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Professional Issues in Software Engineering: The Perspective of Uganda

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Abstract: The research paper is dedicated to investigating legal and professional issues in Uganda's software engineering industry. The paper reflects on academic perspectives on the issue and the lack of relevant academic publications that overview the causality behind the software engineering problems in Uganda. The limited amount of literature on the topic that does exist presents a roadmap to solve the challenges potentially. The overview of the software engineering industry of Uganda is presented. Professional issues that are discussed in the paper include not conducting Requirements Engineering Process Improvement, low quality of practical software engineering education in the universities, lack of adherence to international standards, poor career development, and engineers focusing on seeking foreign jobs. Legal issues include a lack of implementation of the relevant law, multi-sector corruption, and the challenges related to the ease of doing business. The research concludes that the multi-dimensional approach that involves state, academia, and companies has to be used to solve the underlying issues.

Keywords: IT industry, software engineering, software development, developing countries, developers, engineers, corruption, outsourcing.

1.0 Introduction

Reflecting the tendencies prevalent in all developing countries, the software development sector in Uganda is experiencing tremendous growth. The quality of the services provided by the companies in Uganda is approaching international standards, which brings professional issue in software engineering into perspective ("ICT Sector Profile", 2016). Software engineering has been found to be at the top of the risk list in the field. It is prevalent in the preset era, whereby personal information is computerized; hence, a software misuse can influence the privacy of individuals, companies, and economies. Software engineers should guarantee the safety of the information given by users during program development. It follows that the judgement that engineers make concerning the acceptable risks is highly ethical.

Academic institutions in Uganda should focus on educating students about the international accepted ethical guidelines in software engineering. It is based on the observation that ethical concerns and professionalism are a critical part of the software engineering curriculum. Often, most of the learning institutions in Uganda overlook the significance of professional issues in software engineering, as the sector is relatively new and has been experiencing momentous growth in the recent past. Learning institutions in Uganda should place more emphasis on professional and ethical issues in software engineering to ensure competent individuals graduate in the profession.

2.0 Related Literature

The literature on professional and ethical issues in software engineering In Uganda is limited, and more research is needed. However, it is clear that the status of software usability in Uganda requires improvement. According to (Tushabe et al., 2008, p. 11), "a concerted effort is needed to change people's mindset and perception that local software development is poorer." Some of the recommendations aimed at improving the status of software usability in Uganda include increasing the presence of the locally developed software, develop software that meets the needs of the public and private sector in Uganda, develop software that is developed by the local stakeholders, and increase the accessibility of the software.

Uganda is looking for opportunities to expand local businesses by adopting outsourcing. In the 2010s, the country has adopted Business Process Outsourcing (BPO) to attract foreign investors. The Computing and Information Technology at the Makerere University in Kampala are cooperating to create more outsourcing opportunities (Van der Linden & Hengeveld, 2009). It is however still unknown how successful these efforts are going to be. The learning institution should be at the forefront in imparting knowledge about ethical and professional standards in software engineering.

The quality of software in Uganda is impacted by not properly conducting Requirements Engineering Process Improvement. The main challenges that stop this implementation from happening are "ambiguous requirements from the clients, lack of user's involvement, and lack of management support (Kabaale,Kituyi & Mbarika, 20)." To improve this, learning institutions should improve their curricula to incorporate ethical and professional issues.

3.0 Professional Issues

Uganda suffers from a skills mismatch when it comes to the professional level of university graduates. There are reports that the graduates of local universities are incapable of performing skillful engineering jobs after graduation because of the lack of professional skills. This stems from the fact that the knowledge that students gain in the university is mostly theoretical rather than practical (Kulabako, 2018). One of the potential solutions to this issue is to invite lecturers to update their practical knowledge at software development companies. Companies, such as Andela Uganda, provide alternative training to in order to "train and empower Ugandans to build globally competitive software development skills and position the country to harness the new software-based economy that is driving development (Kulabako, 2018)." The companies can also partner with universities to upgrade the practical knowledge of students while they are still studying.

The quality of education reflects on the professionalism of Ugandan companies in many ways. The developers in Uganda fail to adopt human design thinking before they build solutions (Obwod, 2019). They are reported to start building solutions with clients without having meaningful conversations and gathering the requirements to implement the solutions. Some of the companies might also be slow at adopting new technologies. Another potential problem is the neglect of soft skills during communication with potential clients and users. The companies ought to invest more in the development of soft skills instead of focusing on technical skills alone. There is also a need to improve collaborative skills and the way the deadlines are handled by Ugandan developers.

Despite the fact that there are many shortcomings when it comes to professional skills, Africa does have a pool of untapped talent that is worth developing. Solving professional issues in the IT field is necessary for the Ugandan economy as the development of the software engineering industry is likely to improve the state of it. To address some of the issues, Ugandan software engineers and people from related professions within the industry started to unite into communities. Communities like Google Development Club at Outbox, Andela learning community, and Women in Technology are formed in the city of Kampala (Wasajja, 2018). The initiatives of these communities are partly dedicated to improving the state within the industry in Uganda by helping each other. However, many initiatives, such as 'GoGlobal' campaign, are focused on helping developers to find jobs in foreign companies (Wasajja, 2018). The reason why this is happening is a low salary rate and limited career perspectives for the developers.

In September 2019, Andela, the leading outsourcing company in the country, let go of 400 junior engineers and staff members. The reason for this is that the company is looking for more experienced engineers to keep up with the demands of a global market ("Andela lays off 400 software developers in Uganda, Nigeria", 2019). Such configurations hit hard on young developers who use their first job as the platform for studying. The state of the IT market currently limits their growth capacity.

Different ethical issues exist in software engineering and should be addressed adequately at the learning institutions in Uganda. These issues are linked to the social impact and nature of the computer technology. Institutions should acknowledge that ethical problems develop owing to differences in expectations and judgment concerning the appropriate courses of action. Learning institutions should teach students to make ethical decisions in the Ugandan context and should empower them to understand that some of the decisions made might not coincide with their beliefs. Students should be equipped with the knowledge and expertise to make well-justified and rational decisions. Ethical courses in Uganda should support professionals by giving them methods and tools that are practical in such contexts. While learning institutions teach the basic principles of ethical software engineering, they should offer practical knowledge that can be applied in diverse contexts. Ugandan academic institutions should act as the foundation for the development of ethical and professional competence in software engineering.

4.0 Legal Implications Involved

The development of the IT industry in Uganda is complicated by legal problems. According to the World Bank annual rating, Uganda is ranked 116 of 190 countries ("Ease of Doing Business in Uganda", 2020). Despite the slight improvements, Uganda still does not have the best business climate for software development companies to strive.

Throughout the 2010s, the country has made several steps to improve the ease of doing business in the country, but some negative setbacks happened as well. The country's legislation and technology have radically

improved trading across borders, which made it possible to outsource and improve the representation of the international companies in the country. Laws on starting a business have also improved during the last decade. In 2017, the country eliminated "the requirement that a commissioner of oaths must sign compliance declarations ("Economy Profile Uganda: Doing Business 2020", 2020)." Since the mid-2010s, the country has made it easier to start a business and proceed with taxes by making it possible to do it online. Registering property in the country is complicated due to the high cost and difficult tax procedures associated with it.

Uganda is a low-income country with an economy that is problematic in many ways. One of the primary reasons why laws supporting businesses might not work is the high level of corruption in the country. The theft of public funds theft in the country is quite enormous, and there are countless cases of corruption involving public officials. According to the Uganda Corruption Report, "the police, the judiciary, and procurement are areas where corruption risks are very high, and under-the-table cash payments are expected ("Uganda Corruption Report", 2017)." The judicial sector of the country is corrupted because of the high probability of political interference.

The corruption in public services impacts the ease of doing business in the country. About 25 percent of businesses report being expected to give gifts to public officials to get things done ("Uganda Corruption Report", 2017). Starting a business in the country is regulated by The Uganda Investment Authority (UIA). There are high risks of corruption when dealing with tax administration, customs administration, and public procurement ("Uganda Corruption Report", 2017). Public corruption and lack of proper financing hinders the education of the software development students and interferes with the growth of the software development industry.

5.0 Conclusions

To conclude, the state of the software development industry in Uganda is quite typical for this industry in developing countries that fail to focus on professional and ethical standards in learning institutions. The initiatives undertaken by learning institutions to improve their curricula together in order to improve the industry is some of the most promising aspects of problem-solving for the sake of the IT industry. Though it is unfortunate that many engineers are seeking foreign jobs and considering leaving the country, it is perfectly understandable why they are willing to do this due to the state of the economy and lack of professionalism and consideration of ethical standards. The initiatives to decrease the knowledge gap of IT students are promising; however, a wider educational reform is required in order to revolutionize the approach to education in software engineering. The companies are focused on keeping up with international standards, but their success largely depends on the legal environment. In the end, the major changes should be made on a state level to make the opportunities of the software engineering industry more extensive.

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