Leveraging Technology in Doctoral Supervision: A Complementary Approach in Kenya's Institutions of Higher Learning

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ABSTRACT

This paper examines previous empirical studies on adoption of emerging technologies in supervising doctoral students. The conceptual framework highlights the relationship between technology use and enhancing quality of supervision process, borrowing greatly from the theory of change methodology. It highlights the challenges and benefits analysis on the use of technology. The aim of this paper is to examine the efficacies of integration of the technology into the supervision process. As a result, it will provide students, supervisors, colleges of graduate boards, training institutions of higher learning, and regulatory bodies with a framework of incorporating the use of technology, based on needs assessment of respective doctoral supervision process.

Keywords: Innovative Technologies; Doctoral Supervision; Quality Supervision, Pedagogy.

1   Introduction

Postgraduate students have expectations of their supervisors during the supervision process (Chiappetta-Swanson & Watt, 2011). Some of the expectations include agreed flexibility, timely feedback, and regular contact. It is noted that in African universities, supervisor's effectiveness is fundamental in keeping postgraduate students informed about their progress, which can be achieved through regular meetings (Bacwayo *et al.*, 2017). This shows that supervisory challenge in doctoral studies is not just an individual concern but also an institutional concern, national, regional and global concern. In Kenya's universities, researchers seem to concur that quality supervision is one the key challenges experienced in Africa and is one of the leading cause of delay in study completion (Barasa & Omulando, 2018; Mbogo & Wambua, 2020).

The Commission for University Education in Kenya (CUE) reported in its findings of 2019 that 50% of doctoral students registered in a given session drop out, while the remaining take as long as 6 years to complete their studies (Nyaundi & Kimani, 2019). This is further affected by programme duration of three years and the maximum number of three doctoral students supervised per each academic year, per supervisor as stipulated by the Kenya's Commission for University Education, Standards and Guidelines for academic degree programmes 2011 (Commission for Higher Education, 2011). In its 2018 report, CUE, made a proposal for identification of strategies and mechanisms to address the low completion rate and dropout among students enrolled in higher education institutions (HEI's) in Kenya. The report acknowledged the low completion rate among doctoral students, considered critical in reducing the low number of doctoral supervisors available in Kenya's universities, once they complete their studies. The commission attributed this, to quality of supervision, programme cost and busy life styles. Quality supervision was considered as one of the key inhibiting factor that result in frustrations, dropout or deferment from the programme. This phenomenon is exasperated by the need of new doctoral applicants' to be allocated supervisors, hence placing more tension on the already strained supervision process (Commission for University Education, 2018).

In appreciating the recommendations of Salzburg II, the doctoral journey being an individualized process, requires structures and support infrastructure to be put in place so as to enhance high quality supervision (European University Association (EUA), 2005). As a result, Kenya's HEI's, ought to give considerable attention to the supervision process, since most doctoral students get frustrated with long delays it takes to receive feedback from supervisors. However, this should not be blamed wholly on supervisors. HEI's in Kenya should ensure appropriate infrastructure and support is given to the supervisors to facilitate online supervision which can be faster, recorded, previewed, ensures flexibility, affords regular contact between the supervisors and students, both individually or when group meetings are scheduled and can be kept as record of student progress and for future reference.

The need for quality supervision is a discussion that every HEI must discuss and explore strategies to remedy (Baptista, 2011). HEI's in Kenya therefore, need to promote adoption and enhance integration of innovative technologies so as to address the challenges of quality supervision and completion rate among doctoral students. This implies that, academic communities in Kenya's HEI's can take advantage of the flexibility brought by online platforms, which have seen heightened adoption during the COVID19 pandemic. Some institutions in Kenya, have conducted online graduations during the COVID19 period, in which doctoral candidates were among the graduates. The doctoral graduates were successful, due to the use of online platforms for supervision and oral examinations. This is sufficient evidence indicating that, adoption of technology can enhance student progression and completion via the online platform. According to eLearning Africa, 50% of respondents in their study were of the opinion that COVID-19 provided new opportunities and strategies for integration of technology in education systems in Africa. In addition, 85% of respondents believed that there will be increased usage of technology in education in years ahead (eLearning Africa, 2020). However, due to increased use of technology during the pandemic, there is need to find dynamic strategies that can improve learning processes, which is also considered a challenge for researchers and practitioners (Sarker *et al.*, 2019)(Sarker *et al.*, 2019). It is on this basis that such opportunities can be explored and integrated into the supervision process of doctoral students, so as to enhance completion rates and reduce dropouts Kenya's HEI's.

1.1 Background of Doctoral Supervision

Doctoral supervision is considered a key step in doctoral studies. Supervision plays a key role in doctoral journey. In African Universities, doctoral supervision is considered inadequate (Mohamedbhai, 2019), which leads to lower completion rates and drop out. In South Africa, there has been concern to ensure constant monitoring of doctoral students to enhance throughput rates and completion of studies (Mouton *et al.*, 2016). This creates pressure for institutions and supervisors, during the supervision process. Considering that most institutions traditionally use the face-to-face approach, COVID-19 has brought into perspective alternative approaches in conducting the supervision activity. According to, (International Association of Universities (IAU), 2011) "the success of the doctoral students depends heavily on the quality of the supervision they can benefit from". In this case, supervisors can always utilize available technologies, when face-to-face meetings are not possible. Online supervision enables students to save on cost, enhance flexibility and promote collaborative supervision and meetings. In a study in Australia, doctoral respondents noted that, they expect prompt feedback from supervisors, which was considered not to be the case (Maor & Currie, 2017).

According to a study in UNISA, Gumbo (2019), opines that supervision demands are enormous, and that such demands can be lessened by leveraging online information and communication technology. He further asserts that, online supervision, provides an array of tools and applications, for supervisors and students online (Gumbo, 2019, p.8, 11). He further noted that training and knowledge on online tools and application was one of the impediments to online supervision. In Kenya, completion rates are considered low, whereas drop out among doctoral students is also high (Commission for University Education, 2018, 2019; E. Mukhwana *et al.*, 2016; Nyaundi & Kimani, 2019; Too *et al.*, 2016). This is majorly attributed to

poor supervision. Technology uptake, is low, and only came into the fore strongly, during the COVID-19 pandemic

The use of e-supervision platforms allows co-management of students with supervisors outside national boundaries, while also, enhancing mixed methods supervision mechanisms (Quintana & Calvet, 2012, p.24). In this regard, the opportunity to utilize online platforms to complement doctoral supervision and improve its quality (Jowi *et al.*, 2018). Premised on these concerns, Institutions of higher learning in Kenya, may have to consider online technologies as a complementary approach to face-to-face supervision.

1.2   Statement of the Problem

In Kenya, there has been low throughput rate among doctoral students, while enrollment has remained significantly high. Most empirical studies point out the challenge of supervision in doctoral. Most doctoral students take long to receive feedback during the supervision process, consequently increasing their time duration for doctoral studies, increased costs, and may cause despair. This implies that supervisor effectiveness is fundamental in keeping postgraduate students informed about their progress. This poses great challenges that affects both full-time and part-time doctoral learners, who undertake their studies by course work or by thesis. International Association of Universities (IAU) notes that doctoral students in Africa find it difficult to physically meet with supervisors or set appropriate times for supervisory meetings. As such, delayed supervision process may lead to non-completion of studies or drop out. Considering that supervision in Kenya, is mainly via face-to-face, COVID-19 pandemic has brought to the fore the need for alternate, innovative, and interactive solution to the supervisory process. In the midst of COVID-19, most higher education institutions (HEI's) have been compelled to seek alternate technological solutions to the face-to-face supervisory process. As the sphere of academic learning remains dynamic, the adoption of technology in doctoral supervision is significant and may gain traction. Adoption of interactive technological platforms to enhance supervision can be a game-changer to the supervisory process; hence can be a well-intentioned investment and practice in doctoral supervision.

2   Doctoral Enrollment in Kenya's HEI's

According to CUE report on university statistics in Kenya, doctoral enrollment in both private and public universities increased from 7,146 to 9,577 and 20,441 in 2015, 2016 and 2017 respectively (Commission for University Education, 2018, 2019). With increased enrollment (Figure 1), comes the challenge of supervision
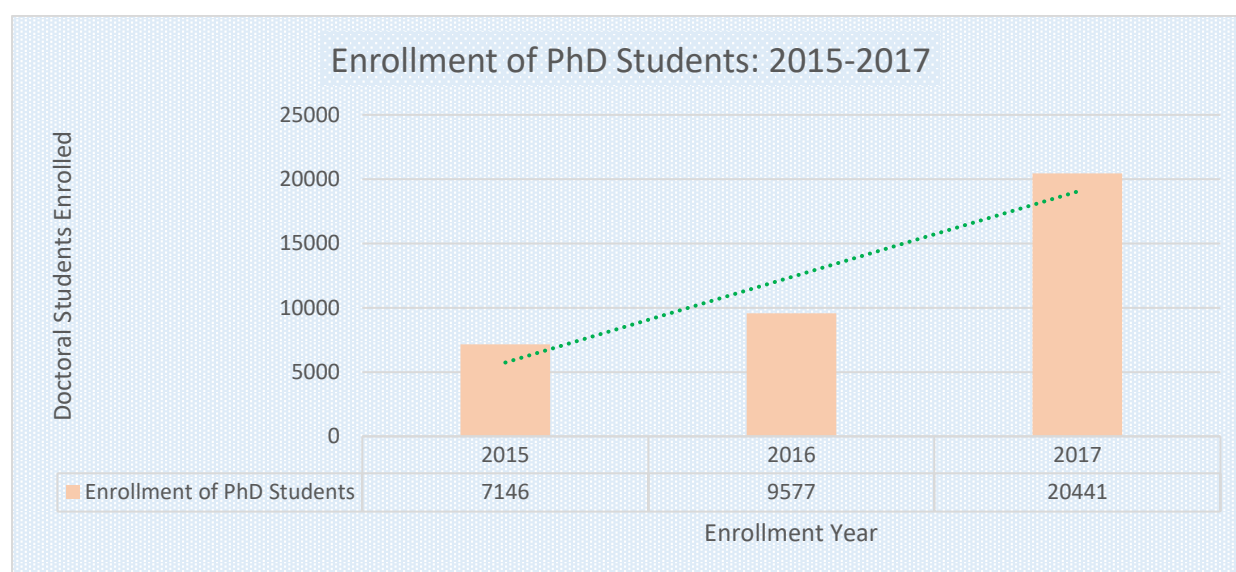

Figure 1: *Enrollment of PhD Students in Kenya: 2015-2017 (Commission for University Education, 2018, 2019)*

The quality of supervision as a challenge of progression requires thorough consideration of strategies to ensure completion of studies within a reasonable time, while discouraging dropouts. Increasing enrollment in doctoral studies do not translate to increased completion rates. This is not the case as shown in Figure 2, where completion trends are on a downward trajectory.

Cases of drop outs are evident to warrant the need for concerted effort to ensure registered students complete their studies, within reasonable time, while reducing the challenges caused by quality supervision (E. J. Mukhwana *et al.*, 2017). Integration of technology as a means for promoting quality supervision is considered central, if the country has to generate enough doctoral supervisors, which is a requirement by the commission for university education in Kenya. As such, acceleration of PhD output, which can be done by integrating technology into the supervision process can produce significant results (Andreas *et al.*, 2016).

3   Doctoral Supervision in Kenya's HEI's

In Kenya, supervision process is documented in postgraduate handbooks as adopting face-to face meetings, at least once per month (Africalics, 2015). However, there is provision for the use of email and other digital media, most supervisors still prefer to meet their students physically. Supervisors are expected to not only provide technical advice, but also guidance, mentorship, hope, coaching and inspiration (Ndiege, 2019). Students also expect their supervisors to be kind and available when in need of guidance. Ndiege (2019) notes that quality supervision is often cited as one of the major hindrances in doctoral studies in Kenya. In contrast, Maina (2019) states that, majority of doctoral students complete their coursework with no hindrances, only to find themselves delayed at supervision level. Some supervisors intimidate students under their supervision due to variety of reasons. These include, enormous workload, delayed payments for previous supervision, while some reasons stem from personal issue.

There is also a growing concern in Kenya's HEI's with regard to supervisors who see students under their supervision as competitors. In so doing, some deliberately fail or delay to support them during supervision process (Maina, 2019). Though, this may be happening, some supervisors perform their supervision assignments exemplary well, thus drawing more students to them, which is limited by CUE regulations on the maximum number of supervised students in each academic year (Commission for Higher Education, 2011). By leveraging technology use, institutions of higher learning can reduce the burden of regular physical meetings, while offering an alternative flexible online meeting. These online meetings can be done with one student or among all students under one's supervision thus making the entire exercise cost-effective, without compromising quality. In doing so, the students under one's supervision can richly benefit from the comments and recommendations made for each doctoral student. Doctoral students Quality supervision of doctoral students is crucial for PhD studies (Manderson *et al.*, 2017). Individual doctoral throughput and ultimately completion, is greatly influenced by quality of supervision they receive. Some supervisors have administrative responsibilities, workload, personal life, own research and writing lead to limited time for individualized supervision. In this case, that technology adoption can be used to complement face-to-face supervision. Furthermore, technology use can be used to reach out to supervisors outside one's country, hence contributing to increased capacity of the number of supervisors in Kenya's HEI's, which is currently considered low.

4   Doctoral Studies Completion in Kenya's HEI's

Programme completion for doctoral students in Kenya is low. CUE puts the completion rate at less than 20% (Wanzala, 2018). Data from 2015-2017 obtained by CUE shows that enrollment trends are increasing whereas completion trends are decreasing (Figure 2 & Figure 3). The Commission reports that, between 2015 and 2016, the country was not able to meet her annual target of 2,400 PhD graduates (Commission for University Education, 2018, p. 58). This was supported by CUE 2015-2016 report, which showed that PhD graduates remained low among other levels of graduations at universities in Kenya (Commission for University Education, 2016, p. 139-141). The country produces an estimated 400 graduates yearly, whereas the it needs a meet a target of 900 (Nyaundi & Kimani, 2019).
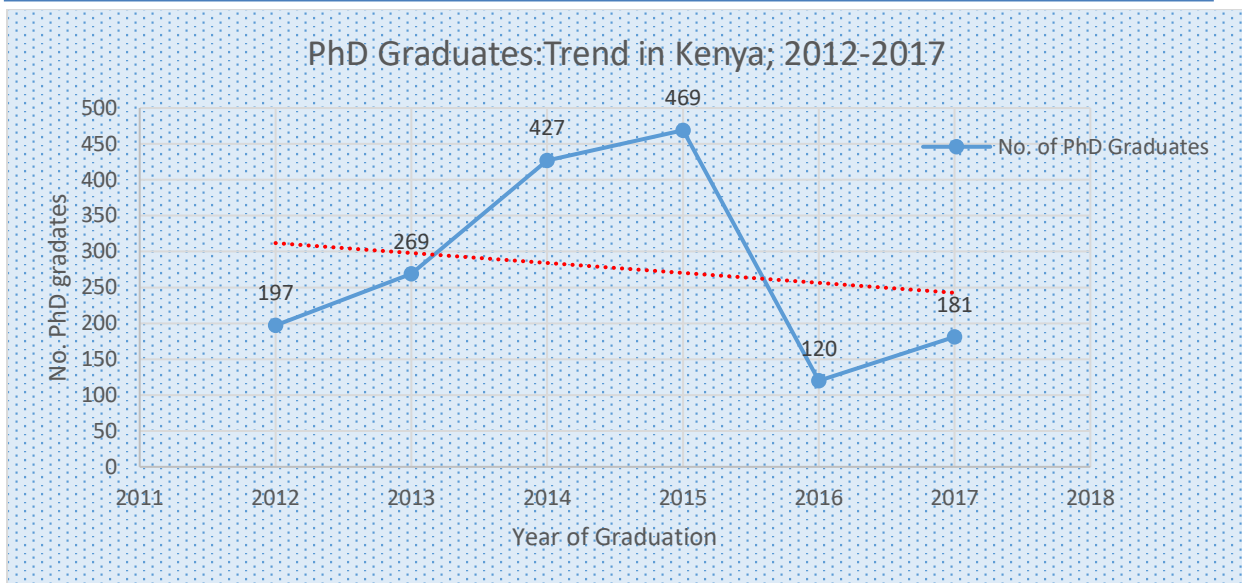
Figure 2: *PhD Graduates Trends in Kenya: 2012-2017 (Commission for University Education, 2016, 2018, 2019)*
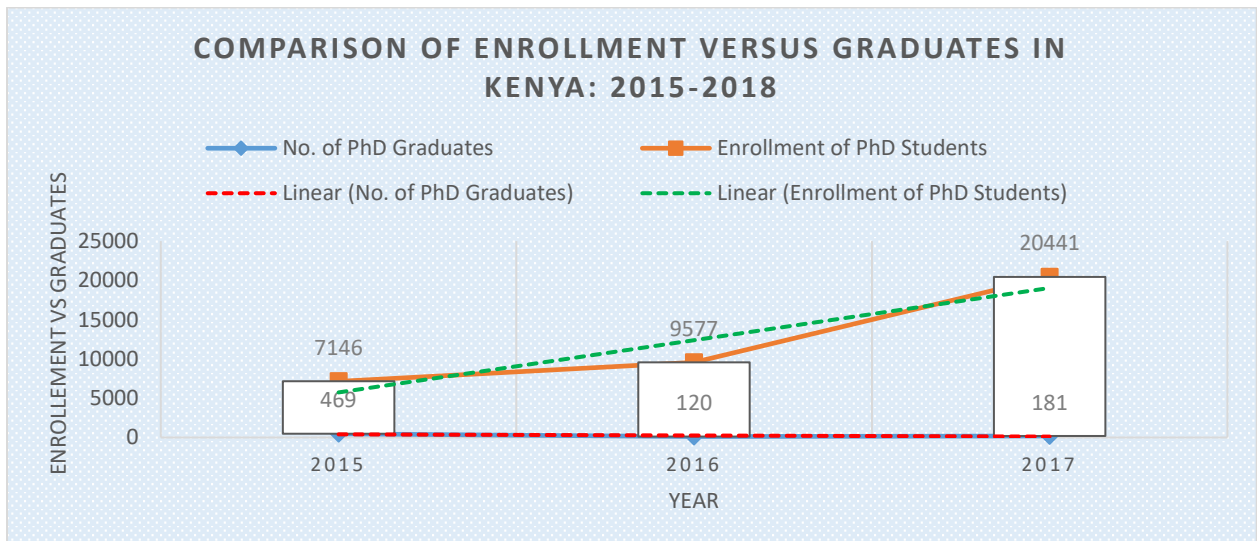

Figure 3: *Comparison of Enrollment versus Graduates in Kenya: 2015-2018 (Commission for University Education, 2018, 2019)*

The Kenya Commission for University Education, considers this figure to be higher at 2,400 Ph.Ds. per year, so at to meet an increase of 10% Gross Enrolment Rate (Commission for University Education, 2018). According to CUE, there were 197, 269, 427 and 469 PhD graduates in 2012, 2013, 2014 and 2015 respectively. As shown in Figure 2, the trend of completion is decreasing, and there is every reason to believe that other than cost and busy schedules, quality supervision plays a key role, due to student despair as a result of long waits for feedback. At times, the long waits is compounded by inability of supervisors to read the student proposals or theses on time, some are not accessible nor available, some supervisors just peruse the document and provide inadequate guidance to the students, while others do not keep record of previous feedback, leading to a back and forth resubmission between supervisor and students. In some instances, the main supervisor and co-supervisors do not move in harmony (Wanzala, 2018). Some give the students contradicting feedback or in some cases similar feedback, which leaves the student in a dilemma on how to incorporate the corrections. Considering the above, the country is not going to meet her target of 2,400 PhD graduates annually any time soon. In this case, some of the inefficiencies arising from the face-to-face meetings can be reduced by embracing new systems such as innovative technologies; zoom, google meets, and Microsoft Teams, among others (Gilbert, 2019). In so doing, students and supervisors

will be afforded flexibility, lower cost of travel and subsistence. This is possible, considering now that in Kenya, internet data service providers are competing aggressively with lower cost for data purchase, which are envisaged to decrease further. or instance, with 5USD or 10USD, one can purchase up to 10GB or 30GB of data monthly. The 4G network available in urban, peri-urban and most parts in rural areas complements low cost of data. However, most PhD students and institutions are well equipped with strong internet connectivity, hence the ability to participate fully in online meeting supervision. The need for adoption of technology to enhance efficiency in the supervision process, will promote progression and completion rates among doctoral students in Kenya's Universities.

The downward trend in graduation (Figure 2) is largely attributed to the quality of supervision (Mbogo & Wambua, 2020). It is further observed that 50% of Ph.D. students drop out from the programme due to poor supervision among other concerns. Others take as long as 6 years to complete the programme, against the set duration of 3 years (Nyaundi & Kimani, 2019). With lower number of Ph.D. supervisors, in Kenya's institutions of higher learning, supervision quality is decreased due to the high number of students allocated to supervisors, despite the guidelines set by CUE.

5   Adoption of Technology in Doctoral Supervision in Kenya's HEI's

Supervision at doctoral level in Kenya is mainly through face-to-face meetings. Some supervisors and students meet in restaurants, hotels, within university premises or in respective offices. COVID19 has provided significant opportunity to carry out the same activity online, using varied technologies such as zoom, google meets, Microsoft Teams, Skype among other novel platforms. A study in two Australian universities in 2017 showed that Most were also using Skype if face-to-face was not possible. The use of track changes on Word documents and sending via email, Dropbox or during skype meetings, were used mainly. Other supervisors in the study used iAnnotate, twitter and Google Hangouts. The report showed that, doctoral students were proactive, going to an extend of recording discussions with the supervisors for later referencing (Maor & Currie, 2017, p.7). The study reported that doctoral students strongly how important it was for them to receive prompt feedback from supervisors. Conversely, supervisors opined that some students expected instant feedback, and recommended the need to agree among students the set schedules and adhere to them so as to promote work-life balance. The study however, observed that one of the key challenges in technology adoption for supervision was "poorly implemented institutionalized use of technology" which was noted to be common among institutions who negative viewed its adoption and use. It is important to note that, COVID19 has provided opportunities for technology assisted learning, due to innovative array of technological media and platforms (eLearning Africa, 2020). Supervision of doctoral students in Kenya is quite weak (Too *et al.*, 2016, p. 13). This according to CUE, is also hampered by less human resource capacity in universities. The adoption, integration and acceptance to utilize emerging technologies, is envisaged to provide more flexibility and promote collaborative supervision among students and supervisors, hence reducing dropout rates and enhancing completion among doctoral students.

COVID19 has brought into focus the significance of online supervision. Mount Kenya University, being one of the institutions in Kenya to move all students to the online platforms, also required students and supervisors to utilize the platforms for supervision, oral examinations, and defense seminars (Mathaai, 2020). This is a common phenomenon in most universities in Kenya, and doctoral students, who usually have to travel from far, have welcomed the new arrangements. However, most students have raised concerns on internet connectivity, and at times less knowhow in navigating the platforms. This can be mitigated by ensuring institutions provide training sessions for any technology platform adopted. Students on the other hand, can also be encouraged to self-train, using the numerous freely available training manuals and instructional videos available in YouTube and relevant websites.

6   Challenges Facing ICT Adoption in Doctoral Studies in Kenya

Doctoral students in Kenya face the challenge of inadequate internet infrastructure. These includes information communication technology (ICT) tools and information access (International Association of Universities (IAU), 2011). In acknowledging the challenge of quality supervision as an impediment to completion of doctoral studies, the report reveals one of the key challenge affecting students in Kenya's HEI's and the dynamism of technology can be given consideration so as to mitigate arising challenges encountered by supervisors and students during supervision. The negative effect of poor supervision is the quality of the research output, which may not address fully the expectation of the candidate and the research itself. IAU, in its recommendation to address the challenge of supervision, opined that there was need to develop capacities for e-supervision. This therefore creates an impetus for improved supervision quality, thus promote student satisfaction, and hence increase completion rates among doctoral students.

Doctoral supervisors have raised the issues of students sending emails and text messages, expecting immediate feedback. In other instances, some students indicated they were apprehensive with online technologies, hence, the need for training. In other cases, students consider written feedback harsh when they see many revisions and comments (Maor & Currie, 2017). These can be mitigated through online video meetings, where screen sharing can enable interactive session, mirroring a face-to-face meeting.

7   Recommendations

As higher education institutions continue to expand its services globally, competitiveness becomes key aspect of internationalization process. As such, universities can leverage emerging technologies so as to promote access, flexibility and cost-effectiveness of supervision process among doctoral students. Such endeavor, will enable universities in Kenya, engage supervision services of competent supervisors nationally, regionally, and internationally on cooperative or co-supervision, where competent among faculty can be sourced outside the university. It is my considered assumption, that ALL doctoral students and supervisors own a smart phone/tablet/laptop. In addition, most doctoral students live in urban centers and are working (due to nature of their lifestyles). Hence, they are located in regions with adequate internet connectivity. Through sensitization and training, the challenge of knowhow in navigating the platforms, can be alleviated. Students and supervisors on the other hand, can also be encouraged to self-train, using the numerous freely available training manuals and instructional videos available in YouTube, Udemy, Futurelearn and other websites. This also, comes with; the requirement for universities to ensure prompt payments for services rendered so as not to impede the process.

As such, the study recommends the following;

- Institutions of higher education (HEI's) ought to adopt the innovative technology in doctoral supervision so as to enhance efficiency in the supervision process, monitor progress and to assess completion rate.
- The use of innovative technology in doctoral supervision, facilitate collaborative pedagogy, where students under one's supervision can be scheduled in the same meeting, together with respective supervisor. This will enhance time management and collaborative learning among the students. Divergent views and recommendations from supervisors and students alike can be harmonized during such meetings. This approach, underscores the reduction in costs of travel, while promoting flexibility.
- The use of innovative technology leads to new opportunities for developing and promoting intra-African cooperation during supervision, and thus integrating distance learning into education,
- Doctoral students can be paired with other students within HEI's in Africa, thus promoting sharing innovative ideas, and best practice.
- HEI's to be left with liberty to choose or recommend appropriate technologies for their supervisors and students. However, where supervisors and students show preference, for a different medium,

institutions should be willing to accommodate. This is because some supervisors are members of research consortiums or projects hence may be subscribed to a particular online platform.

8   Conclusion

Empirical data on adoption of innovative technologies in supervision in Kenya remains low. During the COVID-19 pandemic, most universities commenced revision of policy guidelines to include the use of technology for supervision, oral examination, and seminar presentation. This initiative has seen students cleared to progress and graduate, indicating that it can provide an alternative approach to doctoral supervision. This also shows that technology use can provide an alternative for face-to-face supervision, or rather; institutions can minimize the use of face-to-face, where cost, flexibility and collaborative supervision is considered. One of the advantages accruing from online-supervision is the ability to network and involve supervisors nationally, regionally and internationally. Since, most technologies, offer the advantage of video, voice, text and sharing of documents streaming, institutions of higher learning can consider this a flexible. Institutions who serve students within diaspora, or admit international students, can benefit greatly from innovative technologies such as zoom, Microsoft Teams, GoToMeeting, Skype, ezTalks Meetings, StarLeaf, Cisco Webex, Google Hangouts, among others. Some of the web platforms have to be purchased, while others offer free introductory packages, or with limited service, which remain beneficial to the doctoral supervision process.

9   Competing Interests

The author did not disclose any known conflict of interest in this publication.
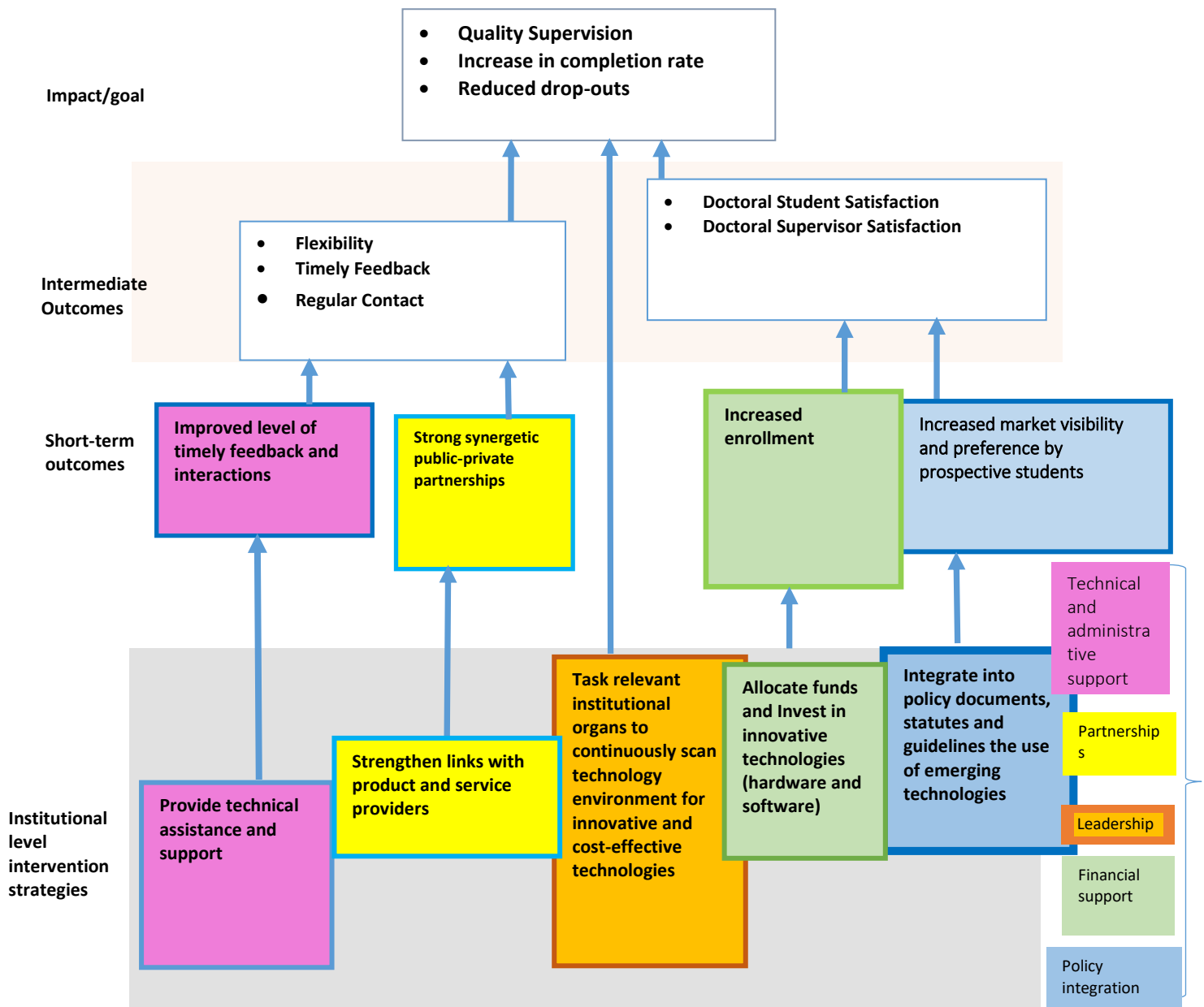
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Annex A – Conceptual Frame for Integration of Technology in Doctoral Supervision

Impact/goal

- **Quality Supervision**
- **Increase in completion rate**
- **Reduced drop-outs**

Intermediate Outcomes

- **Flexibility**
- **Timely Feedback**
- **Regular Contact**

- **Doctoral Student Satisfaction**
- **Doctoral Supervisor Satisfaction**

Short-term outcomes

Improved level of timely feedback and interactions

Strong synergetic public-private partnerships

Increased enrollment

Increased market visibility and preference by prospective students

Institutional level intervention strategies

Provide technical assistance and support

Strengthen links with product and service providers

Task relevant institutional organs to continuously scan technology environment for innovative and cost-effective technologies

Allocate funds and Invest in innovative technologies (hardware and software)

Integrate into policy documents, statutes and guidelines the use of emerging technologies

Technical and administrative support

Partnerships

Leadership

Financial support

Policy integration