EVALUATION OF THE IMPACT OF INNOVATION AND THE ROLE OF THE SCHOOL PRINCIPALS AS AGENT OF CHANGE

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Abstract

School managers have always been on the forefront of the administration of education system since they are the active agents who lead their schools towards wider goals of improving access and quality of education. The purpose of the paper is to give an assessment and evaluation of the concept of innovation by school managers and leaders in the schools. This paper explores impact of innovation and the role of school managers in creating and maintaining an innovative culture and academic performance in selected public schools of the Cofimvaba Education District, which has become synonymous with declining pass rates post-1994.A qualitative research approach was used where existing literature collected, collated and thematically analysed. This paper is novel because it seeks to contribute to the current debate in the literature of educational innovation. The scientific novelty of the article also consists of a conducted large-scale study describing the author's theoretical and practical prerequisites as a former school manager and evidence presented in the research empiricism. The findings of the paper indicated that the school principals are not empowered or willing enough to catalyse the creation and sustaining of innovative cultures in schools. Furthermore, the novelty of the results shows the innovation effects in the high schools and the criteria that school managers employ to get results. Other findings include evidence policy gaps on what is innovation and who must do what in schools which affects the efficacy of school managers. The paper also established that the bureaucratisation of the education sector has done nothing by crippled school managers' ability to innovate by school managers. Furthermore, the paper recommends strategies on how school managers can become that active catalyst that they should be, to drive innovation include in-service training and setting minimum benchmarks for school managers eligibility. Also, policy interventions such as 4th industrial revolution aligned innovation regulations, exchange of ideas with countries which successful school innovation formulating a sanction model of non-performers, towards improving access and quality of education in the Cofimvaba Education District.

Keywords: *Innovation, fourth industrial revolution, catalysts, digitalisation, adoption*

1.INTRODUCTION

A number of countries with schools as institutions have attempted to use innovation in one way or the other to influence some change in management for better academic performance. Innovation is key in transforming organisational effectiveness and efficiency (Drucker, 2005:135). It is therefore against this backdrop that this paper was written after a study in order to assess how innovation can be infused into South African public schools' management systems generally and Eastern Cape Province particularly as a way of enhancing strategies and tactics employed by school managers in facilitating an innovative culture thus improving academic performance of schools. School principals, in executing their duties as school managers need to incorporate creativity in many areas of management and use divergent thinking in order to intensify the academic performance of schools.

Singh (2009:78) emphasise that, the job of a school manager (administrator) is quite cumbersome and that it demands ambition, drive and many attributes together with lots of personal leadership qualities. The principal's job requires them to continuously do personal introspection and self-evaluation on their leadership and management as well as on personal growth. Singh (2009:78) further explain that there is a paradigm shift towards leadership than management in a school context which can integrate the school, parents, community and foster the necessary change needed by thinking outside the box. There is a need to develop principals in terms of skills, values, knowledge and attitudes because the complexity and dynamism of the educational environment is increasing daily.

Schools require transformational and transitional leadership with 'vision and mission' statements in place, a pretence of the shared leadership and an assertion that parents are involved in decision-making, but the reality, indicated by a number of intensive school studies, is very different (Mouton, Louw & Strydom, 2013:36). The paper thus construes that the situation on the ground is far from being desirable because there is not much of an intensive investment into the ICT inspired innovative culture requirements in schools or any other socio-economic circle.

Hanushek and Kimko (2005:105) in an international skill audit and skills possession survey of an international organisation called the International Skills Audit Survey (ISAS) for the youth who have just finished school they found that many youths lack innovation and creativity to perform certain duties. This was an assessment of the after grades of the learners in an attempt to see the value of the school management and leadership impact on the learners. Hanusek and Kimko (2005:105) further add that, "the education systems of Finland, Japan and Korea produced the best scores and the highest quality, while the USA and Spain had only average scores and poor countries like Indonesia and Brazil came in at the end of the ranking. Of the 14 countries covered in the ISAS in 1995, the Scandinavian countries performed best, while Italy and the USA did relatively poorly." The authors further allude that Korea has a rise in terms of intellectual as well as human capital because of the innovation of its education system as compared to other countries at lower grade or matric level. However, this success is not only a contribution of the innovation of the curriculum, but not to be underestimated is the school management responsible for innovative implementation measures on the ground.

Desriel (2016:20) envisages that innovation in Canada was found to increase efficiency and effectiveness by infusing ICTs in the teaching of their school curriculum. The report further adds that innovation in school management improves decision-making thus positively impacting in academic performance of learners through effective teaching. In pursuit of better education, the report of the Organisation for Economic Cooperation and Development (OECD) emphasised that schools in Canada must blend the use of ICTs in their curriculum to improve teaching and learning environment. A study done by Temple (2017:159) assessing a relationship between entrepreneurship education and high human capital development in Kenya. Innovation is exhibited in the rate which equals that of entrepreneurship in most African countries which include Nigeria, Zimbabwe and Mauritius. Schailer (2010:23) writes that, "the rate of entrepreneurship in these countries is directly proportional to the high literacy rates in these countries". Inferably, this researcher observes that more state become technology savvy, the more they enjoy the economies of scale and the many merits of automation and digitalisation. Thus, countries such as South African need not become spectators in something that has had far reaching consequences to both existing and future generations.

Duff and Fryer (2015:7) are of the view that the African human capital and innovation in the schools correlate and they discovered that innovation is an art that school managers need to infuse with transformational leadership as well as transitional leadership. While innovation is reflected in the implementation of the school curriculum in a unique way as well as the high motivation of the teachers who work towards the objectives of the school policy. In support of this perspective Duff and Fryer (2015:7) assert that problems of low and variable quality experienced by the current stock of South African human capital is glaring in the cohort educated during the late apartheid years. It can therefore be contended that South Africans educated during this era lack innovation as they were bound by rules, regulations and rigid prescripts and procedures.

A study in Khumalo (2015)'s paper focussed on school innovation and the following were its objectives: determining the nature of creativity and innovativeness; determining the role of the principal in fostering the creativity and innovativeness of educators at schools; investigating how the creativity and innovativeness of educators is currently fostered at schools; and providing guidelines on how the school principal can foster educators' creativity and innovativeness at schools. Khumalo (2015)'s paper, arguments were that, innovativeness depicts a picture of school environments that foster educators' creativity and innovativeness. Educators seem to be afforded opportunities for challenge and involvement at

most schools. There seem to be school environments that allow for truth and openness, freedom, idea time and support, debate, risk-taking, minimal interpersonal conflicts and humour and playfulness. These conditions should be contributing largely to educator morale, motivation and good performance. Furthermore, both creativity and innovativeness could be better understood in business settings and not so easy to apply in school settings.

Also, the fact that educators are not involved in the review of the school vision as a standard or pace-setter for performance and the fact that educators have to seek permission before implementing decisions for which they have the freedom to make, are cases to note. These responses are inconsistent with climate a where educators are involved and challenged, as well as where risk-taking is allowed. Khumalo (2005) further notes that, creativity and innovativeness are a function of an organisational environment that promotes nine dimensions *viz* challenge and involvement, freedom trust and openness, idea time, idea support, debate, risk-taking, conflict management and humour and playfulness. Another finding was that innovativeness at schools is dependent on the school's organisational or institutional context, the collaboration context and the public policy context. In addition, for innovative education to thrive, staff members, educators who have diverse and complimentary competencies, share common traits, are dedicated and passionate about what they do and can be creative and innovative as a result of school leadership.

2.LITERATURE REVIEW
Education enacts a pivotal role in building an unobjectionable future for all citizens. "Innovation resembles mutation, the biological process that keeps species evolving so they can better compete for survival" (Hoffman and Holzhuter, 2012:3). Christensen, Laegreid and Rovik (2020) note that innovation can therefore be regarded as an indispensable instrument necessary for a positive change in an organization. All operations undertaken by human beings to shape and change the world in all spheres needs consistent innovation to be sustainable. The need for educational innovation has become acute. Serdyukov (2017:45) avers that, "It is widely believed that countries' social and economic well-being will depend to an ever greater extent on the quality of their citizens' education: the emergence of the so-called 'knowledge society', the transformation of information and the media, and increasing specialization on the part of organizations all call for high skill profiles and levels of knowledge. The 21st century education systems are required to be both effective and efficient, or in other words, to reach the goals set for them while making the best use of available resources" (Cornali, 2012:255). According to an Organisation for Economic Cooperation and Development (OECD Report 2015:6), "the pressure to increase equity and improve educational outcomes for students is growing around the world" (Vieluf et al., 2012:3).

In USA, the elementary compulsion of innovation arises from a variety of forces ranging from political to technological forces emanating from within and outside the country.Innovation in a schools' context is one which is unique because of the nature of the bureaucratic structures of the South African education system (Naidoo, 2005). Cumbane (2013:7) envisages that there is need in the way managers in school's act as leaders in sustaining innovation. Dessler (2010:6) argues that no bureaucratic structures in the public sector can produce and it is only the private sector that can bring innovation through competition. One can disagree with this ideology and see a better future in the South African schools being adaptive to new ideas and working towards an innovation culture especially in the implementation of Curriculum Assessment Policy Statement documents in a unique way.

2.1 Management task of school innovation for principals
The concept of management was previously used widely in business. The process of management is the process of planning, organising, leading, controlling and commanding (Fumbler 2012:7). "The extent to which effective learning is achieved therefore becomes the criterion against which the quality of management is to be judged" (Naidoo, 2005). In the context of this paper, management is seen as a key factor in order to understand leadership as the two are closely linked. In support of this, Ehlers and Lazenby (2010) noted that, managers are analytical, controlled and structured while on the other hand leaders are visionary.

2.2 School manager as agents of innovation
A school principal can be seen as a transformational leader in a school context in order for enabling the attainment of the school objectives. Kotter (2016:90) sees the manager as the agent of innovation and change and everything they do is centred on their effort. Johnson et al. (2013:12) asserts that in strategic leadership perspective, the function of a manager is to show what is called servant or pacesetting leadership (Franc, 2013:89) in school leadership scenario argues that it is difficult to foster innovation in a school set up in any area as managers are just like robots. They must adhere to the provisions of the legislation and comply with all school policies. His argument is that any other change can be done at the school and other issues but when it comes to school policies and the CAPS document there is less to change.

Torpedo et al. (2010) see that change is very possible in the school whether it is a public or private because, the change or innovation ,must be inhibited in the methods of teaching .She lambasts the South African education as predominantly relying on following the Curriculum but lacking "implementation skills" She further articulates that when foreign teachers come here ,they produce more results in most schools in Mathematics, physics and Accounting, subjects considered as difficult by South Africans. The difference lays in their classroom innovation techniques and different methods to engage learners in a captivating way Groon et al (2010:25).

Innovation in school management is an area that cannot be taken without talking of leadership which is the engine and driver of innovation in any institution. Prombler (2009:56) posits that innovation is a driving force in an institution and will drive results in effectiveness and efficiency. The Department of Basic Education in South African schools has a curriculum which was called Outcomes Based Education (OBE). The current policy is underpinned in the curriculum 2005 as part of education in South Africa. Schools are run using a bureaucratic type of management following religiously the school curriculum ignoring the innovation part of management and leadership so that learners will acquire life skills to deal with difficulties after school. The extent of South Africa's (SA) lack of skills amongst citizens, particularly, those who have been exposed to technology education in the senior phase of basic education has intensified and reinforced that some research study be regarded as a tool for understanding policy and practice in the teaching and learning of technology as will be apparent from this paper . In this research project, the researcher studies the role of the school managers in helping to be a catalyst for innovation which is the driving force of innovation

2.3 Impact of lack of innovation in schools and the job market
In a survey of 36 African countries in the quality of skills in their labour markets of youths just after school, the author discovered that most of them had a skill deficiency in terms of what is required and the qualification on the degree or diploma. This was a big challenge and has been attributed to the lack of innovation in the schools to impart life skills needed for helping learners be compatible to the outside world pressure (Morsy, 2015:4). From another group, they found out a general lack of skills to perform the required job, but surprisingly the incumbents had certificates and diplomas.

Morsy (2015:5) pinpointed that "it appears that skills mismatches point up a poor quality of education, low innovation and the absence of linkages between education systems and employers as underlying problems." Another assertion was that a shortage of the critical skill artisans in the mechanics and technical personnel including electronics and electricians, but with an excess in the white-collar jobs such as accounting, auditing, marketing and sales staff (Noyelle, 2019:56).

This implies that the shortage of technical skills necessary to maintain equipment and the supervision of unskilled workers remains a challenge. The above perspectives reflect that school management plays a pivotal role for equipping learners with necessary skills in the job market.

3.0 THEORETICAL FRAMEWORK
3.1 Theories
3.1.1 Design-Led Innovation Theory
The Design Led Innovation explains the value of design in an organisation or the design of the framework necessary for employees to adapt to. In this theory, the manager or administrator is taken as a 'technocrat' in setting up policies systems, technical systems which the employees must follow. According to Dong (2010:7), "the framework illustrates that within any business, a fluctuating scale exists spanning operational and strategic activities that have either an internal or external focus". The following figure shows this framework.

Figure 2.1: Design-Led Innovation Theory within a school setting
Source: Dong (2010:15)

The components of the framework are discussed as follows. Diverse divisions within an organisation are consigned with these different activities, and have specific targets depending on their functional role within the organisation." The term or 'proposition' or 'opportunity' as the main aim, which combines all the activities of the organisation together. The school manager in a school context will have to do a set of activities such as reframing, co-design, and looking into customer insights. According to Prombler (2009), "as the design concept matures, all aspects of the business or organisation are informed or have the ability to inform the opportunity, driving change and creativity".

3.1.2 Innovation Concerns Based Adoption Model
This theory is educator based as the principal is also a teacher in the teaching profession. It is ideal in the academic settings looking at the school managers as the agent of change. According to Straub (2011:45), "the theory is largely concerned with describing, measuring, explaining and understanding the process of change experienced by teachers attempting to implement the curriculum material and instructional practices. The model describes how people develop as they learn

about an innovation in curriculum change and implementation." The theory sets the school manager at the pivotal point oscillating at the middle of school management being responsible for curriculum implementation making the social context of the school and influencing changes in the curriculum and teachers following (Desriel 2016:106). Curriculum implementation is treated as a process that requires leadership skills in dealing with a complex and multidisciplinary which concentrate with three parts namely "Levels of Use, Stages of Concern, and Innovation Configurations". "The school manager is seen as a facilitator in the school context who adopts any new change of an innovation at the school or from the department, but he /she must understand the concerns of the teachers at his or her heart (Mulford, 2003:50).

### 3.1.3 Technology Acceptance Model

This other theory discusses of the Technology Acceptance Model (TAM) as developed by Fred Davis as a Doctoral student at the Massachusetts in Institute of Technology in the United States of America (Davis, 2010:320). Importantly, this section focuses on its evolution and core tenets. The theory was developed with a focus of the initial theory was on technology or innovation acceptance behaviours, exploring the correlation between perceived usefulness, perceived ease of implementation, intentions to implement and actual system implementation. The theory took inspiration from earlier works such as the one by Fishbein and Ajzen who originally postulated the Theory of Reasoned Action (TRA) in 1975. TRA, which says that social behaviour is motivated by the attitude and intention to perform, suggesting that individuals mainly behave as they intent within the available time and milieu (Tlou, 2009:25).

Since its introduction in Davis's thesis, TAM has been used to predict and explain usage of technology in institutions. For instance, a 2011 paper by Portera and Donthub (2011:100) shows evidence that the use of ICT was low among the low-income groups, the elderly and the illiterate. This shows the nuances of perceptions and usage or adoption of information technologies in society or classrooms. In the original TAM (Davis, 2010:321) were 5 constructs, namely perceived usefulness, perceived ease of use, attitude toward using, behavioural intention to use and actual system use. The study argues that, it is critical to underline that TAM was developed to test the acceptance of ICTs such as word processor technology in classrooms but has later been accepted to different forms of spawning technologies such as artificial intelligence and massive online learning platforms.

3.2 Research conceptual framework and models

The innovative spectrum model as developed by the researcher acts as a panacea to intuitive and preconceived unresearched perspectives about innovation in a school context. It clearly outlines how innovation can realise4d through an interplay of various factors and stakeholders in an education set up

Figure 3.2: Innovation Concept Spectrum Model
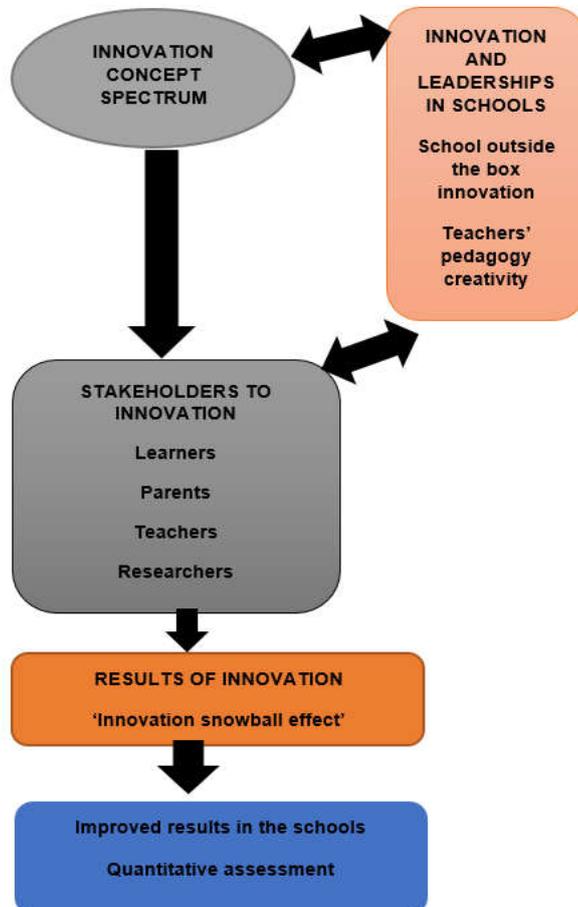
Source: Researcher's Own illustration (2020).

The innovation spectrum model is the outcome of this literature review as a modified model or construct of all the learned outcome in the above literature in this chapter. The innovation spectrum model is a research construct showing the infusion of innovation and leadership. These two can only be achieved by using two innovative tactics which are "School outside the box innovation" and teacher pedagogy creativity. The combination of the two are what the school managers should embrace in the school context. This should lead to the research and development focus in the institutes of higher learning and further studies should embrace the software side of innovation in a new paradigm to a transitional and charismatic leadership styles as the best styles to implement the desired change in the Department of education and the entire public sector administration. .The hardware of research and development focus to this model is the ICT and RBL strategies employed by the teacher in the classroom scenario. The school manager becomes a catalyst in instilling a positive culture in the school using two methodologies of the hardware and software part.

The stakeholders to innovation in the innovation spectrum Model with regards to a school can be learners ,parents ,teachers and researchers .This is the desired outcome in which the school principal must make sure she/he pleases all these stakeholders who are the benefits of such novelty done by the school principal as the catalyst and agent of change .This is where the innovation model hinges on as a model that attempts to be holistic in designing innovative methods that are towards learners in new ways in the classroom, inculcating parents to work with the school(parental involvement) and teachers changing their pedagogy in the classroom. The model sees the teacher at the center of innovation and this can happen only when the concept of "train the teacher" happens meaning the effective training of the educators in the department of education as part of (OD) Organisational Development as an extra training of the teachers besides diploma level or degree level teaching. The researchers are the research students like the writer of this paper who will be looking at adding to a body of knowledge for further innovation. The principle is that innovation begets innovation and it is never static because of time and disruption is always expected in every sector of the innovation dimensions in a country or nation.

The results of innovation are measured in the degree of satisfaction of the stakeholders mentioned earlier on, but should be seen in the improvement of the school results because of the "innovation snowball effect " .The innovation snowball effect is the summative effect of all quantitative and qualitative effects first seen in improved school results (Quantitative effect) and the qualitative effect of the effective school curriculum implementation in the schools .The innovative spectrum model is a closed loop model which shows the interdependence relationship in the measuring outcomes as multi-dimensional. The researcher envisages that measuring an innovation requires the mixed method to full grasp the effect of an innovation from both qualitative and quantitative evaluation (Creswell, 2014).

4.0 METHODS
4.1 Qualitative research
In this regard, the paper adopts and utilises a qualitative research paradigm where data gathering is dependent on the researcher's discretion on various methodological issues through a desktop paper because it provides an insider's perspective to the issues at hand. Hence, the researcher was able to holistically analyse the issue of school managers as catalysts of innovation from within the environment and realm of the real world of world. Such **as** been further cemented by the researcher's passion for improved innovation in school towards better outcomes in the Cofimvaba Education District of the Eastern Cape Province in the Republic of South Africa.

4.2 Desktop literature study
The study used a qualitative desktop analysis of literature as its data collection method. According to Mogalakwe (2006:221), "the use of documentary sources or literature study refers to the analysis of existing documents that contain information about the phenomena under paper ". Synonymously referred to as desktop study, literature paper , secondary research and documentary analysis, the use of works from other scholars and official documents has always been a reliable data gathering methods in social sciences (Tracy, 2019:89). This is because, a rich repository of data and information may be available to researcher hence saving time that can be required for desktop research. In addition, secondary data sources can provide ample evidence for objective and valid conclusions to be drawn from any phenomena under study.

The literature paper focussed on analysis various documents which includes academic or scholarly articles by various authors on aspects of innovative culture and good academic performance in school, official (annual) reports from the Eastern Cape Department of Education, the Government of the Republic of South Africa, civil society organisations and other stakeholders. The reason behind the inclusion of secondary documents from many stakeholders is because the phenomena of ICTs in education and innovation is a multi-stakeholder task were various role players coordinate and cooperatively make innovative culture and good academic performance become a success. This literature was gathered both as hardcopy files together with online published material. Lastly the analysis of data that is already in existence saves researcher from the pitfalls of primary data collection which include the subjectivity and biasness of the secondary data. The following are the documents that the paper has reviewed: The Eastern Cape Department of Education Annual Reports, the ECDoE expenditure plan, the CPS and various scholarly works by various individuals.

5.0 RESULTS
5.1 Hypothesis
H_1 The hypothesis to this research is
H_0 : *There is no innovation in the management of the*
H_0: *The school principals are not effecting the change need for good results in the schools*
H_1 *The school principals in the schools are effecting change*

H₂ :The school management and leadership have the capability to effect change in the schools

In summary, the findings of the secondary data analysed revealed that inter alia:

☐ Negative attitudes by school managers towards skills training and development interventions are prevalent

☐ There is no standardised innovation related qualification benchmark and criteria for school principals.

☐ The Cofimvaba Education District has disparities in school funding.

☐ Innovative culture is a basket of procedures and processes which do not happen isolated from each other.

☐ Schools funded by charities performing way better than their outright public schools.

☐ There is much bureaucratic red tape in the leading of schools.

☐ There are too many prescriptions and directives from the top management, something that 'cripples' the school managers and teachers who are relegated to mere instruction takers rather than innovators.

☐ School managers' hands of are tied when it comes to taking the initiative towards thinking outside the box because the education system is prescriptive which stifles intuition.

☐ Stakeholders' involvement is found to be deficient since CSO strongly feel that they can play a part in empowering school managers to innovative in schools, but they are not getting equally welcomed to take part in making that realised.

☐ Political will is key to the creation and sustenance of innovative culture.

☐ Although the school principal can appear to be pivotal to the establishment of innovative culture, the 'buck starts and stops' with the top leadership of the education sector, who call the shots on what to be adopted and followed.

☐ There are no defined sanctions or threats for school managers who choose to shun innovation.

☐ Disparities in infrastructure and socio-economic developments cross provinces has led to a loss in investment in poorer provinces like the Eastern Cape.

☐ Communities are eager to have an innovative culture in their schools since this can be the gateway to good pass rates and improved quality of education.

☐ The government sometimes get overwhelmed with demand for services thereby making it appear as if the education sector is being neglected.

☐ The state has not made an explicit 4IR policy that can help school managers to innovate; and

☐ Infrastructural development is a lagging behind for the adoption and assimilation of innovation.

6.0 CONCLUSIONS

This paper is novel because it seeks to contribute to the current debate in the literature in educational innovation. The scientific novelty of the article also consists of a conducted large-scale study describing the author's theoretical and practical prerequisites in school management innovation. The foci of the paper is on the innovation with regards to a school innovation has been conceptualised as being able to 'think outside the box' and being detangled from the procedural and bureaucratic web of instructions management. In addition, the innovative culture in schools liberalised school managers' ability to take initiatives, motivates subordinates and instil the obligation public accountability of decision makers. In an innovative organisation, the concerns if on the quality of outputs rather than an obsession over procedures. Therefore, the contemporary world calls more for school managers who can thrive and strive for innovativeness rather than remain trapped in the 'robotic' world on bureaucratic instructions. Global case studies from across the world have shown that countries such the USA, South Korea and Finland have long begun to reap the benefits of the investment into innovative school cultures through effective quality education. Nonetheless, the efficacy of an innovative culture is dependent on the availability of enabling infrastructure, existing of political will, ability to sell the benefits if flexibility and the creation of enabling environments for innovation. Amid the 4IR, schools, governments and state should collectively drive towards a 21st digitalised solution to education service delivery.

7.0 RECOMMENDATIONS
7.1 Recommendations on the role of managers in creating innovative culture
The researcher recommends the following for all relevant stakeholders that can be handy in the management of the selected schools in the CED, the Province and the Republic, for a consideration for adoption towards improving the quality of education.

7.1.1 Semi-privatisation of education service delivery
The research findings emphasis that there are challenges to the attainment of the goals of the school managers when it comes to promoting innovation in the CED. In order to help alleviate the burdensome responsibility that the government as the overseer of the public sector, the researcher recommends that the ECDoE explores the quasi-privatisation of the public education system. This can be done by way of identifying those needy school especially in rural Eastern Cape Province and then forging public-private partnerships which secede the stake that the government currently holds in this sector of the economy. By semi-privatisation, the infrastructure and all the necessary groundwork required to roll-out, implement and sustain innovation can be done without much hassle.

Furthermore, the innovative culture thrives more in a private sector setting where digitalisation and flexibility are bridges that seeks to do away with the drawbacks of financial constraints on the part of the public sector. When this has been successfully implemented all aspects of education service delivery from computers, human capital, monitoring systems and financing are catered for outside government. Semi-privatisation can include making sure that charities such as

churches and other non-governmental organisations take charges of the teaching, learning, management and financing in schools are currently having the public tag.

The findings of this empirical research established that they are ready and willing private sector role players that are keen to partner government if ensuring that innovation is realised. However, there is the lack of ambition on the part of the influential leaders, who currently are making to overtures to indicate that such a partnership is required. Empirical studies from Finland, Norway and the United States of America have shown that the PPPs which these governments entered into with private sector actors have significantly played a part in making the adorable education system that they have today. Hence the education officials in Pretoria and Bhisho should cooperate responsibly and engage the various private sector role players on how best they can chip-in in rolling out be it the erecting enabling infrastructure for innovation or provide the human capital requirements for such innovation.

7.2 Policy interventions into innovative culture in schools

In line with findings in section of this study, this paper explores the need for an entrenched solid culture of innovation in schools, districts and provinces of the Republic of South Africa. The researcher understands that a culture of innovation would imply that all interrelated aspects of the daily school management, learning, teaching, assessment and administration are viewed under the lens of flexibility and innovation. In an innovative culture setting there are policies to the effect of making sure that school manager is mandated rather than given a leeway to decide on whether they can innovative or not. Something that is explicitly put in black and white helps sensitise those tasked with its implementation that they are obligated without fail, to fully implement such a requirement. A policy on innovation can help ensure that those school managers who have been resisting the dictates of the fourth industrial revolution by sticking to their old and archaic ways of doing things, are not even accommodated into the 21st century education system.

The monitoring and evaluation of the compliance and catalytic role that each school manager plays becomes easier when its enshrined in policy since such a policy would content the targeted outcomes expected standards as well as dos and don'ts that guide and shape the behaviour of school managers as the 'foot soldiers' of entrenching an innovative culture for better performance in South African schools. Policy gurus in the fields of education have to explore global best practices towards crafting a workable policy blueprint on creating and sustaining a culture of innovation excellence in the public schools of the Republic of South Africa.

In this paper, there were issue with the lack of policy congruency that affects what needs to be done and how this can be done. The major shake-up towards innovative culture by school managers is the putting in black and white, the requirements in policy by all relevant role players of how they can actively partake in this innovation revolution. Policy documents needs to be formulated which liberalise school management and leadership to set-free many 'chained principals' who have for long wandered in a bureaucratic and too prescriptive environment. A policy of democracy and freewill of school managers together with a policy on incentivisation of innovation can be good starting points. When such policies which should actor in the input of every concerned stakeholder, are in place, how can easily enforce accountability for actions and manage both performers and non-performers in a less haste way thereby promoting innovation and flexibility

7.3 De-bureaucratisation of the public service

The study revealed that the incessant challenge of a rigid bureaucracy has tormented the South African education system for long. Since the many demerits of a mechanistic style of organisational hierarchy and management style are identified as ones that include the stifling of innovation, the paper explores the razing down of all bureaucratic apparatus towards a more flexible and leaner organisation culture and practices. By de-bureaucratisation, the study argues that, all the prevailing 'fear of the unknown' which have characterised the current crop of school managers in the Cofimvaba Education District gets effectively eliminated in the short, medium and long term.

The liberalisation of the management style and culture means that school manager will have the freedom to take on adventures which improve pass rates and academic performance. Such kinds of expedition will ensure that school principals think outside the box, are not fearful of the urge to robustly innovate and always seek responsibility and accountability in every action and decision they make. This solidly implies that school managers are free to innovate and inspire the innovativeness of their subordinates which can result in new improved teaching, assessment and learning approaches, new curriculum components, monitoring and evaluation practices together with public accountability, which is a major ingredient to successful 21st century managers.

While it is an undeniable fact that the features of Weber' bureaucratic organisational management will never be eradicated in full of public services in various states, there is room to remove the mechanistic barriers that continue to stifle innovation and to a greater extent, productivity. The government and policy makers need to operationalise flexible and leaner organisational structures. These democratic systems do not happen involuntarily but can be set-out in policy and directive which aim at giving school managers and circuit managers the room to dismantle the bureaucratic apparatus for expedited public service delivery. The study argues that less-bureaucratic systems of management will go a long way to eliminate challenges such as delays in decision making, bottlenecks in the approval of initiatives as well as instantaneous decision which resolve the challenges that have been identified in the problem statement. These impediments to access to quality

education include poor pass rates, too much red tape and the existence of ancient and less flexible managers in the 21st century context.

The researcher argues that the proper de-bureaucratisation of the public education system requires an equal measure of political will throughout the entire hierarchy of power since the policies are policy makers and advisor on policy matters, hence they shape how the current crop of school managers can innovate and remain relevant amidst the rapid digitalisation and sharing of data in the fourth industrial revolution.

7.4 Reward-sanction system of managing employee behaviour

The study findings established that some school managers use the laissez-faire style of leadership because of the absence of harsh consequences for either non-performance of poor performance. The current policies of school management are mute when it comes to the sanctions that can be meted on culprits of poor innovation of school performance. While normal human capital practices of rewarding good performers, sanction for dismal performance have not been put in black and white. As an antidote for this anomaly, the study implores the responsible authorities (district, provincial and national) in the education sectors across the three spheres of government to design, implement and monitor a bold policy on poor performers in terms of the sanctions that can be available. Such a policy, in this era of the 4IR, has to be tied to the failure to either initiate or make a conducive environment for innovation and good academic performance in the public schools of the Cofimvaba Education District, the Eastern Cape Province and the Republic of South Africa in general.

The paper takes lessons from the Japanese zero-defect total quality management practices where there is a harsh sanction for poor productivity. If the Cofimvaba Education District can introduce such a system of less tolerance for poor performance, the culture of innovation and excellence can result in improves pass rates and concurrently, motivation of the staff in the District. The docking of rewards and other penalties can be the right thing to do especially on the part of those school managers who deliberately choose to ignore and supress innovativeness. The paper however cautions that the sanctions system needs a robust refining to avoid vindictive senior managers or any form of abuse of this system by those tasked to benefit or utilise it. Once these details and refined, all school managers will believe that innovative culture is good, can get them rewarded and improves their throughput and quality of outputs. Therefore, they become motivated to put much more effort.

The paper mentions that school managers who fail to manage and lead their organisation in ways that are equally compliant with the 4IR need to be relieved of their duties or be demoted to ordinary teaching responsibilities. A merit based consistent system of appointing school managers can be supportive of this idea of hard sanction for inability of intentional unwillingness to put in place systems and intervention that promote and innovative culture.

7.5 Selling innovation and creativity to school managers and their subordinates

Findings discussed in sections of this paper, show poor skills and attitudes. The 'fear of the unknown' factor has had a fair share of contribution to the diminished role that school managers play in promoting an innovative culture in schools. At times the innovation culture mantra is introduced to school principals who do not have a background of NPM-inspired flexible types of leadership styles. These will be highly traditional and conventional types of school managers who always take any new initiative with 'a pinch of salt'. The study recommends that the responsible education authorities from the provincial seat of government have to 'sell' or market this open style of school management to all existing and entry level principals to guard against the natural 'reality shock' which comes with adopting new approaches to the day-to-day management of schools. In such a scenario nothing is imposed on school managers of introduces in a haste, there is ample times to adapt, adopt and full work within new systems.

Emphasis on the 'selling' stage of innovative culture is to effectively communicate with the school managers that the transformation of the education system is global, inevitable and advantages to all the stakeholders. Much of the focus should be on making sure that school managers appreciate the rapid transformative effect that adopting an innovative culture will have on the leaners, the curriculum, schools, parents or guardians as well as officials within the system. A shared vision can emerge from these efforts thereby making the effective implementation and sustaining of innovativeness a good and achievable target.

This recommendation emphasises on the essence of effective communication in organisations, especially in the context of transformational processes and practices. In the event of everybody made to 'buy' the idea that innovative culture is a determinant factor in organisational success, school managers are more likely to cooperate with any efforts to innovate. They will also ensure that their workplaces are centres for innovation were their subordinates are always given the freedom to innovate and find the best possible way of attaining set goals. In other words, a broad or generic objective such as that of improving the pass rates in the Cofimvaba Education District can be extended to school managers and their teams (STM, SGB and educators) and how best they can attain such an objective without much intervention of direction form the top management.

7.6 State championed fourth industrial revolution assimilation

As a macro level global wave of transformation, innovative culture in the era of the 4th industrial revolution should be driven by the state as a starting point. The paper found-out that the failure of some policies or programmes in the Republic

of South African was due to the docile nature of the state towards them. Furthermore, the failure of the state as the key player in the economy and society to lead in the major revolution in the global system. African states have lost vital ground on the Western counterparts in terms of socio-economic development because they did not fully exploit the gains of the 1st, 2nd and 3rd industrial revolutions. The researcher writes that, the state should lead the efforts to synchronise all sectors of the economy, education included with the fourth industrial revolution that Africans did not be relegated to be mere spectators.

A state led adoption and implementation of the practices of the 4th industrial revolution imply that South Africa's education system will be synchronised with those of the developed world such as the USA, South Africa and Finland thereby making it a member of the global society on the same yardsticks and standards. The state can begin with policy interventions giving effect to synchronising education practices with those of the global best performers. If the state leads by example, for sure, not school managers can resist something that is nationwide and global therefore creating good cultures of innovation, productivity and academic performance.

In order to fully take part in the 4IR, there is need for massive investment in infrastructure which enables the smooth rolling-out of innovative technologies and systems. During his State of the Nation Address in 2009, former President Jacob Zuma said that his administration would prioritise massive infrastructure development, this however did not benefit the outlying enclaves of the Eastern Cape Province which include the Cofimvaba Education District. However, since the nation can still catch-p with other states in the fourth industrial revolution race, a massive education infrastructure development can be a starting point for a smooth landing of the 4IR. This is because infrastructure is an enabler of innovative systems, which are hugely dependant on schools, roads, rail, internet and communications for successful implementation. The Republic as disparities in socio-economic development hence differences in innovativeness of school managers as well as pass rates between for instance the Gauteng and Eastern Cape schools or education districts.

7.7 Developing new norms and standards for school manager qualification
Benchmarking the hiring and appointment practices of the CED and the ECDoE is one step in the right direction as far the creation and sustaining of the innovative culture in the Republic of South Africa. This benchmarking is also in concordance with the good practice of meritocracy which give merit preference over any other standard. This can make sure that experiential profiles are ranked lower in comparison with the standard of innovation-savviness wich is one determinant factor for an individual's ability to create and maintain an innovative culture in their organisation. Part of this study revealed that the hiring practices in the ECDoE when it comes to the appointment of school principals is devoid of any standard on tech-savviness or any aspect linked to innovativeness. As strategy that drives towards innovative culture in schools, the study calls for the standards to be included since no school can tolerate being managed by somebody who is 'analogue' in this era of digitalisation. The scores allocated to the standard of tech-savviness have to be higher in this instance because the education system has already lost ground on other states in terms on innovativeness, timeliness and era-relevance.

A matrix for the promotion and deployment of school managers which allocates high scores for innovation of innovative literacy must be put in place as a guide to promote school managers. Such a matrix will ensure that prospective school managers either 'shape or ship out' if they are to be deployed. If one potential school managers are cognisant of the need to increase their prospects of being promoted to manage a school, they their career progression and target should be improving their professional portfolio for such as distinctive career milestone. This improvement might include taking training and professional development courses that can make them eligible for such a promotion. On the other hand, the 'tried and tested' brigade that wants to continue using the late 1990s school management styles will be ineligible for such promotion therefore guarding again mediocrity in schools.

The researcher argues that the schools requires managers who can promote and encourage an update of the STEM subjects since the 4IR has seen these leading the pack in terms of solutions that are sustainable to the many challenges that the world faces today. Therefore, merit and technological literacy and willingness should weigh heavily on the appointment processes of school manager from now on. This can however work well if there is not much influence from the political muscle in the public service, leaving everything to impartial, technical and professional individuals who value organisational productivity over political affiliation of correctness.

7.8 Adopting international best practices and benchmarking of innovative culture
Discussion in the paper show the USA, Finland and Korea having innovative cultures in their schools. South Korea, the United States of America, Finland and the United Kingdom are some of the global case studies for successful innovative culture education systems. South African can 'take a leaf' from the best practices on how to design, adopt, implement and monitor an innovative culture-based education system. In all these cited examples, the governments have prioritised technology and innovation to lead the 21st delivery of education services. Additionally, these countries have ensured that natural sciences and STEM subjects are heavily subsidised to incentivise leaners and students who needs to pursue careers in these fields. Resultantly, the poverty levels in these states have plummeted and community development have soured. The researcher proffers that the CED and the Republic of South Africa can adopt similar stances however there must be an emphasis on the need to make sure that there is a fully implementation of such a policy. The researcher also observes

that the Republic of South African has good other policies in the letter of the law, but the corresponding implementation of these policies has always been found wanting.

In the event of such best practices being considered, the government can engage gurus in the education sector from these countries to aid in the drafting revision and implementation of these innovativeness-laden practices. There can be countrywide exchange programmes for school manager where local principals have a visit to say the Chicago city in the American state of Illinois to discover how e-learning and other technology revolution practices are being implemented. Concurrently, South African can host the American school managers so that they help diagnose the faults in the current system that is being used towards advising on areas of improvement. The sole purpose of these exchange arrangements is for the flow of ideas to be facilitated, which has become one key feature of the globalised society. In the end it is the learning and exchanging of ideas on best practices that will gage the level of lag that the South African school manager have, to continuous improvement purposes.

For these global best practices to be adopted, there is need for officials in the education sector to view things from macro level. This implies that they should see education as having one standard which should be applied uniformly across systems regardless of the geographical location of any other arbitrary measure. A universalised policy of innovation and education will make sure that South African schools will pool resources together towards making reforms that makes the local education to be counted amongst the giants. The adage that 'African education has to be decolonised' it not relevant socially given the huge influences that globalisation has had on various state system. The upgrading of African education systems to match their global counterparts are welcome arrangement that can help remove the barriers to world class education standards for Africa, South African and Eastern Cape Province's schools,

7.9 Training and talent management for innovative culture and productivity
The unearthed a deep lying challenge that is faced in the CED in particular and the South African education system in general, that of poor talent management practices. With a rich statutory and regulatory framework for skills development, the on-the job training and development of existing staff members should be problematic. However, the development of staff on the job has become an Achilles Heel for the South African public sector with argument toward professional profile (curricula vitae) development been mooted especially in relation to exist qualifications. The study argues that the culture and benefits of employee training and development should be made known to all employees. The talent management division in the ECDoE must instil a sense of good work ethic where employees should view training and upskilling is being more beneficial to them rather than the school that they are managing.

If such an attitude can be shared and maintained, it means that the employees or school manager will link on-the-job training and development together with other talent management procedures to the positive rewards that comes with compliance and above average performance before they look at it negatively. Besides this, a school manager who get training on how to best catalyse innovation in the school setting can development an appreciation of the practice, becomes productive, have a well dedicated and motivate workforces and always academically performing well as seen through outcomes like pass rates and continuously improving throughput and quality of outputs (pass rates). This recommendation is also associated with the need for the authorities that run the education system to professionalise the training of their school managers. Such a move would involve the sub-contracting of training to private sector professional trainers who will offer the principals a professional exit qualification to help improve their chances of personal career progression. By so doing school managers get motivated to undertake training and development programmes since they will greatly improve their chances to move on with the career, even to join the private

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