international level</p> <p>Discussed in 2.5.7.</p>
<p>2.6.2. Readiness for implementing the project, support required</p> <p>The support of the Community Computer Centre, Abuja, Nigeria is anticipated in order to conduct a phase implementation of this project. To this end, a home grown application software system or service may be targeted.</p>
<p>2.6.3. Project sustainability</p> <p>The UPHSIDI project is aimed at promoting software development in the software industries of target regions, i.e. Nordic and ECOWAS. The software industry is one of the key economic and national development sectors.</p>

3. ACTIVITY PLAN

Activity	Activity planned start (MM.YYYY)	Activity planned end (MM.YYYY)	Activity performer (applicant / partner1 / partner2)
Literature review	09.2013	03.2014	Abiodun A. Ogunyemi, David Lamas
Pilot Survey (Nordic)	04.2014	05.2014	Abiodun A. Ogunyemi, David Lamas

Case Study (Nordic)	07.2014	08.2014	Abiodun A. Ogunyemi, David Lamas
Pilot Survey (ECOWAS)	10.2014	11.2014	Abiodun A. Ogunyemi, David Lamas, Isaias Olimpico Da Rosa
Case Study (ECOWAS)	01.2015	02.2015	Abiodun A. Ogunyemi, David Lamas, Isaias Olimpico Da Rosa
Literature Review	02.2015	05.2015	Abiodun A. Ogunyemi, David Lamas
Triangulation	06.2015	07.2015	Abiodun A. Ogunyemi, David Lamas
Research Design	08.2015	09.2015	Abiodun A. Ogunyemi, David Lamas
Main Survey (Nordic – ECOWAS)	10.2015	03.2016	Abiodun A. Ogunyemi, David Lamas, Isaias Olimpico Da Rosa
Data Analysis	04.2016	07.2016	Abiodun A. Ogunyemi, David Lamas
Triangulation	08.2016	10.2016	Abiodun A. Ogunyemi, David Lamas, Isaias Olimpico Da Rosa
Project Compilation and Defense	11.2016	08.2017	Abiodun A. Ogunyemi

4. PROJECT BUDGET BY EXPENSE TYPE AND PARTNER

Budget description	Amount (Euro)
One Mac Laptop	2600,00
One iPhone Smartphone	600,00
Two Audio Recorders	300,00
License fee for Nvivo (single user)	1000,00
Conference meetings (8)	8000,00
Air travel to ECOWAS regions (Nigeria, Cape Verde, and Ghana) (6)	5400,00
Hotel lodging and local transports during travels to ECOWAS	2700,00

region (150,00 x 3 nights x 6 trips)	
TOTAL ELIGIBLE EXPENSES	39006,00
Requested aid amount	20600,00
Self-financing	18406,56
TOTAL EXPENSES (Eligible)	39006,00

5. SELF-FINANCING AND INELIGIBLE EXPENSES

5.1. Self-financing

Amount (sum)	Sources for self-financing
TLU - 18406,56	Monthly stipends (383.47x48) (State Educational Funding)

5.2. Ineligible expenses

Amount (sum)	Content of ineligible expenses
N/A	

6. PROJECT INDICATORS

Project effect on horizontal issues (explain if the effect is supporting)
<p>Project effect on environmental protection:</p> <p><input type="checkbox"/> supports environmental protection</p> <p><input checked="" type="checkbox"/> neutral towards environmental protection</p>
<p>Project effect on promotion of equal opportunities:</p> <p><input type="checkbox"/> project directed at promotion of equal opportunities</p> <p><input checked="" type="checkbox"/> project has no effect on (un)equal opportunities, i.e. it is neutral in this respect</p>
<p>Project effect on information society promotion:</p> <p><input checked="" type="checkbox"/> directed at information society promotion</p> <p><input type="checkbox"/> neutral</p>
<p>Explanation – The UPHSIDI project is aimed at promoting the information society's</p>

software systems, and services use. Undoubtedly, the development of products and services relevant to people's need has been problematic in ICT industry generally (Steen, 2011). Thus, the outcome of this project is anticipated to enhance usability of software applications, systems, and services, thereby providing justifications to amount of money spent on software projects.

Project effect on regional development promotion:

directed at regional development promotion

neutral

Explanation – The UPHSIDI project is expected to promote the software industries of the ECOWAS region, through the increased use of easy to use, easy to learn, and safe software products. The UPHSIDI project is also expected to enhance local development of software products in the region and enhance the local sector's advancement towards the global map.

Project effect on civil society development promotion:

directed at civil society development promotion

neutral

Explanation – The UPHSIDI project is aimed at promoting the information society's software systems, and services use. Undoubtedly, the development of products and services relevant to people's need has been problematic in ICT industry generally (Steen, 2011). Thus, the outcome of this project is anticipated to enhance usability of software applications, systems, and services, thereby providing justifications to amount of money spent on software projects.

CONFIRMATION

I confirm that all of the data in this application is correct and reliable and I am prepared to justify the assertions made.

Name	Position	Signature	Date
Abiodun Afolayan Ogunyemi	Doctoral student and principal investigator	aaogunyemi	02.03.2014

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