THE EMERGENCE OF TECHNOLOGICAL LEADERSHIP AMID THE PANDEMIC: *REALIZING POTENTIALS AND PRACTICES*

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ABSTRACT

This study utilized a sequential explanatory mixed-methods research design to explore the school head's technological leadership amid the pandemic and delve into the school head's technological potentials and practices. The respondents to this research are the 67 school heads in one of the school divisions in Region 4A and 339 teachers. Based on the result, there is no significant relationship between school head technological leadership and teachers' technological competency (p-value = 0.789 and r-value =.015). The noteworthy result of this study is that there is a significant relation to age [χ^2 (2, N=67) = 11.58, p=.003]., length of service (in reverse) [χ^2 (2, N=67) = 6.69, p=.035], and highest educational attainment [χ^2 (1, N=67) =.04, p=.843]. The following themes emerged from the participants interviews with the school head on technological practices: learning delivery with technology, professional development for teachers, strengthening of mentoring and support, collaboration with local, national, and international academic and professional development institutions, and strengthening technology utilization for management and administration. The significant recommendation of the study based on the Escalaw's Technological Leadership Framework is that DepEd may further the technological information structure and infrastructure in all schools; may consider creating a technological training department in every division for the enhancement of technological skills for teachers and especially for school heads.

KEYWORD*: TL Potential, TL Practices, Technological Leadership, Explanatory Sequential Mixed Method, Digital Transformation*

INTRODUCTION

The technological advancement of schools has the potential to revolutionize the educational system and its electronic native pupils. Technological leadership in education is required, as it focuses on a leader's attributes to motivate staff to incorporate technology within the organization. Technology leaders should have strong ICT capabilities, develop ICT potential strategically, and engage and inspire instructors to utilize ICT more effectively. The Philippine Constitution states that it will establish, maintain, and support a complete, adequate education for the sovereign people. In line with this, the Department of Education (DepEd) is committed to the unhindered delivery of basic education services to its learners and the community amidst the public health emergency caused by the COVID-19 pandemic. The DepEd Order (DO) No. 012 s. 2020 mandated continued learning opportunities for students while protecting and safeguarding teaching and non-teaching personnel. The learning delivery through blended learning, distance learning, and homeschooling (DO No. 032 s. 2020) was implemented.

The Governance of Basic Education Act of 2001 mandates school heads to be technologically savvy and updated on technology. The COVID-19 pandemic has emphasized the need for technological leadership in educational institutions, as leaders must anticipate and respond quickly to crises. In the 21st-century digital education, leaders must be technologically proficient to provide teachers with technological assistance and adapt to digital learners. Technology leadership involves decision-making, guidelines, policies, and implementation. The Department of Education (DepEd) has issued a Google Workspace Training Program to upskill personnel in technology. This study examines the technological leadership of school heads during the pandemic and how their practices contribute to the digital transformation of the Department of Education.

METHODOLOGY

This investigation will employ an explanatory sequential mixed technique. This technique comprises performing quantitative research first, assessing the results, and then using the results to complement qualitative research that delves deeper to explain the findings (Creswell & Creswell, 2018).

RESULTS AND DISCUSSIONS

The level of teachers' technological competencies, with twenty-four indicators, is subdivided into seven constructs: learner, leader, citizen, collaborator, designer, facilitator, and analyst. Based on teachers' technological competencies, the teacher as Citizen got the highest rating (M = 6.99), while the teacher as Analyst got the lowest (M = 6.64), but both are verbally interpreted as high. However, all teachers' technological competencies fall under high verbal interpretation. The overall mean score of the Level for Teachers Technological Competencies

was (mean = 6.77) with high verbal interpretation. The result implied that teachers' technological competencies were high-level.

The study reveals high teacher technological competencies, indicating continuous professional development. During the lockdown, teachers have access to numerous technological webinars and trainings from the Department of Education and non-governmental providers like Eryutech and Vibal. Hero's (2020) research supports this, stating that teachers are proficient technology users in teaching and learning. Teachers should actively embrace technology and pursue advanced technological professional development programs to improve student learning.

The overall descriptive result of school head technical leadership is high (M = 7.21), supporting Hero's (2020) findings. Technology leadership in a school involves enthusiasm for technology use and the implementation of technology professional development for teachers. Technology leaders play a crucial role in guiding and teaching the use of technology in education. They manage and run schools, promoting technological integration and knowledge. School administrators must possess the skills and knowledge to incorporate technology into every educational process. When learning objectives and outcomes are correctly matched, learning professionals can form long-term collaborations with technology specialists to find and select appropriate solutions. Technology leadership significantly impacts the adoption of digitally enhanced teaching and learning.

The test of a significant relationship between school head technological leadership and teacher technological competencies utilizing the Pearson r correlation resulted in a non-significant relationship. Furthermore, the Pearson correlation has a p-value of 0.789 and an r-value of 0.015. The results of the correlation analyses reveal that there is no significant relationship between the technological competencies of the teachers and the technological leadership of their school heads. Since the computed p-values are all greater than the 0.05 significance level, the decision is not to reject the null hypothesis.

The study found no direct correlation between the school head's technological leadership and teachers' technological competencies, but digital leadership positively influenced teachers' technology usage during COVID-19. Factors influencing this relationship include professional development, classroom technology use, ICT training, and equipment availability. However, according to Schwab (2018), technological leadership should be alongside the digital world and digital education (Erkulova et al., 2020; Bocanet and Fleseriu, 2020; Matos et al., 2019; Frick, 2020; Anas, 2019).

The result of the Chi-square test on the significant relationship between school head technological leadership and demographic profile is as follows: significant with age, χ^2 (2, N = 67) = 11.58, p =.003; length of service, χ^2 (2, N = 67) = 6.69, p =.035; and highest educational attainment, χ^2 (3, N = 67) = 8.50, p =.037. However, the school head technological leadership relationship was not significant with sex χ^2 (1, N = 67) =.04, p =.843, and position χ^2 (4, N = 67) = 4.89, p =.299. The study by Minaz, Özel,

and Ay (2022) reveals that older school leaders often lack technical leadership but not school performance. Visionary leadership is crucial for transforming schools, and principals must have a plan to implement changes efficiently. Younger teachers have stronger digital competencies, while older individuals have lower technological skills. Gender doesn't affect a school principal's level of technological leadership or digital citizenship. Higher educational attainment is associated with greater overall technological leadership.

The research of Hecker et al. provided support for the conclusions. According to the investigation done in 2021 with older and younger Americans, the more educated a person is, the more likely they are to be digitally literate, and the less likely they are to have little or no digital abilities (Hecker et al., 2021). Other studies with school principals found no statistically significant difference in the technology competence of school administrators according to whether they have bachelor's or master's degrees (Aktaş, 2016; Akr & Aktay, 2018; Gürkan, 2017; Escalaw, 2021), supporting the findings of the current study by Turan and Gökbulut (2022). School leaders with longer tenures will likely demonstrate less overall technological leadership. Newly appointed or younger school administrators exhibited higher levels of ICT proficiency than those with more administrative experience.

In contrast, Kirsch and Lennon's (2005) findings showed no statistically significant difference between workers with more and less expertise in ICT proficiency. However, a principal's prior experience as a school leader has no appreciable impact on how they employ ICT. In Taiwanese primary schools, Chang et al.'s study from 2023 found that there were substantial differences in teachers' assessments of all the principals' technological leadership components depending on age and teaching experience.

The considerable expertise of the moderator in those constructs did not influence the technical leadership and integration constructs. This finding is consistent with Seyal's (2012) findings that principals' educational background and school leadership experience have no discernible impact on their use of ICT, as well as Kusano et al.'s (2013) finding that teaching experience is not a significant predictor of US teachers' attitudes toward technology integration. A recent study by Orlinga and Escalaw (2022) has indicated that teaching experience considerably impacts technology integration (Marshall et al., 2020; Winter et al., 2021).

The study reveals that older school heads tend to have lower levels of overall technological leadership, indicating that school heads with longer service years are more likely to possess such leadership. However, school leaders in authority positions are likely to have comparable levels of overall technological leadership, suggesting that school administrators in leadership positions will likely possess similar degrees of technological leadership. Since the Internet of Things is quickly transforming classrooms in ways no one could have predicted, school administrators must support and encourage teachers as they incorporate technology into learning and teaching (Escalaw, 2021; Escalaw, 2022; Escalaw, 2023). In line with Raman and

Thannimalai (2019), expertise leadership is being adapted to hasten the use of technology in classrooms and to maintain the development of the skills necessary to generate skilled labor.

The study proposed two frameworks: the School Head Technological Leadership Framework for School Digitalization and the Technological Leadership Framework During the Pandemic. It suggests that a school leader's age, education level, and experience can influence their technical leadership. The study suggests that professional development training for technology executives should be tailored to their unique skills to promote digital transformation.

The potential of a school head is influenced by their intangible values and beliefs, which can be shared among other leaders. This could help reduce the technological leadership divide and achieve digital transformation in education. A technology leader who guides the path towards this goal is essential for schools to achieve digital transformation. Motivating factors include promotion, competitiveness, family support, fear of the unknown, stakeholder pride, professional development studies, responsibility, accountability, and school head performance assessment (OPCRF).

School heads are motivated to extend their technological leadership practice through learning conveyance, professional development for educators, strengthening mentoring and support, collaboration with local, national, and international academic and professional development institutions, and strengthening technology utilization for management and administration. This approach demonstrates that school heads have the technological integration or utilization of technology in all educational institution systems of function.

Digital transformation is a shift in the work system driven by cutting-edge digital technologies and creative business concepts. Implementing a technology solution requires coordination of organizational, human, and digital variables. Technological leadership is crucial for achieving digital transformation in education. The school head's technological potential is crucial for a school's digital transformation, as it can influence future technological practices. This potential includes values, beliefs, and qualities that can drive technology utilization in the school.

Aligning digital technologies with human and organizational factors is essential. Digital technologies refer to the structure and infrastructure needed for a 21st-century school, while technological infrastructure refers to data management in the school. Organizational factors include the school's mission, culture, location, stakeholders, and technological resources. Digital transformation creates new skills and models, necessitating the strategic use of modern technologies. School heads must strategically utilize both soft and hard skills and innovate to improve the technological environment in the school.

This framework suggests that since all school heads encounter difficulties in terms of technological aspects, if school heads optimize technological potentials that are latent, such as being

visionary, technologically innovative, and resourceful, some technological provision that is lacking may find a way to make it happen. Technological leadership covers technological skills and capabilities that are parallel or connected to other leadership styles and potentials.

Figure 1 shows the School Head Technological Leadership for School Digitalization Framework.
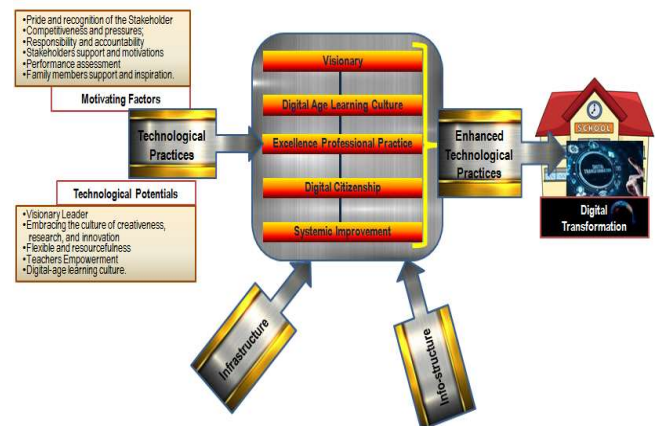
See the larger version in appendix 1.

Figure 1 School Head Technological Leadership for School Digitalization Framework

CONCLUSION

Based on the qualitative data analysis, this study was summoned to establish a technological leadership framework amid the pandemic. The school head's motivating factors and technological potentials are the aspects or dimensions that the school head has to further the school's technological practices that enable the educational institutions to heighten teaching and learning delivery to the stakeholders during pandemic education.

Most school heads are motivated despite their fear and uncertainty about the unknown causes of COVID-19. Moreover, most school heads are also emotional, as seen in the theme that emerged in motivating factors such as family members' support and inspiration. During COVID-19, everyone cares for the welfare of others.

The pandemic gives the nation a sense of family first. Hence, the familial notion is on the broader spectrum—family not only by blood but as a nation. Other motivating factors are common even before the pandemic, such as aiming for promotion, competitiveness and pressures, fear of the unknown, pride and recognition of the stakeholder, professional development studies, responsibility and accountability, and school head performance assessment (OPCRF).

Motivation is a system that leads, supports, and governs behavior, which is critical in the workplace (Lazarova, 2021). This technological framework concerning motivating factors is paramount, as school leaders must be motivated to enhance the school's digital transformation, which this technological framework is grounded upon and supported by different scholars.

Motivating factors as theme emerged such as aiming for promotion (Yamin, 2020); competitiveness and pressures (Goegan et al., 2020; Daniels et al., 2020); family members' support and inspiration (Menges et al., 2017; Karakose et al. 2021); fear of the unknown (Yang, 2022); responsibility and accountability (Whang, 2021; Mbangula & Albert, 2022); professional development (Caingcoy & Lepardo 2020); school head performance assessment (OPCRF) (Mapa, 2019; Aquino et al., 2021).

The study explored the potential of school heads as technological leaders during the pandemic. Key themes include visionary leadership, embracing creativity and innovation, flexibility, resourcefulness, empowering teachers, and fostering a digital-age learning culture. These qualities are essential for school leaders to possess. The study also highlights the importance of practice in achieving digital transformation. Key themes include learning delivery through technology, professional development for teachers, collaboration with digital academic institutions, and strengthening technology utilization for management and administration. Future research may explore these aspects and discover additional valuable qualities for school heads in technological leadership.

The study supports ISTE's constructs on technological leadership for school heads, including visionary leadership, digital age learning culture, excellence in professional practice, systemic improvement, and digital citizenship. The quantitative data analysis shows high results, indicating that the Technological Leadership Framework explains participants' high school head technological leadership, which may motivate them to adopt technological practices during the pandemic.

Figure 4 presents the proposed technological leadership framework amid the pandemic education.
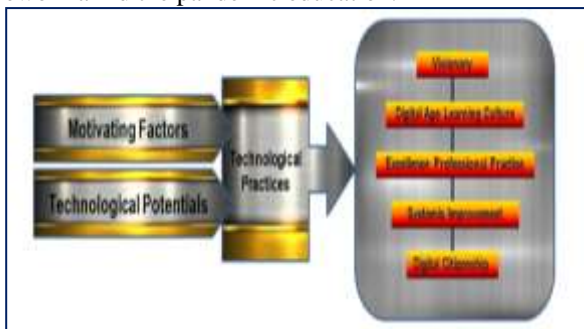
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Figure 4 Technological Leadership Framework amid the Pandemic

RECOMMENDATION

The following recommendations are made based on the findings of this research

1. Technological training for school heads will be based on strategic training, considering the range of time of life, extent of service, and highest educational fulfillment.

2. Technological training for the school head should be targeted or customized depending on the dimensions of the school head who needs a certain competency.

3. School head training may be done by experts in the technology field and not through a specialized Department for true application skills.

4. The DepEd may further the technological infrastructure and infrastructure of all schools in the Department of Education.

5. The DepEd may consider creating a technological training department in every division for the enhancement of technological skills for teachers, especially for the school head.

6. Future researchers may revisit the results of this study to support or debunk the results of this undertaking.

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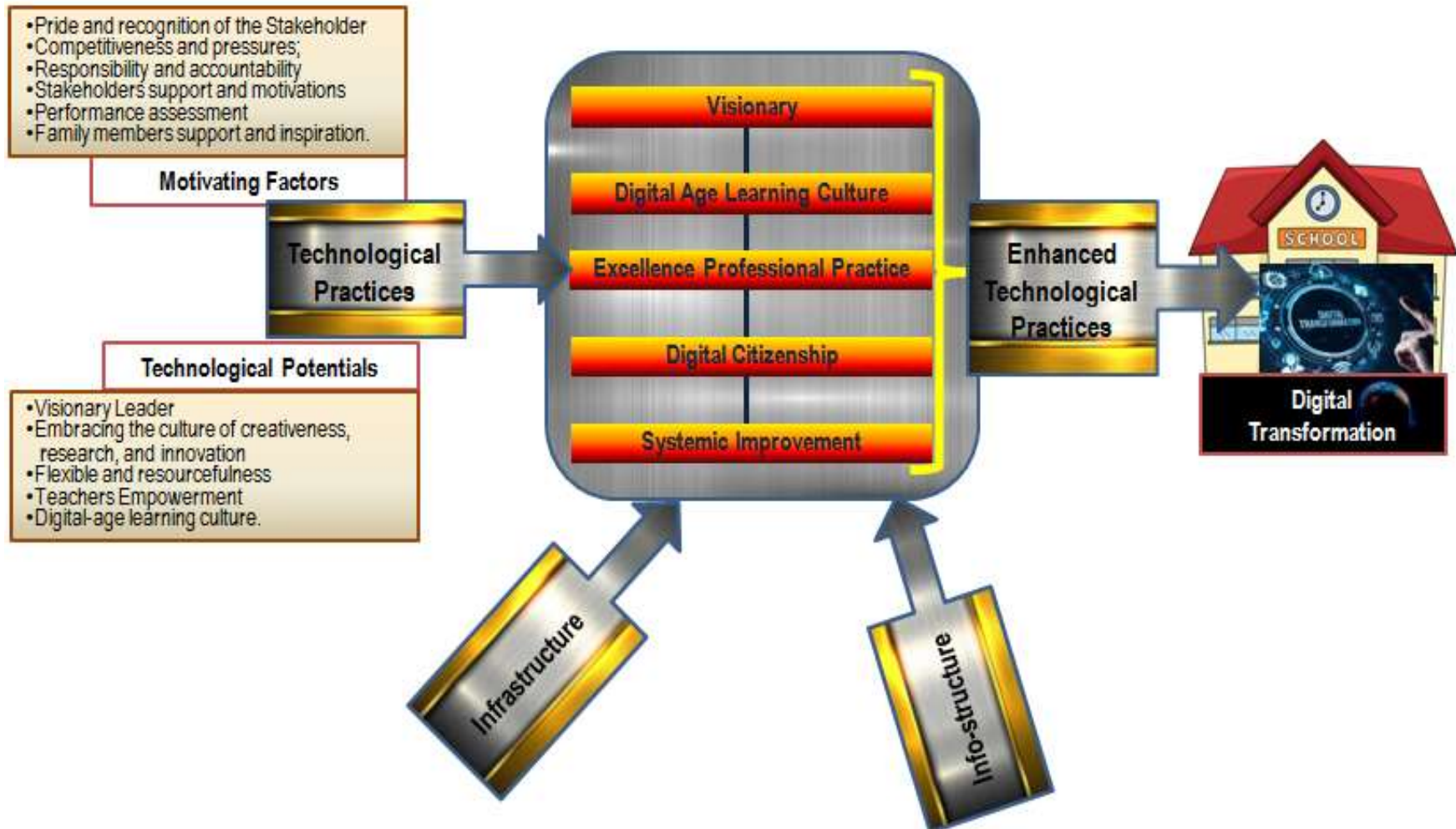
Appendix 1

Figure 1. School Head Technological Leadership for School Digitalization Framework. (Escalaw, 2023)
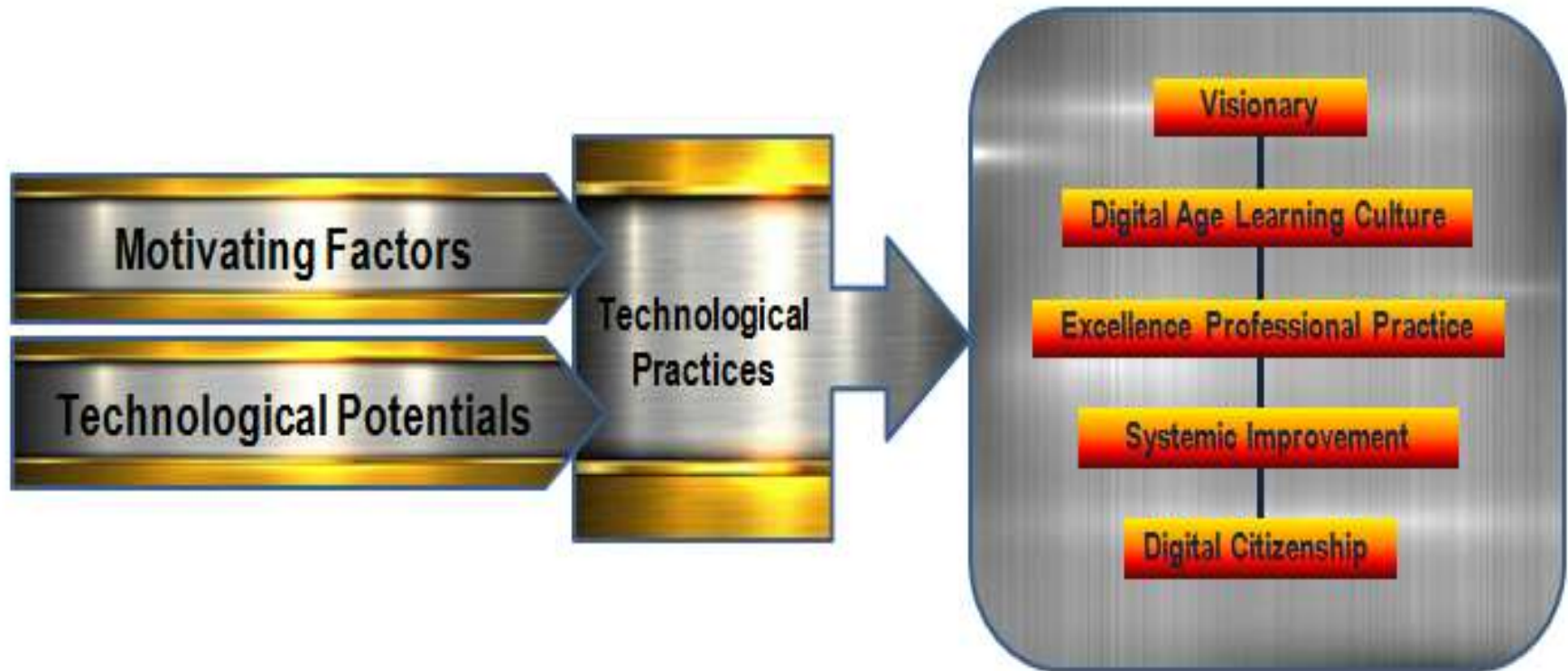
Appendix-2

Figure 2. Technological Leadership Framework amid the Pandemic. (Escalaw, 2023)