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THE PLACE OF TECHNOLOGICAL INNOVATION IN URBAN PLANNING PEDAGOGY AND PRACTICE IN NIGERIA.

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ABSTRACT

With the world becoming a 'global village', African cities, their residents, and those who attempt to plan for them, as AbdouMaliq Simone (2001, p. 17) aptly put it, are now "forced to operate with a more totalising sense of sense of exteriority". Compelled by two pervasive global forces of globalisation and technological advancement, the way we perceive and experience the world, our approaches to learning, and our activity systems are changing irreversibly. Amidst these ground-shifting changes, the current paper attempts to assess the place of technological innovations in planning knowledge and skill transfer in Nigeria with a view to exploring their various contributions to urban planning education and practice. Evidence abound that with the advent of information and communications technology (ICT) in the country, and open access software are facilitating technology-driven applications in data collection and analysis, design, visualisation and decision-making by aspiring planning students, researchers and practitioners with improved performance and outcome. Many challenges, however, remain in the optimum utilisation of these technological innovations in the Nigerian planning system.

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Keywords:
information and communication technology (ICT); technology innovation; urban planning; Nigeria.

INTRODUCTION

The above opening quotations allude to the reality of at least two broad categories of urban planners: those who have aversion for, and are typically clumsy or cautious about modern technology (technophobes); and the others with special liking for, and interest in, modern technology (technophiles). Globalisation coupled with advances and increasing reliance on information and communications technology (ICT), or digital technology, is not only changing the nature of work and organisations (Cascio & Montealegre, 2016), but also affecting the structures of cities in the Global North and South, urban planning is still said to be slow in responding to this challenge (Vonk, Geertman & Schot, 2006; Maeng & Nedović-Budić, 2008; Firmino, Duarte & Moreira, 2008). In other words, cities and countries of the world differ widely in their adoption of ICT-driven urban planning or what is generally known as planning support systems (PSS)1. Apparently, e-planning is the end state of such systems, which to Silva (2010, p. xx):

> Entails a move from a paper based urban planning system, described in this handbook as conventional urban planning, to one based primarily on the integration of various new information and communication technologies and on the interaction of multiple urban stakeholders.

E-planning is therefore synonymous with the concept of ubiquitous computing, an advanced information era environment "in which computational technology permeates almost everything, thereby enabling people to access and control their environment at any time and from anywhere" (Cascio & Montealegre, 2016, p. 353).

Silva (2010) refers to e-planning as "the methodological revolution associated with the use of information and communication technology (ICT) in all stages of the planning process" (p. xx). Does this then presuppose that piece-meal and uncoordinated efforts at PSS adoption, no matter how technologically driven, that detracts from 'all stages of the planning process' may not qualify as authentic e-planning? In Nigeria, most literature on the subject, with possible exception of Dekolo & Oduwaye, 2014 and Odeleye (2014), are piece-meal treatises—frequently, focusing on few tools (in particular, GIS, remote sensing application and AutoCAD) for mostly analytical and presentation purposes (see Onyebueke & Ndukwu, 2017; Agboola, Rasidi, Said, Abogan & Adejuwon, 2018 for example). The planning process is hardly ever mentioned. As expected, academic and policy debates on this compelling theme in Nigeria are still at rudimentary stages, and by implication, retains little prospects for e-planning. These incapacities are occasioned by relatively weak ICT infrastructure, bandwidth constraints, poor informative content, and lack of requisite skills (Adam, 2003; Fadahunsi, 2010; ITU, 2016).

The current paper aims to explore the place or role of technological innovation in planning pedagogy and practice in Nigeria, taking due cognisance of how these applications relate to the planning process. Three specific objectives were pursued, namely, to: (i) ascertain types of PSSs or

[1]Batty (2003, p) defines PSS as "consternation of digital technics (such as the GIS) which were emerging to support the planning process"; and more recently as "that loose assemblage of computer-based tools that urban and regional planners had garnered around them" (Batty, 2007, p. 2). Although slight differences are implicated between PSS, GIS, and Spatial Decision Support System (SDSS) (Xi & Jiao, 2013), GIS is treated as a PSS in this paper.

technological tools in use in Nigerian planning schools; (ii) identify the equivalent PSSs deployed in practice; and (iii) identify key areas of technological neglect in planning, and the extent of PSS penetration or diffusion in the Nigerian planning system with reference to the planning process (i.e., stages in the planning process aided or not aided by PSS). The remainder of the paper is structured in this manner. The next segment reviews contemporary scholarship on technological innovation and urban planning and their significance for improved performance and outcome in the discipline. This is followed by the research methods and process segment. Afterwards, the findings are then unpacked and discussed. The paper concludes with a discussion of the theory and programme implications vis-à-vis planning school curriculum development and continuing education for practising planners, pointing to directions for further research.

Urban Planning, Multiplex Challenges and the Role of Technological Innovation

Modern urban planning arose out of social movements, model experiments, and health legislations in response to the massive urban pollution and poor living conditions that followed the 18th Century Industrial Revolution in America, Great Britain and Continental Europe (Hall, 2002; Ravetz, 2013). From the European colonial powers urban planning practice as 'government of space' then spread to their former colonies across the world (Ravetz, 2013). Over the decades, there has been a core shift from the old planning paradigm, with scope limited to "physical design, land use, and the pattern of transport routes", to the new planning paradigm that addresses "urban issues from a perspective of sustainability, with its overlapping economic, environmental, and socio-cultural dimensions"[2] (Friedmann, 2005, p. 224). Akin to planning practice, planning education is equally experiencing continuing shifts and reforms as Frank (2006, p. 21) affirmed:

> The shift in planning education away from physical design to more knowledge-based activities supporting the rational planning model in the 1970s and 1980s, and then later to advocacy and activist planning, led to a more theoretical, academic, research-oriented, and scientifically rigorous approach to planning education.

In the context of sub-Saharan Africa, Watson & Agbola (2013) have also underlined that together with planning education reform, far-reaching transformations in planning practice and legislation are also imperative for better planned urban futures.

1. Technological applications for modelling and developing information systems aimed at enhancing planning decisions are reported to date back to the 1950s in a number of American planning agencies (Klosterman, 1995). Before elaborating further, a working

[2]John Friedmann's characterisation of the paradigm shift in planning straddles between the 1952 definition of the disciplines by the famous British planner, Lewis Keeble and one by the Draft Vancouver Declaration prepared for the 2006 World Planners Congress in Vancouver, Canada, 17-20 June, 2006. Whereas Keeble (1952, p.) defined *urban planning*as "the art and science of ordering the use of land and siting of buildings and communication routes so as to secure maximum practicable degree of economy, convenience and beauty", Farmer, et al. (2006, p. 2) described *new urban planning* as proactive governance practices, "focused on sustainability, and making the connections between people, economic opportunity and the environment … [that are] explicitly pro-poor and supportive of social, environmental and economic sustainability".

definition of planning is imperative. A fitting start is Hall's (2002, p. 3) summation of planning as:

> …the making of an orderly sequence of action that will lead to the achievement of a stated goal or goals. Its main techniques will be written statements, supplemented as appropriate by statistical projections, mathematical representations, quantified evaluations and diagrams illustrating relationships between different parts of the plan. It may, but need not necessarily, include exact physical blueprints of objects.

As a goal-oriented and problem-solving discipline that entails 'an orderly sequence of action', it becomes apparent that the planning process is actually at the core of planning practice and education (Nedovic`-Budic`, 2000, p. 81-82; Hall, 2002, p. 5; Geertman & Stillwater, 2004; Virtudes & Sá, 2017). The implicit rationale in this argument is that we can neither short-circuit nor do away with the planning process without the jeopardy of sabotaging progressing courses of action proper or their final outcomes. Just as e-planning is the infusion of digital technology or ICT in 'all stages of the planning process', it is therefore a sort of veritable end state in ongoing clamours of applying technology innovation to urban planning.

Urban planners depend on technology to "enhance their analytical, problem-solving, and decision-making capabilities" with potentials to make planning less rigorous and more effective by driving the planning process (Nedovic`-Budic`, 2000, p. 81). Even when utilised in discrete manner with little or no coordination, as is the current case in Nigeria, accessible technological tools such as the Internet and Intranet, word processors, online search engines, ArcGIS, AutoCAD, multimedia devices, etc. have potentials for boosting the capacities, analytical and communicative skills of planning educators, students, and practitioners with enhanced planning interventions and outcomes. Figure 1 shows the relationships between the planning process and e-Planning. But to what extent does available knowledge and skills production, epitomised by published materials, meet this collective planning vision to harness the benefits of ICT and digital tools in planning in Nigeria? Alternatively, is there any available 'conceptual guide'[3] for integrating technology into planning through a more holistic adoption of appropriate PSS in the country?

[3]Maeng &Nedović-Budić (2008, p. 2)

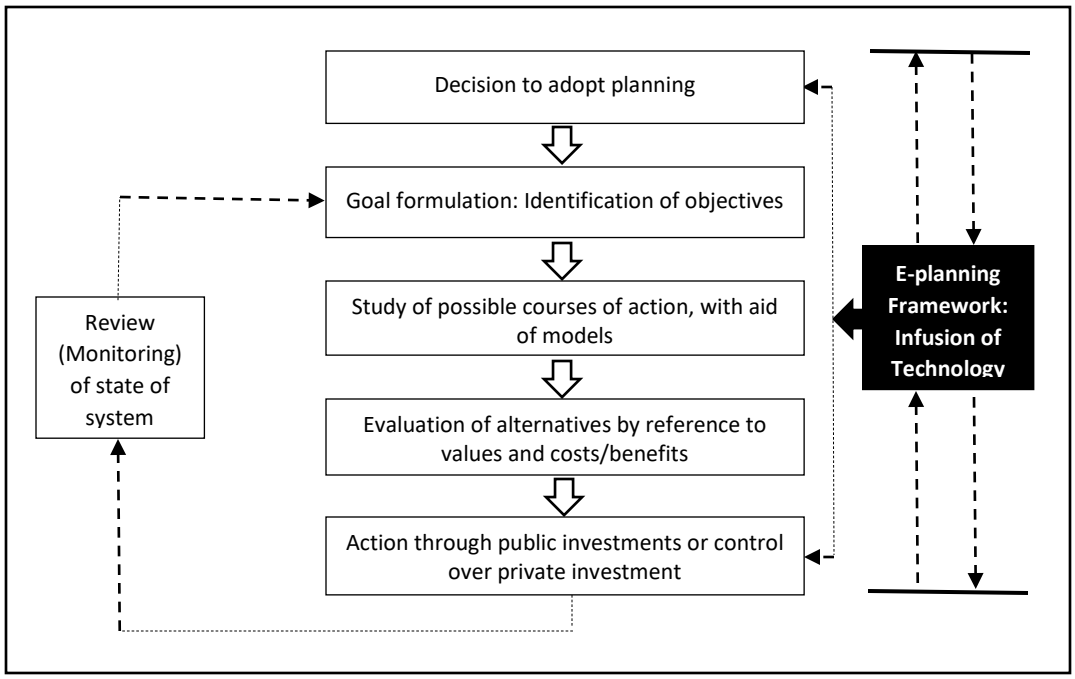

Figure 1 The planning process and e-Planning framework relationship. Modifiedfrom Brian McLoughlin's concept of the planning process in Hall (2002, p. 214).

A review most Nigerian literature on technology application in urban planning fall into two major categories—the descriptive and applied perspectives. The former elaborates the tool(s) in question and its/their merits usually from general theoretical standpoints, and in some cases, specifying particular planning contexts/case studies. Typical descriptive accounts include Oduwaye and Dekolo (2005, 2014) detailing the diverse planning benefits of GIS applications and the abortive attempts to build a GIS hub, the Lagos State Planning Information Centre (LASPIC) and others focus on the concept, compensations, and challenges of applying GIS and digital tools in planning education and practice in Nigeria (Fadahunsi, 2010; Egila & Agbola, 2012 for example) The latter, on the other hand, are normally concerned with practical application of such tools to particular environmental, planning and/or urban contexts such as urban morphology and sprawl, flooding, gully erosion, etc. (Anejionu, Nwilo & Ebinne, 2013; Dekolo & Oduwaye, 2014; Dalil, Ilegieuno, Babangida & Husain, 2016; Okorafor, Akinbile & Adeyemo, 2017; Onyebueke & Ndukwu, 2017; Agboola, Rasidi, Said, Abogan & Adejuwon, 2018).

While both standpoints attempt to showcase in ample detail the analytical, presentation or other benefits of the tool(s) under discussion, they remain 'stand-alone' strategies lacking in collective planning vision of ICT-driven urban planning or e-planning (Odeleye, 2014). On the contrary, Odeleye (2014) holistically explored the progressive deployment of ICT technologies and e-platforms (teleconferencing, teleshopping, tele-working, e-logistics, e-mobility-portals, etc.) in the banking/finance, education, health and other sectors of the Nigerian economy, and advocated for a more coordinated and integral system. Another lacuna in the related but limited literature on the subject in Nigeria is the non-existent attention to the

unintended consequences or negative effect of PSS adoption in planning education and practice. In fact, Vonk, Geertman & Schot (2005) see this as a global problem as since "little research has been undertaken on the successes and failures in the adoption of PSS within the planning community" (p. 909). The positive and negative effects of technology on general work (dis)location and organisational behaviour has been explored by Cascio and Montealegre (2016), but of particular relevance to this discourse is the effects concern planning education and practice (Willson, 1997; Urey, 2002).

The positive and negative effects of unbridled computer application or PSS adoption in the teaching and practice of planning is summarised in Table 1. Cascio's and Montealegre's (2016) suggestion for individuals and organisations is instructive for planning—a simultaneous maximisation of the positive effects and minimisation of the negative effects of technology applications. But is it possible to deliver this delicate balance in Nigeria? But first, it is important to examine the current state of affairs of applications in the Nigerian planning system.

STUDY METHODOLOGY

The paper is basically a review piece, and as a result it of made use of related literature on the broad theme of infrastructure applications in urban planning, as well as publicly available curriculums of Nigerian planning schools, and a few anecdotal evidence. Search engines such as Google, Google Scholar, J-Stor and Sage Search were deployed in gathering data on relevant literature, including searching the cited references of pertinent works. The curriculums and other detailed course materials of the selected Nigerian planning school were also obtained in the same manner from online sources. Since the subject represents a very expansive, which is of interest to diverse disciplines, the huge collections of sourced materials (over 100) were further reduced by sorting based on degree of relevance, and the remainder (about 45) were then stored for final review and content analysis.

Table 1 Positive side effects (advantages) and negative side effects (disadvantages) of technological applications in urban planning.

POSITIVE EFFECTS	PSS	NEGATIVE EFFECTS	PSS
Spatial data storage, retrieval and presentation for enhanced analysis (terrain analysis, land use features, transport networks, etc.) and decision-making in planning (Klosterman, 1995)	GIS	Monetary and personnel cost of installing, maintaining GIS hardware and software, and undertaking frequent updates are much more prohibitive than the conventional paper approach (Klosterman, 1995)	GIS
Avails planners and planning students with faster and more accurate tool for analysing vast amount of data (Willson, 1997) and facilitates urban policy coordination (Kintu, 2014)	GIS other data-intensive models	Imbues a 'data-base way of thinking' mentality, stunted sensory capacities, altered learning and practice environments; and tools are often too generic and inflexible, and inadmissible of ethical and moral values (Willson, 1997; Bradley & Shaefer, 1998; Vonk, Geertman & Schot, 2005)	GIS & other data-intensive models

Capability to create clean and precise graphs plus other diagrams (Urey, 2002)	Spreadsheet (and GIS)	Tend to create obstacles to learning basic methods and quite often result in communication distortion of inevitable or preventable and ad-hoc or systemic proportions (Forrester, 1998; Urey, 2002). Yet, scarcely used for "those tasks that are unique to planning,such as visioning, storytelling, forecasting, analysis, sketching, and evaluation" (Vonk, Geertman & Schot, 2005, p. 909)	Spreadsheet (and GIS)
Increases the 'voice', access, and participation of the youth and other marginalised groups in local governance; and on the part of authorities increases openness, transparency as well as strengthens feedback and monitoring (Ben-Attar & Campbell, 2014; Driscoll, Larsen, Shutina & Ciro, 2014; Sutti, Roberto, Stefani & Leblanc, 2014)	ICT-enabled mobile platforms, mobile, phones, e-participation	Prone to hacking, Internet and other electronic frauds, electricity outages, low bandwidth, manpower and management constraints, etc. () It is widely acknowledged that for a long time to come digital tools for participation (E-participation) can only complement rather than substitute the traditional devices (Kubicek, 2010)	ICT-enabled mobile platforms, mobile, phones, e-participation
Enables more electronic-based transaction (cashless transfers for goods, service and/or charity) that are convenient and less risky for customers, and better fiscal architecture, reduced revenue leakages and cash handling costs for both corporations and government (Odeleye, 2014).	ICT-enabled mobile platforms, mobile, phones, and e-platforms.	Prone to hacking, Internet and other electronic frauds, electricity outages, low bandwidth, manpower and management constraints, etc.	ICT-enabled mobile platforms, mobile, phones, and e-platforms
Development of smart or intelligent city frameworkwith ubiquitous computing network that responds to devise challenges such as cleaner urban air quality, improved urban energy use, enhanced urban information sharing, improved urban productivity, eliminating inefficiencies, promoting the development of networks, etc. (Tao, 2013; Odeleye, 2014; Virtudes & Sá, 2017).	Smart city concept and platform	Personnel, technical, and maintenance cost can be prohibitive for developing countries.	Smart city concept and platform

Sources: Compiled from extensive literature search.

Planning Education and Practice in Nigeria: Diffusion and Application of Technology

This result section
will be discussed under four subsections corresponding to the four stated objectives, viz.: types of PSSsor technological tools in use in Nigerian planning schools; the equivalent tools deployed in practice; and identify key areas of technological neglect in planning, and the extent of PSSpenetration or diffusion in the Nigerian planning system with reference to the planning process.

Types of PSS (or Technological Tools) for Teaching Planning

Nigeria has a total of 36 planning schools, slightly more than half of the African total of about 70 institutions awarding planning degree on the continent (Watson & Agbola, 2013). An assessment of the curriculums of six planning schools (16.67%) in Table 2 reveals that most, if most all, of the planning

students are exposed to basic computer appreciation as well as to fundamental PSS tools (GIS and AutoCAD), all things being equal. There is however no indications from the curriculums that the remote sensing and photogrammetry courses have digital contents, and but is presumed that basic computer appreciation courses taught in all the planning schools analysed incorporate basic Microsoft Office Package (Windows, Excel or Spreadsheet, Power Point, Office Online and Outlook). Of course, studios are an essential element of the six, and indeed all, planning schools in Nigeria and elsewhere (Frank, 2004; Watson & Agbola, 2013), but there is nothing in the programmes to show that contemporary pedagogical approaches like multimedia, role play and simulations (Plate 1)

.

Table 2 Content assessment of the curriculum of six planning schools in Nigeria (2018)

UNIVERSITY/ PLANNING SCHOOL	COMPUTER-BASED COURSES		PSS TYPES
	Basic Appreciation (Credit Unit)	Planning Support Systems (PSS)	
Abukakar Tafawa Balewa University Bauchi	CS 142: Introductions to Computer Science (3) (*Most probably, including Microsoft Office Package*)	EMT 311 Remote Sensing I (2)*(Elective)* SAG 313 Introduction to Photogrammetry (3) *(Elective)* URP 416 Geographic Information System (2)	Computer appreciation, ,Photogrammetry & Remote Sensing, GIS
Ahmadu Bello University, Zaria	URPL 212 Computer Application in Planning (1) (*Most probably, including Microsoft Office Package*)	URPL 301 GIS in Planning (2)	Computer appreciation, AutoCAD, GIS
University of Benin, Benin	200 & 300 Levels Faculty courses on Introduction to Computers (2 each) (*Most probably, including Microsoft Office Package*)	GEO 325: Aerial Photo Interpretation and Production Cartography. GEO 332: Geographical Information System.	Computer appreciation, ,Photogrammetry & Remote Sensing, GIS
University of Jos, Jos	URP 213:Introduction to Computer Appreciation(*Most probably, including Microsoft Office Package*)	URP 311: Computer application	Computer appreciation, AutoCAD, GIS
University of Lagos, Akoka	URP 101 Computer Basics (2) (*Most probably, including Microsoft Office Package*)	URP 305 Computer Programming & System Analysis for Planners (2) URP 306 Computer Applications for Planners II (2). GEO 413: Introduction to Remote Sensing.	Computer appreciation, ,Photogrammetry & Remote Sensing, AutoCAD, GIS
University of Nigeria, Enugu Campus	COS 101: Introduction to Computer Science (2)(*Most probably, including Microsoft Office Package*)	URP 331: Computer Applications in Planning (2)	Computer appreciation, AutoCAD, GIS, Spreadsheet

Sources: Author's compilation from published curriculums of planning schools in various web platforms sourced 26th February, 2018.

Plate 1 Role playing is becoming an essential element of planning pedagogy. A role playing section on housing gentrification at the Erasmus-IHS University in April 21, 2006.

Types of PSSdeployed inPractice

Here, we use selected literature from the applied literature category as a surrogate of PSS deployment in practice. In a similar way as in private planning practice (see Egila & Agbola, 2012), these works demonstrate practical applications of such tools to particular environmental, planning and/or urban contexts. The content analysis on six purposively selected articles are shown in Table 3, and it appears to reveal in some cases slight gaps (in terms of range and sophistication of PSS deployed) between what planning students are taught in the universities (as measured by curriculum contents) (refer to Table 2) and what obtains in practice. It is noteworthy that the teaching/learning environments in urban planning for planning students, practitioners, and academics no longer terminate in the classrooms: they extend to continuing and further planning education at home (like the current Mandatory Continuing Professional Development Programme, MCPDP) or abroad, and with the Internet, even interconnect with the virtual world (Figure 2).

Table 3 A content analysis of six purposively selected articles on technological application in urban-related and urban planning issues in Nigeria.

AUTHOR(S)	PROBLEM STATEMENT	PSS TOOL(S) USED	KEY FINDINGS
Ikhile & Oyebande, 2007	To investigate land use changes from 1970 to 2000 in Osse-Ossiomo River Basin (Benin city and environs) of Edo	Baseline map (1965), Remote sensing data (Landsat ETM images), AutoCAD 2000, ArcView GIS 3.2, and	The built-up area increase as follows: 2,500 ha (1965), 64,500 ha (1987) and 80, 400 ha (2000). Benin city had sprawled up to 10 Km radius to merge with 5 other

	State, Nigeria	Erdas Imagine 7.1	villages (Aduwawa, Ekosodin, Isihor, Ugbekun, and Oliha)
Anejionu, Nwilo & Ebinne (2013)	Erosion mapping and assessment in Southeast Nigeria (Imo, Anambra, Abia, Enugu and Ebonyi States)	Remote sensing data (ASTER Global Digital Elevation Model - DEM - V2, SRTM 90m, and GTOPO30 DEM -1996, 2000 and 2011), GIS (Revised Universal Soil Loss Equation, RUSLE)	High and extreme erosion areas or erosion hotspots were in most parts of Ebonyi State, Enugu State (Northwest axis), Anambra State (South East and Central axis), and most parts of Abia State with Imo State being the least affected.
Dekolo & Oduwaye (2014)	A scrutiny of the level of geospatial technologies and infrastructure use in local planning authorities in Lagos State and the obstacles to extending the constituent PSS to the 20 LGAs.	Essentially a review of a web-based enterprise GIS Living Lab hub, LASPIC (Google Earth, ArcGIS Explorer, and ArcGIS Map-Server)	Four most important ICT softwares by usage in the State are: Microsoft Office (81.0%); AutoCAD (50.0%); Map windows (22.7%); and ArcGIS. General lack of awareness and access the hub are major limiting factors.Over 73% of the agencies do not have the basic digital data. No observed framework for data sharing among the planning agencies in the State.
Dalil, Ilegieuno, Babangida & Husain (2016)	Assessment of the impact of gully erosion in Auchi town (Edo State) from 2006 to 2012.	Map Digitalizer, GPS, Remote sensing data (Digital Terrain Model - DTM,Digital Elevation Model -DEM),ArcGIS 10.1,Surfer10 and Global Mapper softwares	Total land area lost to the gully: 102,537m2 (2006); 119,481m2 (2009) and 140,450m2 (2012). If not mitigated, the projected loss for 2015 is more than150,000m2
Onyebueke & Ndukwu (2017)	To map the growth and urban extent of Enugu metropolis from 1985 to 2015 (Enugu State).	Remote sensing data (Landsat 5 Thematic Mapper for 1985; Landsat 7 Enhanced Thematic Mapper for 2000; andLandsat 8 Operational Land Imager, OLI, for 2014)	Whereas population of Enugu increased about 32-fold from 1986 to 2015, the city increased nearly 45-fold in size. Between 1961 and 2014, the number of new layouts have grown at an average rate of about 29%. Most of this growth is due to schemes initiated by rural peri-urban communities.
Agboola, Rasidi, Said, Abogan & Adejuwon (2018)	Exploration of the morphology of growth and land use diversification and residents' perceptions in Ijebu-Jesa, Oriade LGA, Osun State (1910-2015).	ArcGIS version 10.3	Ijebu-Jesa experienced significant sprawl in three phases 1910-1960, 1960-1999,and 2000-2015 with remarkable inverse changes in land use between the built-up area and open spaces/greenery. Changing settlement dynamics reflected in accessibility, safety, interaction and other values.

Sources: Author's compilation from literature search.

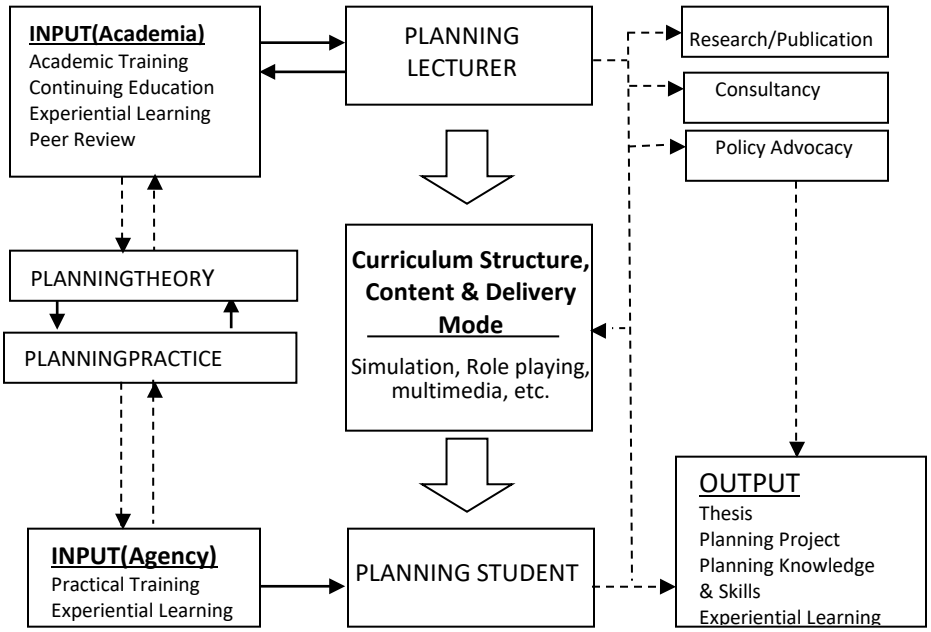

Figure 2 Processes in the innovative planning pedagogy system (Onyebueke, 2014, p. 18)

Areas of Neglect and Extent of PSS Penetration in Nigerian Planning System

Today the teaching and learning environments have become virtual and boundless, thanks to the Internet and ICT. It is crucial, therefore, to explore key areas of technological neglect in planning, and the extent of PSSpenetration or diffusion in the Nigerian planning system with reference to the planning process. To do this, a short list of conventional and mature PSS tools (from the most common place to the rare)[4] was compiled from extensive review of international and national literature on the subject based on the stages of the planning process they were regularly used (Table 4). The low place of Nigeria in the application of technological innovation in urban planning is decipherable from Figure 3 as there are no known cases of use of sophisticated PSS IBM's IOC, SimCity, SLEUTH, CommunityViz, and What if [TM], many of which are in use in some cities/countries of the Global South.

[4]According to Klosterman and Stillwater (2004) and Brail (2008) who have attempted making inventories of PSS, the list is almost endless as the number of newly developed ones by far outpaces attempts to apply them in planning practice. According to Klosterman and Stillwater (2004, p. 294) "the planning community as a whole has little idea of where to look when searching in the academic orplanning literature for good examples of the use of PSS in practice."

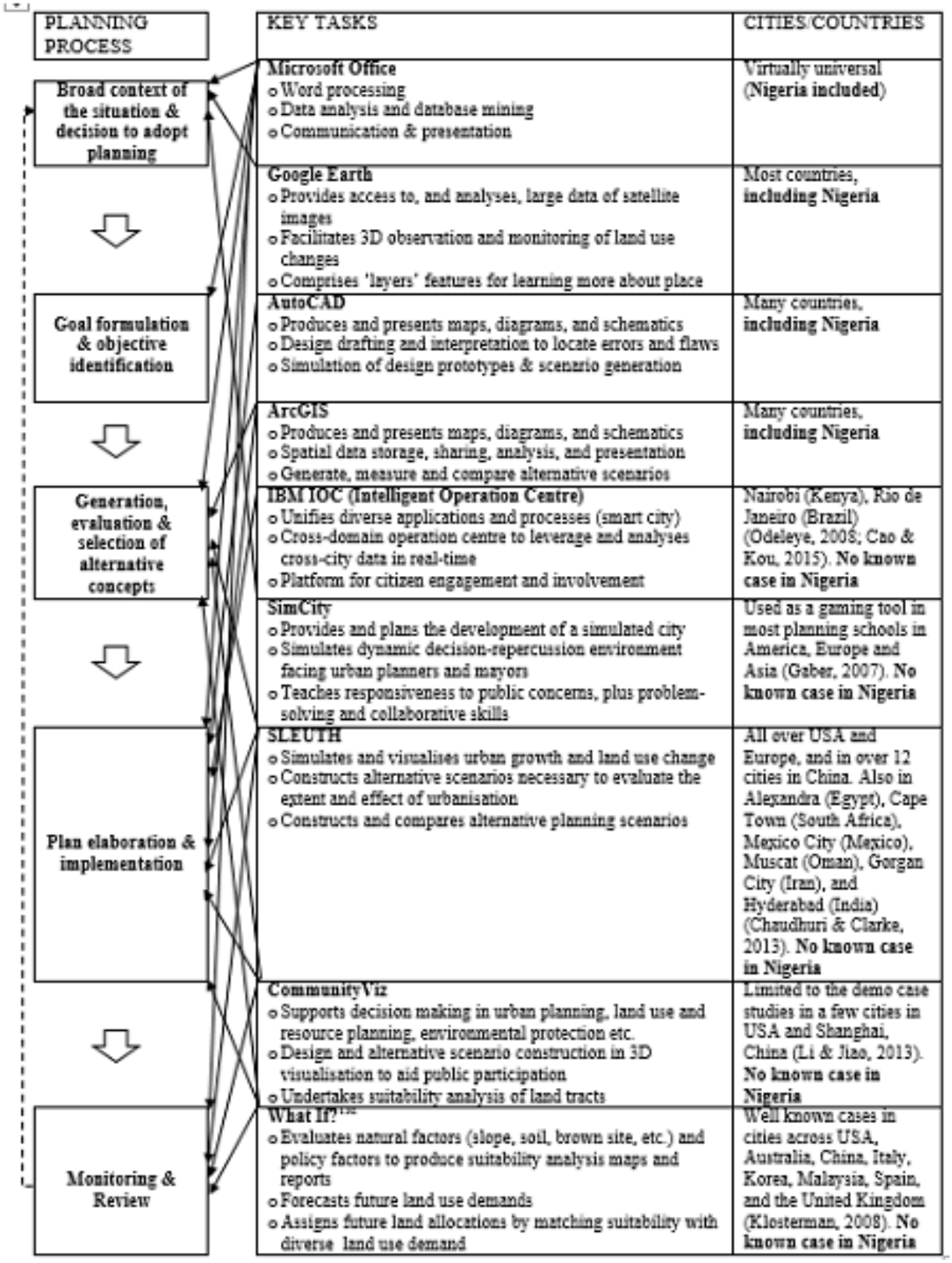

Figure 3 Planning support systems (PSS), innovation diffusion and the planning process

CONCLUSION AND RECOMMENDATIONS

Under the current interconnected 'global village', it does appear that *technophobic* urban planners do not stand much chance when compared to their *technophilic* colleagues. Just like the world, both the city and the distinguished profession (urban planning) we once knew, is changing drastically and beyond recognition. Yet, the planning discipline grapples with multi-fold challenges of rapid urbanisation and the restless city, and its own internal evolutionary that daily test its legitimacy and efficiency. In as much as Nigerian planners are lagging behind in this 'digital march', even by African standards (recall the mention of Nairobi and Cape Town in Table 4), it is however sensible to heed the warning of Richard Willson (1997, p. 41) and other cautious advocates of technological application in planning that there are substitutes for ethics, values, and human sensibilities.

The current handicaps in the Nigerian planning system with regard to attainment of E-planning aspiration are not restricted to individual planners, they are also institutional both as it concerns planning education and practice. With respect to the former, Watson & Agbola (2013, p. 8) had this to say:

> Educational reform is no easy task in most African universities – oranywhere. Curriculum change is a highly centralised and usuallyprotracted process. Severe financial constraints are commonplace.Underpaid staff undertake consultancy work to make ends meet,library resources are poor, and there is a shortage of computersand other essential equipment. Internet bandwidth is usually verylimited, technical support inadequate, and power outages frequent

The situation in practice appears even direr as we can learn from the laudable, albeit wobbly, case of LASPIC see (Oduwaye & Dekolo, 2005; Dekolo & Oduwaye, 2014). The current paper submits that technological innovation has comparatively low standing in planning pedagogy and practice in Nigeria. This conclusion is based on the task inventory of the particular grades of PSS in use in planning pedagogy and practice and in the piece-meal and uncoordinated manner—that distracts from the planning process—in which most of them are deployed. Like Oyeleye (2014, p. 178) rightly muted, "technological solutions and innovation that is capable of combining physical and virtual mobility needs in a more realistic and sustainable manner." It is imperative for planning schools, agencies, and professional institutes to adopt a more holistic and coordinated approach to realising E-planning mandate in Nigeria.

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