Human Capital Development And Economic Growth In Nigeria: 1990 -2013

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Abstract: This study investigated the relationship between human capital development and economic growth in Nigeria by empirically analyzing time series data spanning 1990 – 2013. The study employed Johansen co integration test and Vector error correction approach. The co-integrating vector coefficient showed a long run relationship between expenditure on education, gross capital formation, health expenditure and economic growth rates in Nigeria. However, only expenditure on education showed a positive and significant effect on economic growth rates in Nigeria in the long run. In view of this, this research recommends increased dedication on the part of the Nigerian government to adequately fund qualitative education at all levels.

I. INTRODUCTION TO THE STUDY

As modernization advanced, human living conditions were characterised by widespread and intense changes (Ogunjiuba 2013). The emphasis in the global economy embraced knowledge based sectors such as the manufacture of ICT based services and research and development (Adelakun 2011). Human capital development gained importance in policy making in both developed and developing economies as people began to innovate and use innovations. The quest for forces, driving economic growth, yielded technical progress, and the accumulation of human and physical capital as the ultimate result. In the past, economic growth was essentially believed to be based on accumulation of physical capital (Adawo, 2010). A closer look however at the rich nations of the world, characterised by high productivity, showed that, their development could be attributed, not so much to natural resources endowments and physical capital, but to the quality and quantity of human resources (David 2010). Oladeji and Adebayo (1996) submitted that the development of human resources is critical to the growth process and hence worthy of development. Human capital development is equally strategic to the socio economic development of a nation, having

widespread impact on education, health, labour, employment and women affairs (Ogujuiba 2013). In addition, the new growth theories asserted that developing nations can transform into developed economies if they possess the requisite reservoir of labour with the skills necessary to develop new technologies or adopt and use foreign ones. (Yusuf, 2012). In view of all these, investing in human capital development becomes essential, as it ensures that a nation's human resource is knowledgeable, skilled, experienced, productive and healthy enough to optimally take advantage of other resources in its environment. This helps to bring about growth in a productive and efficient manner. Hence a country which lacks the capacity to develop the skills and knowledge of its people and to utilise this effectively within its national borders, will be unable to develop anything else (Eigbiremolen and Anaduaka 2014).

Nigeria as a country is blessed both with natural and human resources. The primary focus of the Nation in recent times has been finding a means of accelerating its rate of economic growth iIn order to realise its vision of becoming a developed economy by 2020. The Nigerian economy has been plagued by many socio – economic problems including mass poverty, high levels of unemployment and

underemployment, low per capita income, low human capital development, high levels of illiteracy, and low levels of productivity. It is ironic that a country endowed with vast natural and human resources has been unable, thus far, to convert these into meaningful economic growth and development. Hence, it is essential that Nigeria, as a country minimize the constraints militating against effective human capital development so as to enhance rapid economic growth. Hence this study investigates human capital development and economic growth in Nigeria.

II. STATEMENT OF THE PROBLEM

The need to develop a nation's stock of human capital cannot be overemphasized. The importance of human beings as the most essential and promising source of growth in productivity and economic growth has been corroborated by many studies (Barro and Lee (1993); Benhabib and Spiegel (1994); Johnson 2011 and Romer (1991)). Technological development and innovation are bye products of human mind. The economic success of any nation is dependent on human innovative ideas and creativity. Capital and natural resources are viewed as passive agents of growth. The active agents of modernization are human beings (Eigbiremolen and Anaduaka 2014), since they alone can accumulate physical capital, exploit natural resources and build social, and political organisations. (Sankay, Ismail and Shaari 2010).

Nigeria is characterised by a high level of illiteracy. Many workers are unskilled using outdated methods of production. These results essentially in low marginal productivity, culminating in low real income, low savings and hence low levels of investment and capital formation. None the least, the expansion of education (a veritable tool of human capital development) does not seem to equally match with expansion in economic growth. In time past, great prominence was accorded accumulation of physical capital to the detriment of human capital in the Nation's drive for rapid socio economic growth. All these put together, did little to accelerate the pace of growth and development in the country. In view of these, the objective of this study is to evaluate the impact of human capital development on economic growth in Nigeria.

III. CONCEPTUAL FRAMEWORK

Human Capital is the sum total of skills and abilities possessed by human beings, while human capital development is a process of acquiring and increasing the reservoir of human resources who have the skills, education and experience with which to engender growth for their country (Harbison 1973). Ejere (2011) defined human capital as human factor engaged in the production process, consisting of the knowledge, skills, competencies and abilities of the workforce. To Schulz (1971) human capita refers to the stock of skills, knowledge, ideas, talent and health status of individuals which are relevant in the process of production. Smith (1776) refers to human capital as the acquired and useful abilities of all the inhabitants of a society. Manning (2003) sees human capital as capital capable

of creating and developing other capital. Hence human capital development was viewed as the process involved in developing that capacity. It was further defined as the development of health and inculcation of education to cultivate and develop human capital.

IV. EMPIRICAL REVIEW OF LITERATURE

Egbiremolen and Anaduaka (2014) used the augmented Solow human- capital – growth model to investigate the impact of human capital development on national output, using quarterly time series data from 1999 – 2012 in Nigeria. The results showed that human capital exhibits a significant positive impact on output levels. It was recommended that government and policy makers should make concerted and sincere efforts in building and developing human capacity through adequate educational funding across all levels. Sankay, Ishmail and Shaari (2010) investigated the impact of human capital development on economic growth in Nigeria between the period 1970 – 2008 using Johansen co integration technique and Vector Error Correction analysis. It was shown that human capital development has a significant impact on Nigeria's economic growth. Dauda (2010) used the human capital model of endogenous growth to test empirically the role played by human capital in the development of the Nigerian economy. The study used co integration and error correction models to verify this. The result showed a long run relationship amongst labour force, physical capital investment and human capital formation. Hence a high priority was suggested for human capital development. Amassoma and Nwosa (2011) studied the causal nexus between human capital investment and economic growth in Nigeria over the period 1970 – 2009 using Vector Error Correction and Pairwise Granger Causality Method. The result showed no causality between human capital development and economic growth. Bakare (2006) investigated the growth of human capital investment in Nigeria using, Vector Error Correction Mechanism. The study indicated a significant functional and institutional relationship between investments in human capital and economic growth in Nigeria over the period 1970 – 2000. Johnson (2011) examined human capital development and economic growth in Nigeria using the Ordinary Least Square to ascertain the relationship between economic growth and the different proxies used to represent human capital in Nigeria. A strong positive relationship was documented between human capital development and economic growth. Stakeholders were advised on the need to evolve pragmatic approach to developing the human capabilities, since it was an important driver of economic growth. Oluwatobi and Ogunrinola (2011) investigated the relationship between human capital development efforts of the government and economic growth in Nigeria. Specifically they examined the impact of government recurrent and capital expenditure on education and health on economic growth in Nigeria. They submitted that a positive relationship exists between government recurrent expenditure on human capital and economic growth while a negative relationship was recorded between capital expenditure by government on human capital and economic growth in Nigeria. Hence an appropriate

direction of capital expenditure in the country was viewed as essential for economic growth. Adawo (2011) inquired into the contribution of human capital to economic growth in Nigeria between 1970 and 2006 using an econometric model. Human capital was proxied by enrolment rates at various levels. Other variables included in the model were physical capital formation and total expenditure on health. The result obtained showed primary school in put, physical capital formation and health were contributory factors to growth. The study recommended that schools should be adequately funded. Ogunjiuba (2013) analysed the impact of human capital formation on economic growth in Nigeria with the aid of the Error Correction Model. The study made use of secondary data and examined the time series characteristics of the variables selected. The findings showed that investment in human capital in the form of education and capacity building at both primary and secondary levels has significant impact on growth, but capital expenditure was found to be insignificant to the growth process. It was suggested that education in Nigeria should be re – structured towards quality at all levels of education. Atoyebi et al (2013) focussed on the effect of human capital development and economic growth in Nigeria. Regression and co integration tests were used to ascertain this relationship over a period of 1970 – 2010. The result showed there was cointegration between real gross domestic product, proxy for economic growth, and proxies of human development index. It was recommended that government should provide an enabling environment by ensuring macroeconomic stability and increased investment in human capital by individuals.

V. METHODOLOGY

VARIABLES

This study examines the impact of human capital development on economic growth in Nigeria over the period 1990 to 2013. The variables to be employed in the study include; GDP, expenditure on education and health and gross fixed capital formation.

DESCRIPTION AND SOURCES OF DATA

All data is sourced from World Development Indicators.

EMPIRICAL MODEL

Endogeneous growth theory as developed by Lucas (1988) extends Solow (1956) neoclassical growth model by incorporating positive externalities associated with possessing a stock of human capital namely, knowledge. Lucas (1988), Becker (1993) and Schultz (1997) posit that production of human capital is possible through the education and health sector. This study adopts the model used by Mc Mahon (1998) and Oketch (2006). It states its implicit production function thus:

$$Y_t = Y (K_t, H_t, N_t) \qquad (1)$$

Where Y is aggregate output, K is the stock of physical capital, H is the stock of human capital and N is aggregate employment, with T being time.

Representing Y_t with Real Gross Domestic Product, K_t with gross capital formation, H_t by expenditure on health and education, we can rewrite equation (1) thus

$$RGDP_t = \alpha_0 + \alpha_1 \, Exp \, E, + \alpha_2 \, Exp \, H + \alpha_3 \, GCFC + u_t \qquad (2)$$

Intuitively, all the three explanatory variables are expected to have positive effects on the growth level. Hence $\alpha_1, \alpha_2, \alpha_3, > 0$.

Asteriou and Hall (2007) are of the opinion that most macroeconomic time series are trended and therefore in most cases are non stationary. To avoid estimating spurious regressions which leads to incorrect conclusions, it is essential to test for stationarity and the order of integration of the variables being considered. The Augmented Dickey- Fuller (ADF) test is used to test for unit root (nonstationarity) (Dickey and Fuller 1981, Fuller 1996). After testing whether the variables are of a similar order of integration, it will be necessary to conduct a co integration test (to find a combination of the dependent and independent variables which yields a unique solution, eliminates non stationarity, as they trend together). Co integration is an essential requirement for economic models using non – stationary series. If there is a genuine relationship amongst the variables, although the variables will rise over time (as a result of trending), there will be a common trend that links them together. For an equilibrium or long run relationship to exist, a linear combination of the dependent and independent variables must yield a stationary variable (an I (0) variable).

After ascertaining that the variables are of similar order of integration, and on the evidence of co integration, then a Vector Autoregressive model (VECM) is estimated to reflect the short and long run dynamics. The VECM model shows the speed of adjustment from the short-run to the long-run equilibrium. The greater the coefficient of the parameter, the higher is the speed of adjustment of the model from the short-run to the long-run.

The next process is to find the appropriate (optimal) lag length in order to have Gaussian error terms. These are standard error terms that do not suffer from non – normality, autocorrelation, heteroskedasticity etc. The Schwartz and Akaike information criterion (AIC and SBC) are used to determine the appropriate lag length. The model that minimises the AIC and SBC is selected as the one with the optimal lag length.

VI. PRESENTATION AND ANALYSIS OF RESULTS

Name of Variable	ADF I(0)	ADF 1st Difference	Phillip Perron I(0)	Phillip Perron Ist Difference	Order of Integration
Exp on Educ	1.58555	-6.451542 *	-0.356563	- 8.539619 *	I(1)
Health Exp	0.381266	-5.989721 *	1.111614	- 5.989721	I(1)
GFCF	3.85975	1.142460	-0.300365	-4.575832 *	I(1)
GDP	12.70521	-3.397677 ***	10.64964	- 0.069301	I(1)

All variables are I (1) significant at*/**/***/ 1, 5 and 10 % respectively.

Table 1: Augmented Dickey- Fuller Unit Root Test (1990 – 2013)

The Augmented Dickey Fuller (ADF) and Phillip Perron (PP) test were used to ascertain the presence of unit root in each of the time series. The results were presented in table 1 above. The results showed that none of the variables were stationary at levels. Hence the null hypothesis of the presence of unit root at levels was accepted. All variables were differenced once and the ADF and PP test were conducted on them. The result in table one also shows that the variables were stationary at first difference. The null hypothesis of non stationarity was rejected, the alternative hypothesis of stationarity was accepted. This implies that the variables are integrated of order 1.

CO INTEGRATION TEST

A co integration test was carried out after ascertaining stationarity in all the variables. The Johansen co integration technique was employed to ascertain the existence if any of a long run relationship. Table 2 shows the result of the co integration test. The result of the co integration test shows there is at least one co integrating equation. Specifically, the maximum Eigen value showed only one cointegrating equation, while that of the trace statistic indicated three co integration equation at 0.05 level of significance, suggesting that there is co integrating relationship amongst GDP, expenditure on education, gross fixed capital formation and health expenditure in Nigeria.

Date: 06/01/16 Time: 13:41
Sample (adjusted): 1992 2013
Included observations: 22 after adjustments
Trend assumption: Linear deterministic trend
Series: GDP EXPED GFCF HEAEXP
Lags interval (in first differences): 1 to 1

Unrestricted Co integration Rank Test (Trace)

Hypothesized No. of CE(s)	Eigenvalue	Trace Statistic	0.05 Critical Value	Prob.**
None *	0.824457	74.53954	47.85613	0.0000
At most 1 *	0.597342	36.26242	29.79707	0.0078
At most 2 *	0.516957	16.24974	15.49471	0.0384
At most 3	0.010916	0.241474	3.841466	0.6231

Trace test indicates 3 cointegrating eqn(s) at the 0.05 level
* denotes rejection of the hypothesis at the 0.05 level
**MacKinnon-Haug-Michelis (1999) p-values

Unrestricted Cointegration Rank Test (Maximum Eigenvalue)

Hypothesized No. of CE(s)	Eigenvalue	Max-Eigen Statistic	0.05 Critical Value	Prob.**
None *	0.824457	38.27712	27.58434	0.0015
At most 1	0.597342	20.01267	21.13162	0.0711
At most 2 *	0.516957	16.00827	14.26460	0.0262
At most 3	0.010916	0.241474	3.841466	0.6231

Max-eigenvalue test indicates 1 cointegrating eqn(s) at the 0.05 level
* denotes rejection of the hypothesis at the 0.05 level
**MacKinnon-Haug-Michelis (1999) p-values

Table 2: Estimation of the Long run Relationship, Co - Integration Test

Variable	Co efficient	Standard error	t –stat
C	6.136234	6.65443	0.92213
GGDP(-1))	0.529044	0.39985	1.32309
D(GDP(-2))	0.339991	0.37153	0.91510
D(EXPED(-1))	-0.191178	0.26686	-0.71639
D(EXPED(-2))	-0.073767	0.20934	-0.35237
D(GFCF(-1))	-7.27E-12	7.1E-12	-1.02668
D(GFCF(-2))	-2.13E-12	5.6E-12	-0.38039
D(HEAEXP(-1))	0.431870	0.28203	1.53129
D(HEAEXP(-2))	0.235705	0.18354	1.28425
ecm -1	-0.041387	0.05029	-0.82303
R – Sq 0.907192 Adj R 0.831259 S of squa 700.947 F - stat 11.94720			

Table 3: Vector Error Correction Mechanism: Model 1

Variable	Co efficient	Standard error	t –stat
C	-26.51008	20.2689	-1.30792
GGDP(-1))	0.709769	1.21792	0.58277
D(GDP(-2))	0.445175	1.13166	0.39338
D(EXPED(-1))	1.611891	0.81285	1.98302
D(EXPED(-2))	0.586657	0.63765	0.92003
D(GFCF(-1))	3.45E-11	2.2E-11	1.60053
D(GFCF(-2))	-6.66E-12	1.7E-11	-0.38969
D(HEAEXP(-1))	-1.615935	0.85904	-1.88108
D(HEAEXP(-2))	-0.936142	0.55903	-1.67457
ecm -1	0.322494	0.15317	2.10550
R – Squar 0.777039 Adj R 0.594617 S of squr 6503.133 F - stat 4.259557			

Table 4: Vector Error Correction Mechanism: Model 2

Variable	Co efficient	Standard error	t –stat
C	-4.43E+10	6.3E+11	-0.07012
GGDP(-1))	-3.07E+10	3.8E+10	-0.80892
D(GDP(-2))	5.29E+10	3.5E+10	1.49890
D(EXPED(-1))	-3.63E+10	2.5E+10	-1.43039
D(EXPED(-2))	7.99E+09	2.0E+10	0.40138
D(GFCF(-1))	-0.736939	0.67309	-1.09486
D(GFCF(-2))	-0.270080	0.53315	-0.50658
D(HEAEXP(-1))	2.40E+10	2.7E+10	0.89363
D(HEAEXP(-2))	4.76E+10	1.7E+10	2.73075
ecm -1	3.22E+08	4.8E+09	0.06733
R – Squ 0.767740 Adj R 0.577709 S of squ 6.33E+24 F - stat 4.040085			

Table 5: Vector Error Correction Mechanism: Model 3

Variable	Co efficient	Standard error	t –stat
C	15.04460	18.4540	0.81525
GGDP(-1))	-1.141644	1.10887	-1.02955
D(GDP(-2))	1.650924	1.03033	1.60233
D(EXPED(-1))	-1.777329	0.74007	-2.40158
D(EXPED(-2))	-0.247978	0.58055	-0.42714
D(GFCF(-1))	-1.97E-11	2.0E-11	-1.00441
D(GFCF(-2))	-8.03E-12	1.6E-11	-0.51610
D(HEAEXP(-1))	0.495419	0.78213	0.63342
D(HEAEXP(-2))	1.390477	0.50898	2.73189
ecm -1	-0.124386	0.13945	-0.89196
R – Squ 0.809460 Adj R 0.653563 S of squ 5390.708 F - stat 5.192281			

Table 6: Vector Error Correction Mechanism: Model 4

The ECM coefficient indicates the adjustment of short run variables to equilibrium. With reference to table 3 showing results for the dependent variable, the lagged error correction

term is negative and statistically insignificant. The coefficient of ecm -1 is – 0.041387 with an associated t –stat of – 0.82303. With reference to expenditure on education in table 4, the coefficient of ecm -1 showed a positive and significant relationship with a coefficient of 0.322494 and a t -stat of 2.10550. This result is in line with the result presented by David and Odjegba (2013) who used two proxies of human capital development, education and health in their study. Their results showed that only education contributed positively and significantly to economic growth in Nigeria. Gross fixed capital formation in table 5 showed a long run coefficient that is positive and insignificant with a coefficient of 3.22E + 08 and a t-stat of 0.06733. The relationship between health expenditure and GDP in table 6 was negative and insignificant with a co –efficient of -0.124386 and a t-stat of -0.89196.

VII. CONCLUSION AND RECOMMENDATION

This study investigated the relationship between human capital development and economic growth in Nigeria by empirically analyzing time series data spanning 1990 – 2013. Table 2, above revealed that the trace statistics and max-eigen statistics value shows there existed three and one co-integrating equation respectively at 5 percent probability level. The co-integrating vector coefficient showed a long run relationship between expenditure on education, gross capital formation, health expenditure and economic growth rates in Nigeria. However, only expenditure on education showed a positive and significant effect on economic growth rates in Nigeria in the long run. Gross fixed capital formation and health expenditure showed both positive and negative, but insignificant relationship with economic growth, respectively, in Nigeria. The result showed a proxy of human capital development, expenditure on education as having a significant relationship with economic growth. This shows that a country seeking rapid economic growth must ensure access of a broad section of its populace to qualitative education. The education sector guarantees increase in output per worker which ultimately translates to growth. In view of this, this research recommends increased dedication on the part of the Nigerian government to adequately fund qualitative education at all levels. Also the prevailing economic environment in Nigeria should be made more conducive for private sector partnership in funding education by abolishing all forms of prohibitive policies militating against private sector partnership in the education sector in Nigeria.

APPENDIX

Vector Error Correction Estimates
Date: 06/01/16 Time: 13:52
Sample (adjusted): 1993 2013
Included observations: 21 after adjustments
Standard errors in ( ) & t-statistics in [ ]

Cointegrating Eq:	CointEq1
GDP(-1)	1.000000
EXPED(-1)	-6.516478
	(0.46303)
	[-14.0734]
GFCF(-1)	-1.79E-10
	(3.5E-11)
	[-5.06684]
HEAEXP(-1)	8.143914
	(1.49752)
	[5.43827]
C	-215.0098

Error Correction:	D(GDP)	D(EXPED)	D(GFCF)	D(HEAEXP)
CointEq1	-0.041387	0.322494	3.22E+08	-0.124386
	(0.05029)	(0.15317)	(4.8E+09)	(0.13945)
	[-0.82303]	[2.10550]	[0.06733]	[-0.89196]
D(GDP(-1))	0.529044	0.709769	-3.07E+10	-1.141644
	(0.39985)	(1.21792)	(3.8E+10)	(1.10887)
	[1.32309]	[0.58277]	[-0.80892]	[-1.02955]
D(GDP(-2))	0.339991	0.445175	5.29E+10	1.650924
	(0.37153)	(1.13166)	(3.5E+10)	(1.03033)
	[0.91510]	[0.39338]	[1.49890]	[1.60233]
D(EXPED(-1))	-0.191178	1.611891	-3.63E+10	-1.777329
	(0.26686)	(0.81285)	(2.5E+10)	(0.74007)
	[-0.71639]	[1.98302]	[-1.43039]	[-2.40158]
D(EXPED(-2))	-0.073767	0.586657	7.99E+09	-0.247978
	(0.20934)	(0.63765)	(2.0E+10)	(0.58055)
	[-0.35237]	[0.92003]	[0.40138]	[-0.42714]
D(GFCF(-1))	-7.27E-12	3.45E-11	-0.736939	-1.97E-11
	(7.1E-12)	(2.2E-11)	(0.67309)	(2.0E-11)
	[-1.02668]	[1.60053]	[-1.09486]	[-1.00441]
D(GFCF(-2))	-2.13E-12	-6.66E-12	-0.270080	-8.03E-12
	(5.6E-12)	(1.7E-11)	(0.53315)	(1.6E-11)
	[-0.38039]	[-0.38969]	[-0.50658]	[-0.51610]
D(HEAEXP(-1))	0.431870	-1.615935	2.40E+10	0.495419
	(0.28203)	(0.85904)	(2.7E+10)	(0.78213)
	[1.53129]	[-1.88108]	[0.89363]	[0.63342]
D(HEAEXP(-2))	0.235705	-0.936142	4.76E+10	1.390477
	(0.18354)	(0.55903)	(1.7E+10)	(0.50898)
	[1.28425]	[-1.67457]	[2.73075]	[2.73189]
C	6.136234	-26.51008	-4.43E+10	15.04460
	(6.65443)	(20.2689)	(6.3E+11)	(18.4540)
	[0.92213]	[-1.30792]	[-0.07012]	[0.81525]
R-squared	0.907192	0.777039	0.767740	0.809460
Adj. R-squared	0.831259	0.594617	0.577709	0.653563
Sum sq. resids	700.9470	6503.133	6.33E+24	5390.708
S.E. equation	7.982634	24.31448	7.59E+11	22.13740
F-statistic	11.94720	4.259557	4.040085	5.192281

Log likelihood	-66.63076	-90.02064	-597.4577	-88.05076
Akaike AIC	7.298168	9.525775	57.85312	9.338168
Schwarz SC	7.795559	10.02317	58.35051	9.835559
Mean dependent	29.18095	8.557143	4.89E+11	13.02381
S.D. dependent	19.43282	38.18845	1.17E+12	37.61095

Determinant resid covariance (dof adj.)	4.82E+28
Determinant resid covariance	3.63E+27
Log likelihood	-785.4989
Akaike information criterion	78.99989
Schwarz criterion	81.18841

Dependent Variable: D(GDP)
Method: Least Squares
Date: 06/01/16   Time: 14:04
Sample (adjusted): 1991 2013
Included observations: 23 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	20.76089	4.668838	4.446693	0.0003
D(EXPED)	0.018880	0.156394	0.120719	0.9053
D(GFCF)	1.37E-11	8.43E-12	1.621683	0.1223
D(HEAEXP)	-0.044126	0.353028	-0.124993	0.9019
ECM(-1)	-0.213457	0.188186	-1.134284	0.2716

R-squared	0.377885	Mean dependent var	27.02174
Adjusted R-squared	0.239638	S.D. dependent var	19.90484
S.E. of regression	17.35677	Akaike info criterion	8.735503
Sum squared resid	5422.637	Schwarz criterion	8.982350
Log likelihood	-95.45828	Hannan-Quinn criter.	8.797584
F-statistic	2.733393	Durbin-Watson stat	0.378323
Prob(F-statistic)	0.061430		

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