



LEVERAGING EMERGING INFORMATION AND COMMUNICATION TECHNOLOGIES FOR ENHANCED SERVICE DELIVERY: A FOCUS ON FEDERAL COLLEGES OF EDUCATION LIBRARIES IN SOUTH EAST NIGERIA

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Abstract

The study examined leveraging emerging information and communication technologies for enhanced service delivery: a focus on federal colleges of education libraries in south east Nigeria. Four research objectives guided the study. Descriptive survey research design was adopted for the study. The population of the study is 90 consisting of 30 librarians and 60 para-librarians in the institutions under study. A questionnaire titled leveraging emerging information and communication technologies to enhance service delivery questionnaire (LEICTESD) was used as instrument for data collection. Descriptive statistics of mean and standard deviation were employed in the data analysis. Result revealed that institutional repositories, social media and webOPAC are the emerging ICTs applied for effective service delivery; institutional repository, social media and integrated library management system are emerging ICTs applied in a very high extent for effective service delivery, the application of emerging ICTs contribute to effective service; inadequate funds and electric power supply are the major challenges affecting emerging ICTs and its application for effective service delivery. The study recommended that librarians should make effort in identifying emerging ICTs to apply for effective service delivery; they should improve in the application of emerging ICTs in library operations for effective service delivery; librarians should always apply emerging ICTs to its operation for effective service delivery; and there should be the provision of adequate funds, electric power supply and others which will enhance the application of these emerging ICTs for effective

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service delivery.

Introduction

Over the years, conventional library services were the only method obtainable in libraries. Services such as acquisition, processing, storage and dissemination of information could only be carried out within the four walls of the library (James and Emmanuel, 2017). However, the application of emerging information and communication technologies (ICTs) in these libraries especially colleges of education libraries will drastically influence enhanced information service delivery.

Emerging ICTs are considered to be one of the best rewards modern science and technology has brought to libraries as its application in information service delivery have revolutionized the conventional service concept of libraries to technological driven. By implication, these technologies have opened a new era in collage of education libraries by facilitating users' global and unrestricted access to information aimed at supporting teaching, learning and research activities of the parent institution. These technologies according to Chukwueke and Onuoha (2019) Include library management system for library automation, radio frequency identification (RFID) for access control, conservation and security of print resources like Web-OPAC (online public access catalogue) as against the manual OPAC for cataloguing services. There is also transition from reference desk assistance to web-based

remote access to information resources. Gupta and Singh (2018) identified library bookmark application, big data and Internet of Things (IoT) as some emerging ICTs that have been applied in academic libraries for effective service delivery. Other emerging technologies are Augmented Reality (AR), Virtual Reality (VR), QR (quick response) barcode technology, cloud computing, social media applications and Artificial Intelligence (AI) (Sheik and Olugbenga, 2019). The application of these technologies in colleges of education libraries will not only enhance effective service delivery, rather make these libraries smarter, and bridge the information gap.

The importance of emerging ICTs in colleges of education libraries cannot be overemphasized. Jindal R. and Khan J. (2019) highlighted change in library housekeeping operation, security of information resources, web based library services, use of library portals, and library networking as some benefits associated with the application of emerging ICTs in academic libraries. The application of these technologies will change housekeeping operations of the library and make them become quick and easy. There are many Library Management Softwares (LMS) available in the market for library automation. Therefore colleges of education libraries can take decision regarding the most suitable LMS to adapt in order to achieve enhanced information service

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delivery. Security of information resources is of paramount importance to libraries if they must achieve enhanced service delivery. This is because colleges of education libraries in Nigeria have a large collection of print material despite having access to e-resources. These libraries face the problem of theft and mutilation of library resources; and this can be tackled through emerging technologies such as Radio Frequency Identification (RFID). RFID is a theft detection technology used by libraries to provide efficient tracking of all information resources in the library along with the security. It also provides easier and faster check-in/check-out, stock taking, and inventorying library resources aimed at enhancing effective service delivery.

The conversion of conventional library services to library 2.0 is also considered as a benefit associated with the application of emerging ICTs in colleges of education libraries for enhanced service delivery. These web 2.0 services such as social networking services and the use of library portals have enabled colleges of education libraries in Nigeria make its users which primarily consists of students, lecturers and researchers more comfortable in the access and use of information resources. Networking of libraries in Nigeria has been made possible through the help of emerging technologies. Through library network, colleges of education libraries can share information resources and also arrange seminars, workshops, training

programs etc for users to enhance effective service delivery.

However, despite the numerous benefits associated with emerging technologies and its application for enhanced effective service delivery, colleges of education libraries still encounter numerous challenges. Odeyemi (2019) said academic libraries have adopted emerging technologies into the library service delivery system even though a few factors like technophobia stand as a challenge. Also, Oketunji (2012) noted that library tasks have not been fully exploited because of its numerous challenges such as power failure, inadequate funds, computer system failure, staff attitude towards use of ICT, lack of ICT policies and shortage of competent staff to manage the ICT facilities. Even where funds and resources are readily available, libraries are expected to train their staff to enable them perform better in the application of these emerging technologies to enhance effective service delivery. These challenges hinder the application of emerging technologies in many colleges of education libraries. Based on the identified gaps, the study seeks to investigate emerging information and communication technologies (ICTs) for enhanced service delivery in federal colleges of education libraries in south-east, Nigeria.

Statement of the Problem

Colleges of education libraries generally function to grant access to information resources and services to support users'

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research and learning activities. In Nigeria, colleges of education libraries despite their importance to the parent institution that established it, they fear going on extinct considering the recent impacts of information and communication technology, the changing information seeking behaviour of users and the introduction of remote information access services from emerging information technologies.

The application of emerging technologies in colleges of education libraries has the potential of improving their present situation and making them better positioned to fulfill their information role which is to support teaching, learning and research activities. The literature concerning emerging ICTs for enhanced service delivery show that libraries in Nigeria are not applying most of these emerging ICTs in its operation as effective as those in developed countries. Federal colleges of education libraries in South East Nigeria, particularly do not seem to apply emerging ICTs in its information service delivery to users. This has resulted to poor information service delivery and its consequences are enormous. It has resulted to users' denial to access enormous information resources to meet up with learning, teaching and research activities.

Consequently, it is important for Federal colleges of education libraries in South East Nigeria to expand their horizon and apply these emerging technologies to its operation to

achieve enhanced service delivery. Studies have been conducted on application of ICT for effective service delivery in libraries but only few have investigated emerging ICTs for enhanced service delivery in Federal colleges of education libraries in South East Nigeria. Therefore it becomes imperative and timely to carry out the investigation to ascertain the state of emerging technologies for enhanced service delivery in federal colleges of education libraries in south-east Nigeria. The problem of this study in question form is to what extent are emerging ICTs applied for enhanced service delivery in federal colleges of education libraries in south-east, Nigeria?

Purpose of the Study

The main aim of this study is to investigate emerging Information and Communication technologies for enhanced service delivery in federal colleges of education libraries in south-east, Nigeria. Specifically, the study sought to determine:

1. Emerging ICTs applied for enhanced service delivery in the libraries;
2. Extent of application of emerging ICTs for enhanced service delivery in the libraries;
3. Ways emerging ICTs contribute to enhance service delivery in the libraries;
4. Challenges affecting the application of emerging ICTs for enhanced service delivery in the libraries;

Research Questions

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The following research questions guided the study;

1. What are the emerging ICTs that are applied for enhanced service delivery in the libraries?
2. To what extent are emerging ICTs applied for enhanced service delivery in the libraries?
3. In what ways does emerging ICTs contribute to enhanced service delivery in the libraries?
4. What are the challenges affecting emerging ICTs for enhanced service delivery in the libraries?

Literature Review

Emerging ICTs and its application in libraries especially colleges of education libraries today have not only increased and broadened the impact of information service delivery, rather has brought services to users doorsteps and have continued to ease and promote quick and timely access to and transfer of information services to support users learning, teaching, and research activities. In his study on emerging information technologies in libraries, Omosor (2014) stressed that the influx of technology-based support services in library operations has improved service delivery in a faster and more accurate way in academic libraries. This of course shows the usefulness of the application of emerging technologies in colleges of education libraries. Odeyemi (2019) identified barcode technology, cloud

computing, social media applications, artificial intelligence (AI) and robotics as some of these emerging technologies that is applied in library operation to achieve effective service delivery. That is why Abdulwahab, Agun, Usman, Aliyu(2011) noted that in libraries, several systems have been developed for their various housekeeping chores and more still are being designed and refined due to technology of large-scale integration to handle any of the library information services such as acquisitions, cataloguing, serials control, circulation control, bibliographic control, or Selective Dissemination of Information (SDI). Emerging Technologies like digital storytelling, RFID, library bookmark application, big data, and Internet of Things (IoT) have been introduced and applied in library operations recently. Hoy (2017) opined that the application of Block-chain for metadata and networking of libraries will go a long way in improving effective information services delivery. Also, Massis (2018) maintained that ambient intelligence and data mining have currently been introduced and applied in library operations making the libraries smarter, improving work capabilities of staff, satisfying customer needs, and bridging the information gap. This is indeed, positive impacts of these emerging technologies in libraries in Nigeria especially colleges of education libraries. The aim of applying emerging ICTs in libraries across the globe is to enhance effective service

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delivery. Jindal R. and Khan J. (2019) said emerging technologies have affected colleges of education libraries in Nigeria in the following ways:

Emerging ICTs have improved housekeeping operations as well as other user services by making them become quick and easier. There are many Library Management Software (LMS) available in the market to automate the library. Therefore, the application of these LMS in colleges of education libraries in Nigeria will reduce human intervention in all services so that users can receive their desired information with the maximum comfort and at the lowest cost. Automated Circulation system helps in keeping record and track of users as well as library documents. The Overdue reminders may be sent to users through email. An Intelligent Return and Sorter System can be used in libraries for automating the check-in and sorting process. The Intelligent Return and Sorter System help in reducing the time span, increasing staff productivity and enhancing user satisfaction.

Emerging ICTs and its application in library operation has also enabled web based services through web 2.0. With web 2.0, users can read and even write any information on the web anytime and at anywhere without time and location constraints. Web 2.0 services mainly include web access of E-resources such as e-books and ejournals, electronic databases etc. Users can access the e-resource through the

library website. Therefore, the application of emerging ICTs in colleges of education libraries in Nigeria cannot be overemphasized.

However, colleges of education libraries in Nigeria encounter numerous challenges with emerging ICTs and its application in library operations in a bid to enhance effective service delivery. Omosor (2014) reported that inadequate technical staff, complexity of the technology interface, slow bandwidth and the growing demands of users has become some of the major challenge for most libraries. Ahmed (2012) has earlier said ICT skill acquisition and training is pertinent for emerging technologies to be introduced and applied in Nigerian libraries since it stands as a threat to library services. Other challenges as identified by Otunla (2016) include lack of funding, lack of ICT staff, and insufficient power supply. Several challenges have been reported and they need to be examined and addressed for emerging technologies to be fully applied to enhance effective information service delivery in federal colleges of education libraries in south-east, Nigeria.

Methodology

Descriptive survey research design was adopted in carrying out this study. Nworgu (2008) view descriptive survey design as a research method that involves collecting data on and describing in a systematic manner the characteristics, features or facts about a given population. It is usually concerned with description of events as

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they are. Descriptive survey design was considered appropriate because the study collected data from librarians and para-librarians that were used to describe and explain the status of the application of emerging ICTs for enhanced service delivery in federal colleges of education libraries in south-east, Nigeria. This study was carried out in south east, Nigeria. South-East Nigeria is one of the six geopolitical zones in Nigeria. The population of the study is 90 comprising of 30 librarians and 60 para-librarians from the three (3) federal colleges of education libraries in south-east, Nigeria namely: Federal college of education, Umunze, Anambra State; Alvan Ikoku federal college of education, Owerri, Imo

State; and Federal college of education, Eha-Amufu, Enugu State. Questionnaire was used as an instrument for data collection. Cluster A sought to find out emerging ICTs applied for enhanced service delivery in the libraries. Cluster B sought to find out extent of application of emerging ICTs for enhanced service delivery in the libraries. Cluster C focused on ways emerging ICTs contribute to enhanced service delivery in the libraries. Cluster D looked into the challenges affecting the application of emerging ICTs for enhanced service delivery in the libraries. Descriptive statistics of mean and standard deviation were employed in the data analysis.



Results and Discussion

The results of the study are presented in table 1-4 below:

Research Question 1: what are the emerging ICTs applied for enhanced service delivery in federal colleges of education libraries in south-east, Nigeria?

Table 1: Mean rating of responses on emerging ICTs applied for enhanced service delivery.

S/N	Items	Mean	Std	Rank	Decision
1	Institutional Repository (e.g. DSpace)	3.82	.38	1 st	SA
2	Radio Frequency Identification (RFID)	3.17	.65	10 th	A
3	Cloud computing	2.82	.98	13 th	A
4	Social media	3.73	.44	2 nd	SA
5	Internet of Things (IoT)	3.30	.82	8 th	A
6	WebOPAC	3.60	.58	3 rd	SA
7	Artificial intelligence	3.13	.96	11 th	A
8	Integrated Library Management System	3.47	.66	4 th	A
9	Virtual/Augmented Reality	3.08	.84	12 th	A
10	RSS Feeds	3.34	.64	7 th	A
11	Voice-Over-Internet Telephony for users	3.30	.55	8 th	A
12	Google partnered Libraries-Ready-to-code Initiative.	3.13	.81	11 th	A
13	3D/2D Digital Printing	3.39	.58	6 th	A
14	Specialized library website	3.73	.44	2 nd	SA
15	Library Guide Apps	3.43	.58	5 th	A
16	Digital storyteller	3.21	.85	9 th	A
Cluster Mean		3.35			A

SA = Strongly Agree; A = Agree; D = Disagree; SD = Strongly Disagree

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Table 1 shows result on emerging ICTs applied for enhanced service delivery. It shows that respondents strongly agree that institutional repository, social media, specialized library website and webOPAC ranked 1st, 2nd, and 3rd as emerging ICTs applied for enhanced service delivery. Other emerging ICTs rated agree are integrated library management system, Library guide apps, 3D/2D digital printing, RSS feeds, Voice-over-internet protocol telephony for users, internet of things (IoT), digital story teller, and Radio Frequency Identification (RFID). The lowly rated agree emerging ICTs such as artificial intelligence, Google partnered libraries-ready-to-code initiative, virtual/augmented reality and cloud computing ranked 11th to 13th. The cluster mean (3.35) shows that respondents agree that emerging

ICTs are applied for enhanced service delivery in federal colleges of education libraries in south-east, Nigeria. The standard deviation .98 - .38 shows high response variance. Wenborn (2018) agree with this finding that emerging ICTs and its application in library operation promotes enhanced service delivery. More so, it is clear that libraries will be integrated into the core value system and workings of society in the shortest possible time through the accommodation of new technological applications for teaching, learning and research. In a similar view Odeyemi (2019) clearly posited that the application of emerging technologies will not only make libraries smarter, rather improve working capacity of staff, satisfy customer needs and bridge information gap. All these are aimed at enhancing service delivery.

Research Question 2: To what extent are emerging ICTs applied for enhanced service delivery in federal colleges of education libraries in south-east, Nigeria?

Table 2: Mean rating of responses on extent emerging ICTs are applied for enhanced service delivery.

S/N	Item Statement	Mean	Std	Rank	Decision
1	Institutional Repository (e.g. DSpace)	3.65	.62	1 st	VHE
2	WebOPAC	3.42	.63	4 th	HE
3	Voice-Over-Internet Protocol Telephony for users	3.02	.81	7 th	HE
4	3D/2D Digital Printing	2.88	.83	9 th	HE
5	Internet of Things (IoT)	2.28	.99	13 th	LE

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6	Social media	3.55	.71	2 nd	VHE
7	Digital storyteller	2.92	.77	8 th	HE
		3.50	.73	3 rd	VHE
		3.11	.95	6 th	HE
8	Integrated Library Management System	2.56	.85	11 th	HE
9	RSS Feeds	2.11	.89	14 th	LE
		2.78	.82	10 th	HE
10	Library Guide Apps	1.93	1.02	16 th	LE
11	Cloud computing	2.22	.98	15 th	LE
		2.36	.81	12 th	LE
12	Radio Frequency Identification (RFID)	3.40	.81	5 th	HE
13	Virtual/Augmented Reality				
14	Google partnered Libraries-Ready-to-code Initiative				
15	Artificial intelligence				
16	Specialized library website				

Cluster Mean

2.79

HE

VHE = Very High Extent, HE = High Extent, LE = Low Extent, VLE = Very Low Extent

Table 2 shows result on extent emerging ICTs are applied for enhanced service delivery in federal colleges of education libraries in south-east, Nigeria. The cluster mean (2.79) shows that emerging ICTs are applied for enhanced

service delivery in a high extent. The result in the table indicates that institutional repository, social media and integrated library management system ranked 1st, 2nd, and 3rd accordingly as emerging ICTs applied in a very

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high extent. Also the result indicated that WebOPAC, specialized library website, RSS feeds, voice-over-internet protocol telephony for users, digital story teller, 3D/2D digital printing, radio frequency identification and library guide ranked 4th and 11th accordingly as emerging ICTs applied in a high extent. However result revealed artificial intelligence, internet of things (IoT), cloud computing, Google partnered libraries-ready-to-code, and

virtual/augmented reality as emerging technologies applied in low extent. This result agrees with Emiri (2019) who stressed that there is evidence in the extent of application of emerging ICTs in libraries in Niger Delta region of Nigeria. These choices were probably made based on the growing demand of remote learning and the need to provide effective service delivery.

Research Question 3: in what ways does emerging ICTs contribute to enhanced service delivery in federal colleges of education libraries in south-east, Nigeria?

Table 3: Mean rating of responses on ways emerging ICTs and its application contribute to enhanced service delivery

S/N	Item Statement	Mean	Std	Rank	Dec
1	Promotes visibility of library professionals	3.86	.34	1 st	SA
2	Influences library housekeeping activities	3.65	.48	2 nd	SA
3	Develops skills for optimal efficiency of library professionals/Builds digital capacity for positive service impact of library professionals	3.43	.66	4 th	A
4	Enhances the development of the digital natives/community	3.56	.72	3 rd	SA
5	Builds bridges for library and information services platforms	3.08	.79	7 th	A
6	Fosters web based services to users	3.39	.65	5 th	A
7	Fosters libraries networking	3.30	.63	6 th	A
8	Saves libraries from devaluation	3.65	.48	2 nd	SA
Cluster Mean		3.50			SA

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SA= Strongly Agree; A = Agree; D = Disagree; SD = Strongly Disagree

Table 3 shows result on ways emerging ICTs contribute to enhanced service delivery. The mean cluster (3.50) shows that emerging ICTs and its application contribute to enhanced service delivery. Result revealed that respondents strongly agree that promoting visibility of library professionals, influencing library housekeeping activities, save libraries from devaluation and enhancing the development of digital natives/community ranked 1st, 2nd, and 3rd respectively as ways emerging ICTs and its application contribute to enhanced service delivery. Result also indicated that developing skills for optimal efficiency of library professionals/Building digital capacity for positive service impact of library

professionals, fostering web based services, library networking and building bridges for library and information services platforms ranked 4th to 7th. The standard deviation that range from .79 to .34 shows low variation in the responses. This result agrees with Krubu and Asowaru (2011) whose studies confirmed that emerging ICTs has an enormous impact on Nigeria academic libraries. Similarly Omini and Esin (2019) found out that there is a significant influence in the application of emerging ICTs on library operations. This explains the importance of the application of emerging ICTs in library operations for enhanced service delivery.



Research Question 4: What are the challenges affecting the application of emerging ICTs for enhanced service delivery in federal colleges of education libraries in south-east, Nigeria?

Table 4: Mean rating of responses on challenges affecting the application of emerging ICTs for enhanced service delivery.

S/N	Item Statement	Mean	Std	Rank	Decision
1	Inadequate electric power supply	3.78	.42	1 st	SA
2	Lack of ICT staff/ tech savvy library professionals	3.43	.50	2 nd	A
3	frequent changing and modification of ICT/digital technologies	2.65	.93	11 th	A
4	Inadequate funds	3.78	.42	1 st	SA
5	Technophobia	3.21	.59	4 th	A
6	Low ICT competence among librarians to deliver services	3.34	.64	3 rd	A
7	lack of ICT policies	3.00	.85	5 th	A
8	Negative attitude of staff towards ICT/ digital technologies	2.95	.70	6 th	A
9	Expensive nature of the technology	3.21	.59	4 th	A
10	Fear for non-acceptance of technology by users and librarians	2.69	1.14	10 th	A
11	Poor maintenance culture	2.82	1.15	8 th	A
12	Internet connectivity problems	2.86	1.14	7 th	A
13	Complexity of technology interface	2.78	1.04	9 th	A
Cluster Mean		3.11			A

SA = Strongly Agree; A = Agree; D = Disagree; SD = Strongly Disagree

Table 4 shows result on the challenges affecting service delivery. It reveals that respondents the application of emerging ICTs for enhanced strongly agree that inadequate funds and

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electric power supply ranked 1st as challenges affecting emerging ICTs and its application for effective service delivery. According to results also, respondents agree that Lack of ICT staff/tech savvy library professionals, Low ICT competence among librarians to deliver services, Technophobia, lack of ICT policies, Negative attitude of staff towards ICT/digital technologies, Internet connectivity problems, poor maintenance culture, complexity of internet interface, Fear for non-acceptance of technology by users and librarians and frequent changing and modification of ICT/digital technologies ranked 2nd – 11th as challenges affecting the application of emerging ICTs for enhanced service delivery. The cluster mean (3.11) shows that respondents agree that the identified challenges affect the application of emerging ICTs for enhanced service delivery. The standard deviation which ranges from 1.15 - 42 shows high response variation of the respondents. This result agrees with Otunla (2016) who stressed that inadequate fund hinders the application of emerging ICTs in libraries in developing countries. Similarly Nwachukwu and Asom (2015) said unstable power supply constitute among the militating factors against the application of emerging ICTs in academic libraries. The implication of these challenges is that federal colleges of education libraries in south-east Nigeria must put in efforts to improve on the application of

emerging ICTs for enhanced service delivery especially in this technological driven era.

Conclusion

Based on the findings of the study as it relates research question 1-4, the following conclusions are drawn. The application of emerging ICTs is necessary in order to achieve library's objective which is enhanced information service delivery. The status of the application of emerging ICTs for enhanced service delivery in federal colleges of education libraries in south-east, Nigeria was unknown, and therefore became imperative to carry out the investigation.

The findings of this study revealed respondents strong agreement that institutional repositories, social media and webOPAC are the emerging ICTs applied for enhanced service delivery. It also shows institutional repository, social media and integrated library management system as emerging ICTs applied in a very high extent for effective service delivery. Result revealed respondents strong agreement that the application of emerging ICTs contribute to effective service delivery by promoting visibility of library professionals, influencing library housekeeping activities, save libraries from devaluation and enhancing the development of digital natives/community. Finally, result revealed that respondents strongly agree that inadequate funds and electric power supply are the major challenges affecting the application of emerging ICTs for enhanced service delivery.

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Recommendations

Based on the findings and conclusion, the following recommendations were made:

1. Efforts should be made by librarians in identifying emerging ICTs to be applied in library operations for enhanced service delivery.
2. Librarians should also improve in the application of emerging ICTs in library operations for enhanced service delivery.
3. Librarians should always apply emerging ICTs to its operation for enhanced service delivery
4. There should be the provision of adequate funds, electric power supply and others which will enhance the application of these emerging ICTs for enhanced service delivery.

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