Policy Implication of the Rate of Return Criterion in Higher Educational Investment Planning : The Case of Bangladesh

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Financing educational programmes in Less Developed Countries (LDCs) is at the cross-roads. The clamour for socialization of higher education in the face of large number of unemployed university graduates vis-a-vis dearth of adequate manpower to feed the development activities deserves consideration in a clearer perspective. The relatively high incidence of unemployment points out the economic waste involved in using scarce resource. The unemployment dilemma thus augurs that investment on education may not always yield a positive return. Moreover, for each occupation there is an optimum amount of formal schooling. Thus in some cases, labour productivity declines as schooling increases.

Despite substantial investment during the past 20 years, the literacy rate *in* many LDCs is almost in a static state. Bangladesh is not an exception to the case. The literacy rate according to the 1961 census was 21 percent. Now it is only 26 percent; but this does not imply that there is a dearth of educated persons seeking employment in Bangladesh. Unemployment or underemployment is rampant among graduates in liberal sciences, but there is shortage of manpower trained in technical education.

This study attempts to assess the usefulness of the rate of return as a criterion for making investment decision on the educational programmes. An exercise is carried out with secondary datn to work out the private rate of return of higher levels of education in Bangladesh. These estimates are then tested in an international environment and policy issues are

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designed for a rational and pragmatic educational investment programmes. The study is divided into four sections. Section I outlines in brief the educational system in Bangladesh. Section II reviews the findings of the estimated rate of return and tries to posit a semblance with international findings. Policy implications are outlined in Section III. Summary and conclusions are given in Section IV.

SECTION I

The educatio ial system of Bangladesh is modelled after the British system inherited from the colonial rule, but a few modifications were carried out during the pre-liberation days and subsequently after independence in 1971. Globally, the basic educational system consists of four tiers: (I) Primary Education, (ii) Secondary Education, (III) Higher Secondary Education, and (IV) Higher Education. Primary education includes Grades I--V and students belong to the age group 5--9. The major emphasis in this tier is to let the students acquire the 3 R's. The number of primary schools increased from 30,446 in 1973 to 44,200 in 1985. Although there are primary schools in the urban areas managed by urban elites, primary education is managed by the government through an institutional setup, 'Directorate of Primary Education'. The total enrollment of the primary level increaded from 6.0 million in 1973 to 8.9 million in 1985. Tile number of primary school teachers increased by 53 percent from 124,146 in 1973 to 190,000 in 1985. The student teacher ratio increased from 44 to 47 over the same period. This happened because growth of teachers failed to keep pace with the growth of students. The attrition rate is very high; out of every 100 students enrolled in Grade I, only 30 remained in Grade V.

The secondary stage and higher secondary stage include Grade VI-XII including two years in college, after passing a nationwide certificate examination in Grade X. The passing out examination at the secondary level is not conducted through a single stream examination system; instead the examination system incorporates various sub-discipline such as humanities, science, commerec, industrial arts and so on. Students passing a nationwide certificate examination in the h gher secondary level either enter the university or depending on their previous background and as well as opportunities enter medical, engineering or agricultural college,' university. There is in fact very little option at this level to change the sub-discipline one pursued from either the grade VIII or from secondary

level. A good number of students enter various vocational or technical colleges/institutes mainly run by public money. This tier may be considered as the entry door for higher education, or for entry into the job market as a relatively unskilled labour. The number of secondary schools increased from 8,327 in 1980 to 9,085 in 1985. Total enrolment of students at the secondary level increased from 2.00 million in 1980 to 2.49 million in 1985. The number of teachers increased from 87,963 in 1980 to 97,748 in 1985.

The citadel of higher education are the universities. a few upgraded university colleges and degree colleges. There are seven universities in the country ; four are general, one agricultural, one engineering and one fundamentally based on Islamic orientation. Generally, students enter universities for a four year term. During the first three years, they study in the various departments with specialization in one subject and graduate with Bachelor of Arts/Science/Commerce degrees. In the final year, they earn a Masters degree, The upgraded colleges get affiliated with universities of that academic region and follow the rules and regulations prescribed by the universities. However, the universities currently follow course system while the upgraded colleges follow the traditional one. The traditional system puts major weight on the results of the final examination which is conducted generally on completion of the syllabus. There are 12 upgraded university colleges in the country. The number of colleges increased from 556 in 1980 to 602 in 1985 and their enrolment increased from 0.40 million to 0.43 million over the same period.

SECTION II

Quintessence of educational investment planning stems from the necessity of generating required number of potential skilled and unskilled manpower in the most desired field of economic activities. Thus educational planning may be nested in the overall planning framework of an economy. An economic plan may be segregated into a consistent set of sectoral plans. The sectoral plans may be the seminal point for manpower plan from which an educational investment planning may be detailed out. Three different criteria were advanced in order to provide guidelines to public authorities in planning education to achieve social and economic objectives. Rate of return criterion and manpower forcasting criterion are based on the future demand market for labour, irrespective of the societal demand for education. Social demand criterion may generate a mismatch in the system, because of its advocacy that educational

expansion be geared to the demand of individual households for education.

Literature on the rates of return calculation abounds in economic analysis. Generally, Earnings Function Method is widely used.[1] The rate of return estimation for different educational levels in Bangladesh are, howzver, scanty. ILO-ARTEP[2] estimated the rate of return to higher education (General) in Bangladesh with certain assumptions. The estimate was based on age earning profile constructed on the basis of data from a survey conducted by the Foundation for Research on Educational Planning and Development.[3]

This study also attempts at estimation of the private rate of return with the same data set but using a different model. The data set is appended at Annexuse-111. The secondary data set specify annual earnings of employees according to length of service and educational level so that by incorporating a set of dummy variables for different educational levels, we can estimate the following single equation model :

$$\ln Y = a + b\,(BA) + c\,(MA) + d\,(EX) + f\,(EX)^2$$

where lnY is the natural log of earnings and (EX) stands for years of experience on the job, BA (Bachelor) and MA (Master) indicate degrees which have been substituted later on by dummy D_1 and D_2 for three levels of education, having a value of 1 if the individual belongs to the particular educational level and O otherwise i.e. for SSC (Secondary School Certificate) category.

Earnings are expected to vary directly with experience because an individual's productivity is expected to increase as he gains more dexterity with experience, and we expect the coefficient to be of positive sign. However, earnings are expected to vary inversely with experience squared because of monotony, the repetitive nature of work, and the problem of adaptation with new technology. So the expected sign is negative for the squared term.

The rates of return to the different levels of education are derived from the estimated coefficients b and c in the above function as follows.[4]

$$r(\text{SSC vs BA}) = \frac{b}{S_{SSC}}$$

$$r(\text{MA vs BA}) = \frac{c-b}{S_{MA} - S_{BA}}$$

where r gives the marginal private rate of return for one extra year of schooling and S refers to years of schooling for various degeees according to subscript. Thus S stands for years of schooling for MA degree and so on. MA

We employ two dummy variables, D_1 and D_2 for three levels of education.

We use

$D_1 = 1$ for MA degeee
$= 0$ Otherwise
$D_2 = 1$ for BA degree
$= 0$ Otherwise

where the omitted category is the SSC level.

The estimated equation is:

$$\ln Y = 1.40 + .62\ D_2 + 1.05\ D_1 + .044\ Ex - .00027\ (Ex)^2$$
$$(32.91)\ (35.24)\ (20.69)\ (8.50)\ (1.76)$$
$$\bar{R}^2 = .95$$
F statistic (4.94) = 520.052

Figures in parentheses are 't' statistic. All of the coefficients except that for $(Ex)^2$ are significant at the 1 percent level. Computer print out of rate of return estimation is given at Annexure-II.

The marginal private rate of return for different levels of education are derived from the estimated coefficients.

$$r(\text{SSC vs BA}) = = \frac{.62}{4} \quad 15.5\%$$

$$r(\text{MA vs BA}) = \frac{1.05 - .62}{6 - 4} = \frac{.43}{2} = 21.5\%$$

These estimates are, however, partial. We considered only two educational levels, college bachelors degree and university masters degree.

The rate of return estimate for primary and secondary level may be supplemented from other studies. Psacharopoulos[5] presented estimates which are the end-product of several research studies carried out in connection with estimation of rates of return, both private and social, by region and by country type. We present he findings in the following table.

Table I

The Return to Education by Region and by Country Type

Region or country type	Private			Social		
	Prim.	Sec.	High.	Prim.	Sec.	High.
Africa	29	22	32	29	17	12
Asia	23	17	19	16	12	11
LDC(Average)	29	19	24	27	16	13

Prim. =Primary education level
Sec. =Secondary education level
High. =Higher educational level
Source : Psacharopoulos. (1981) p.329

This table gives a comprehensive overview of rate of return, both private and social, for a large group of countries. The estimated rates of return for LDC closely resemble the estimated rate of return for higher education in Bangladesh. For their policy implications, we shall rely mainly on the aggregated table and the estimated rate of return for LDC average.

SECTION III

The policy instrument on educational investment planning should address two cardinal issues : the characteristics of the existing labour market and the nature of the future labour market which to some extent is determined by the state of the economy, the projected growth rate and the structural transformation of the economy in the development process. At present 30 percent of the total labour force in Bangladesh is unemployed/underemployed. Micro analysis of this unemployment situation reveals that in the job market educated unemployed constitutes a major proportion. It was estimated that by the terminal year of the First Five Year Plan educated unemployed would constitute 48 percent,[6] although

there were dearth of engineering graduates, engineering technicians, medical technicians, agricultural professional and t ained teachers. By the end of the Second Five Year Plan the situation further deteriorated. The following table captures the job market for the edu-a ed manpower at the end of the Second Five Year Plan.

Table II
Comparative Picture of Job Market for Educated Manpower

Item	Begining of Two Year Plan 1978	As on 31st Dec. 1985	Increase
Stock of educated job seekers	13,89,583	23,67,240	9,77,657
Total number of job available	7,24,364	8,37,740	1,13,376
Number unemployed	6,65,219	15,29,500	8,64,281
Percentage of unemployment	48	65	17

Source : The Bangladesh Manpower Planning Centre, **Manpower Bulletin,** September, 1986,p-8.

It appears that a staggering65 percent of educated manpower remained unemployed in 1985. This alarming state of affairs needs to be taken into account while formulating policies for rational allocation of resources in the education sector.

An examination of the estimated rates of return for different levels of education in Bangladesh shows that the private rates of return to university and college education are significantly higher than comparable social rates of return. This is mainly due to heavy subsidization of higher education. The subsidy given to university and higher level education has increased substantially over the past 20 years. A study by Islam' indicates that student fees as a proportion of current expenditures for the University of Dhaka declined from 39 percent in 1960161 to 27 percent in 1965/66, to 21 percent in 1972/73 and it was only 8.4 percent in 1979180.

We know that investment in any project will be worthwhile if the estimated social rate of return is higher than or equal to the social discount rate which will yield positive net present value. If we use the opportunity cost of capital as a proxy for social discount rate and accept a rate of

return in the range of 10-15 percent,[8] then public investment at the secondary level may be marginaly justifiable. The same conclusion may be drawn for the estimated rate of return of higher education for the LDC average. The current state of large scale nationalization episode on the private colleges and the government subsidy programme in the non-government colleges may reduce the social rate of return at a much lower level. Further, a comparison of the opportunity cost of capital with the social rate of return by university education gives a disappointing picture. The estimated social rate of return for university education supports in no way the current subsidy programme of higher education. The total institutional cost of university education and subsidy per enrolled student during 1978/79 was Tk. 13,174 and TK. 13,010 respectively.[9] The institutional cost includes recurring expenditure, capital cost, imputed rent of student housing. The subsidy per enrolled student is estimated by addition of schloarships and grants to the total institutional cost and by deduction of tuition and other fees.

A comparison of the returns on educational investment vis-a-vis returns on physical capital investment may unfold a completely different picture. The study by Psacharopoulos gives an indication that returns to higher education in developing countries are higher than returns to physical capital, 14.9 percent and 12.8 percent respectively.[10] Returns to physical capital refer to irrigation, hydroelectric and highway projects. The study was carried on minutiae scale (only 11 developing countries represented sample size) and obviously any meaningful generalization is not possible from this. Nevertheless, in the face of a large number of unemployed university graduates, the above findings need to be treated with caution. Besides, variations of social returns to higher education by subject may warrant designing a discriminatory policy towards specific subjects for optimum investment results.[11]

The large discrepancy between the private and social returns in higher education suggests that there exists room for private financing at the university level. These findings favour two options : first, a part of the educational expenditure may be shifted to the enrolling students and thereby relieve the government of increasing additional expenditure compatible with larger social demand of higher education; secondly, selectivity in higher education may be adopted as a policy goal to curtail expenditure both on revenue and development heads, presupposing that the secondary level will be a terminal qualification for most.

The metastasis of higher education in Bangladesh displays a distorted growth during 1975-80. The period upto 1978 manifest unplanned growth in higher education. This phenomenal growth was possible by sqeezing funds from lower levels which has resulted in an acute imbalance in the education system as depicted in table III.

Table III
Share of Development Budget : Levels of Education*

(In Million Taka)

Level	1975-78	1978-80	1980-83	1983/84	1984/85	1984/85
Primary Education	169 (15)	147 (20)	960 (40)	641 (51)	625 (48)	656 (52)
Secondary Education	163 (14)	126 (18)	543 (22)	203 (16)	265 (20)	196 (16)
University Education	418 (36)	167 (23)	268 (11)	126 (10)	113 (9)	118 (9)
TOTAL	**1165**	**719**	***2339***	***4265***	**1294**	**1260**

Figures in the parentheses indicate percentage of total.

"Exclude technical education and department's own expenditure. Data on 1983184, 1984/85, 1985186, are based on actual expenditure. The other data are from Annual Development Programme's allocation which roughly correspond to actual expenditure.

Source : Ministry of Planning, Planning Commission, **Economic Review,** Issues of 1975176, 1976177, 1977178, 1978/79, 1979/80.
Ministry of Education, Educational Statistics, (Dhaka : January 1986), pp.85-86.

A close examination of the development budget during the period 1975-78 revealed that during the First Five Year Plan period, the university education apportioned roughly 36 percent of total development expendi-

tures. This sharply conrasts with primary education and secondary education roughly constituting 15 percent and 14 percent respectively. The historical observation beyond 1978 and upto 1984/85 on allocation for different tiers of education may be treated with trend analysis to specify the allocational shift in the different educational levels. Using the old equation

$$I = e^{\alpha + \beta T}$$

$$\rightarrow \ln I = \alpha + \beta T$$

where I = investment

α = arbitrary constant

T = Time

β = Designate the percentage change in allocation

We estimated three equations for three levels of education. Computer print out of the estimated equations are given at Annexure-I. The estimated equation for primary and secondary education (using a dummy for 1980-83) along with t-values are given below.

$$\underset{PE}{\ln} = 5.8479 - 1.1693 + 0.3397T$$

$$(13.21) \quad (2.9517) \quad (3.93)$$

Durbin—Watson Statistic 1.98, $\bar{R}^2 = .80$

whene PE subscript stands for primary education and SE for secondary education

$$\underset{SE}{\ln} = 6.0141 - 1.1335 + 0.0943T$$

$$(21.67) \quad (4.56) \quad (1.74)$$

Durbin — Watson Statistic 2.42, $\bar{R}^2 = .80$

The estimated equation for University education with first order auto regressive treatment is

$$\underset{UE}{\ln} = 5.8760 - 0.2126T$$

$$(39.31) \quad (5.43)$$

Durbin—Watson Statistic 2.76, $\bar{R}^2 = .68$

The estimated equations thus indicate that for primary and secondary education, the allocation in development budget is in tune with the rate of return as indicated by positive sign. The parameter β for both the level ndicates 33 percent increase in expenditure for primary education and 9

percent for secondary education. On the other hand the expenditure for university education registered a decline of 21 percent over the same period.

The share of revenue budget for university education is in the range of 10-15 percent which is in line with the Education Commission recommendation of 15 percent. However, the share of primary education where social rate of return is much higher lies in the range of 45-50 percent. This is below the Education Commission recommendation of 60 percent.[12]

The higher rate of growth in the demand for private education in LDCs may be substantiated on two grounds; one purely economic and the other based on political philosophy. The economic ground enunciates a positive correlation between the level of education and employment. A higher level of education is generally required for entry into higher level jobs carrying a higher salary. The "certification"[13] phenomenon which implies a higher level of probability for urban jobs with good salary is a common characteristic of labor markets in the developing countries. There are also non-economic factors like the high social status and value attached to a university degree.

The linear expansion of higher education is also embedded in the notion of ensuring desirable political behaviour.[14] The ruling elite as well as their opponents consider seat of higher learning instrumental in carrying out desired changes. The universities are susceptible to even minor political malfunctionings and this student community reacts to these situations with indications for desired change. An enlarged student community may thus be considered as a driving force both by ruling elite as well as their political opponents. Thus the issue of socialization of higher education concomitant to social demand approach gained the support of nearly all political parties and found a prominent place in their programme despite large number of educated unemployed, poor prospects of urban employment generation and wastage theough subsidization of higher education in the face of demand surplus.[15] Evidence on educational expansion over the last two decades in many developing countries is consistent with this hypothesis of political behaviour.

A large number of studies confirms the rate of return for primary education in the range of 25-45 percent. The private rate of return is in the range of 30-45 percent. The social rate of return is well above 20 percent. For LDC average, the rate is 27 percent. The social rate of

return is inversely related to the literacy rate. This rate was as high as 57.3 percent in Columbia during 1964 when adult literacy rate was 63 percent and the rate was 45.4 in 1975 when the country attained a literacy rate of 81 percent.[16] So in Bangladesh where the literacy rate is 26 percent, the social rate of return for primary education may assume a much higher value. Investment in primary education generate externalities both measureable and immeasurable in the development process. Research in eight countries shows that the annual crops yields of farmers with four years of primary schooling are on average 9 percent higher than those of uneducated farmers.[17] Basic knowledge of numeracy also opens up avenues for farmers in undertaking extension services which considerably increase profitability of investment in agricultural activities. The non-quantifiable benefits are also enormous. The enhancement of literacy generates development spree because an educated person can appreciate better the value and norms adjunct to economic development. The indirect effects of primary education on health, nutrition and fertility are particularly significant.

SECTION IV

In this paper an attempt has been made to present the plausibility of rate of return as a criterion on educational investment planning in the context of Bangladesh. The major findings endorse the previous state of misallocation in the higher levels of education. Although the situation improved somewhat during the implementation of the Second Five Year Plan (1980-85), yet the recurrent nature of expenditure lags far behind the recommendation of the Education Commission Report of 1974 persist. The literacy rate in the country is one of the lowest among the Asian countries and this necessitates that more financial resources be allocated for meeting school contingencies ,procuring teaching aids, and introducing an incentive system to regulate attendance and minimize drop-outs.

This study reflects only a micro aspect of policy issues. Investment planning in technical education is outside the purview of the study. However, an analogy may be drawn if information on the rate of return for technical education is available.

The output of an educational system whether evaluated on internal efficiency or external efficiency[18] is often mentioned as residual variance

in output.[19] Investing in human capital formation thus deserves adequate consideration. A developing country experiences a dynamic composition of labour force at its various stages of development. Initiation of industrialization and a process of technological evolution demand more skill oriented human resource; a general educational flow cannot meet this requirement. General education helps in the appreciation of values and norms pertinent to development but its catalytic impulse is rather slow. The rate of return criterion can partly meet the gap and a long term strategy of human capital development warrants a pragmatic outlook on manpower forecasting approach. This appronch takes care of a myriad of factors: the state of the economy, development philosoply and the direction of development. Through labour coefficients and with the help of Leontief Input-Output Matrix this approach can delineate the areas where a growing economy needs its human capital.

Annexure—I

LS Dependent Variable is LIPE

SMPL 1 — 6

6 Observations

VARIABLE	COEFFICIENT	STD.ERROR	T-STAT.	2-TAIL SIG.
C	5.8479061	0.4424764	13.216313	0.001
T	0.3396756	0.0864449	3.9293880	0.029
DUM	—1.1692834	0.3961404	—2.9516897	0.060

R—squared	0.877469	Mean of dependent var	6.062368
Adjusted R—squared	0.795782	S.D. of dependent var	0.793336
S.E. of regression	0.358512	Sum of squared resid	0.385592
Durbin Watson stat	1.981140	F—sattistic	10.74185
Log likelihood	—0.279430		

LS Dependent Variable is LISE

SMPL 1 — 6

6 Observations

VARIABLE	COEFFICIENT	STD.ERROR	T—STAT.	2-TAIL SIG.
C	6.0141011	0.2774269	21.678145	0.000
T	0.0943360	0.0541998	1.7405219	0.180
DUM	—1 .1334942	0.2483748	—4.5636432	0.020

R—squared	0.880745	Mean of dependent var	5.399699
Adjusted R—squared	0.801241	S.D. of dependent var	0.504195
S.E. of regression	0.224782	Sum of squarde resid	0.151581
Durbin-Watson stat	2.424660	F—statistic	11.07804
Log likelihood	2.521547		

LS Dependent Variable is LIUE

SMPL 2 — 6

5 Observations

Convergence achieved after 2 iterations

VARIABLE	COEFFICIENT	STD. ERROR	T—STAT.	2-TAIL SIG.
C	5.8760876	0.1494741	39.311734	0.001
T	—0.2125782	0.0391430	—5.4308040	0.032
AR(1)	—0.7350759	0.3404141	—2.1593583	0.163

R—squared	0.810332	Mean of dependent var	5.008667
Adjusted R—squared	0.681863	S.D. of dependent var	0.359346
S.E. of regression	0.202684	Sum of squared rseid	0.082162
Durbin-Watson stat	2.759032	F—statistic	5.286602
Log likelihood	3.176561		

Annexure—II

PAGE 5 WILLIAMS/ COL SORITEC 1.05 (MAY1981) THE SORITEC GROUP INC.

83/03/13

LINE 10 RESEARCH EDUCATION

ECUATION 1

DEPENDENT VARIABLE IS LYIP

THE CURRENTLY ACTIVE OBSERVATION SET IS

(1— 99)

ORDTNARY LEAST SQUARES

RIGHT-HAND VARIABLE	ESTIMATED COEFFICIENT	SATNDARD ERROR	T— STATISTIC
CONST.	1.39885	.424929-001	32.9195
D1	1.05083	.298175-001	35.2421
D2	.617016	.298175-001	20.6931
YEXP	.448056-001	.526817-002	8.50495
EXP	—.266017-003	.150315-003	—1.76973

R—SQUARED— .955956 NOBS—	99
R—BAR-SQUARED (ADJ FOR DF)—	.954081
DURBIN-WATSON (0 GAPS)	.139814
SUM OF SQUARED RESIDUALS—	1.37897
STD ERROR OF REGRESSION—	.121119
SUM OF RESIDUALS—	.790687-014
MEAN OF DEPENDENI VARIABLE—	2.61549
F—STATISTIC (4, 94)	510.052

STOP 83/03/13

Annexure—III

ANNUAL EARNINGS OF EMPLOYEES ACCORDING TO YEARS OF SERVICE AND BY EDUACTION LEVEL,1987/79

ANNJAL LEVEEL OF EARNINGS (in '000Taka)

LENGTH OF SERVICE

Year	SSC	Bachelor's Degree	Master's Degree
1	5.47	7.39	10.40
2	5.61	7.69	10.81
3	5.74	7.99	11.22
4	5.88	8.29	12.15
5	6.02	8.59	12.86
6	6.12	8.89	13.68
7	6.29	9.28	14.66
8	6.43	9.66	15.65
9	6.57	10.04	16.63
10	6.70	10.42	17.62
11	6.84	10.81	18.60
12	7.17	11.35	19.41
13	7.50	11.90	20.22
14	7.82	12.45	21.03
15	8.15	13.00	21.83
16	8.48	13.54	22.57
17	8.56	14.15	23.45
18	8.65	14.75	24.25
19	8.73	14.35	25.06
20	8.81	15.95	25.87
21	8.89	16.55	26.68
22	8.97	17.62	27.53
23	9.06	18.69	28.59
24	9.14	19.75	29.55
25	9.22	20.82	31.35
26	9.30	21.89	33.16
27	9.38	23.46	34.97
28	9.47	25.03	36.77
29	9.55	26.61	38.58
30	9.63	28.18	38.85
31	9.71	28.59	30.12
32	9.74	29.00	39.12
33	9.77	29.00	39.12

SOURCE: ILO,ARTEP **Survey,** *Manpower Planning in Bangladesh*: ***Projections Policies and Planning with Special Reference to the Second Five-Year Plan*** **Bangkok,** ***October,*** 1881 p. 1.25

FOOT NOTES

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