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Highlights

Profitability and Constraints

Factors Affecting Early Marriage

Discovering Thoughts, Inventing Future

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Factors Affecting Early Marriage in Bangladesh

By Md. Rasel Kabir, Masudul Islam, Md. Salauddin Khan & Raju Roy
Khulna University, Bangladesh

Abstract- This study based on BDHS-2007 data of 10,996 ever married women presents the current scenario of female age at marriage in Bangladesh and its noteworthy impact on fertility as epoch at first marriage has a chief upshot on childbearing as women who get married before time contain, on an average, a longer era of disclosure to the risk of fetching pregnant and a superior figure of lifetimes birth. Logistic regression model was conceded to this cram with the effects of the allied explanatory variables tested by chi-square test on early matrimony. Respondents' work status, education level, religion, wealth index and partners' educational level drastically guessed the early marriage. Women from the rural area be located to acquire married 1.50 period more anticipated than the women from inner-city.

Keywords: *early marriage, logistic regression, bangladesh.*

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Factors Affecting Early Marriage in Bangladesh

Md. Rasel Kabir [α], Masudul Islam [σ], Md. Salauddin Khan [ρ] & Raju Roy [ω]

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Keywords: early marriage, logistic regression, bangladesh.

I. Introduction

Wedding ceremony in Bangladesh symbols the peak in a woman's life when childbearing becomes up to standard. Marriage takes place early for women in Bangladesh: among 20-49 age of women, 78 percent are wedded by age 18 and 88 percent are wedded by age 20. Among men age 20-49, only 5 percent are connubial by age 18 and 15 percent by age 20[17]. In the 25-29 age cohorts, for example, three-fourth of women are married by age 18 and 95 percent by age 25[3]. In a state like Bangladesh along with the enlarged control of marital fertility, it is also important to inquire into the age at marriage in any assessment of the concern of dropping fertility [17]. This paper will seek to verify various foremost factor linked with early age at marriage in Bangladesh.

The large population of Bangladesh, which is continuing to enlarge at a quick rate, is a foremost barrier to societal and profitable progress in the state. Sivaram, independently Richard and Rao (1995) studied the determinant of early marriage among rural and urban females of South India. The multivariate analysis showed brides' education to be related to early age at marriage of females in both the areas [15]. Choe, Thapa and Mishra (2004, p.4) showed in study in Nepal, education along with parental education has a decidedly main consequence on early marriage. The study showed that achieveing the level of education boosts ages at first marriage.

According to Chojnacka (1995), non-traditional and non-agricultural employment of young women favours later marriage. Chojnacka (1995) mentioned the findings of WFS data for the end of the 1970's and 1980,s in this regard, which showed age at first marriage to be higher among employed in modern and transitional occupations than in traditional or unspecified ones[7]. Hirschman (1985) gave two possible clarifications for the causal liaison between women's premarital work experience and their age at marriage [5].

Age at first marriage in the middle of women inhalation in metropolitan in general found to be upper than those breathing in countryside. Yang (1990) documented that female age at primary matrimony in China had been increasing considering the year 1980s, and accelerated after 1972 following the implementation of the family planning policy. Minh (1997) observed that females born in metropolitan areas of Vietnam got married on average 1.3 years shortly than individuals who were born in countryside [17]. Exposure to mass media may have a significant effect on female age at marriage as well (Savitridana 1997) [21].

II. Data and Methods

a) Data source

This study utilized the facts commencing Bangladesh Demographic and Health Survey (BDHS) 2007. The Demographic and Health Survey (BDHS) program is an imperative resource of information regarding health other related issues in Third world countries[1]. The 2007 BDHS employs a on a national scale envoy sample that wraps the entire population residing in personal dwelling units in Bangladesh. The core intention of the survey were to endow with advanced information on fertility and childhood mortality levels fertility penchants; awareness, approval, and apply of family arrangement methods. All ever-married women 15-49 who naped in the preferred domestic the night before the analysis were adequate for the survey. Still the amount of ever –married women age 10-14 was very low, and thus this group had to be debarred from the study. The study was designed to fabricate spokesperson estimates for the majority of the indicators for the country as a whole, for the town and the rustic areas independently, and for each of the six divisions.

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The 2007 BDHS is a nationally representative of 10,996 women age 15-49 and 3,771 men age 15-54 from 10,400 households covering 361 sample points (clusters) throughout Bangladesh, 134 in urban areas and 227 in the rural areas[19]. This survey is the fifth in a sequence of national-level population and health surveys carryed out as part of the global Demographic and Health Surveys(DHS) program.

b) Sample Design

The sampling frame used for BDHS 2007 was the population census of the People's Republic of Bangladesh conducted in 2001 (PCPRB, 2001), provided by the Bangladesh Bureau of Statistics (BBS). The sampling frame was comprised of 259,532 enumeration areas (EAs) created for the 2001 census[18]. The sample for BDHS 2007 was a stratified sample, selected in two periods from the 2001 census frame. Stratification was achieved by separating each division into municipal and rustic areas. Administratively, Bangladesh was alienated into six divisions. In turn, each division is divided into Zillas; each Zilla is divided into Thana; In rural areas; each Thana is divided into Unions; each Union to mouzas. Urban areas in an upazilla are wards, and wards are subdivided into mahallas. An EA, which includes of about 100 households, on average, is correspondent to a mauza in rustic areas and to a mohallah in inner-city areas. The 361 Primary Sampling Units (PSUs) preferred in the earliest stage of sampling included 227 countryside PSUs and 134 inner-city PSUs. The lists of households were used as the sampling frame for the selection of households in the second stage of sampling.

c) Data Processing

All questionnaires for the BDHS were periodically returned to Dhaka for data processing at Mitra and Associates. The dealing out of the data composed began curtly after the fieldwork originated. The processing operation consisted of workplace editing, coding of open-ended questions, data ingress, and editing inconsistencies initiated by the computer programs. The information were processed on six microcomputers working in double shifts and conceded out by 10 data access operators and two data entry controllers. The synchronized dispensation of the data was an advantage since the quality control teams were capable to recommend field teams of problems detected during the data entry. In particular, tables were generated to check various data quality parameters. Data processing commenced on April 16 and ended on August 31, 2007[1].

d) Variables and Statistical Technique

The linear logistic regression method was applied to find out the net belongings of diverse determinant of early marriage more precisely. Variables used as dependent and independent in the investigation. All these variables with their original codes cannot be used in this training; some of them are recoded in relation to their necessity for the study. The selected demographic and socio-economic variables, which we used in this paper, are briefly described here.

Age at first marriage was used as the dependent variable, which was recorded in single years. The reliant variable was made dichotomous by dividing it into two groups: those who married before reaching of 18, were considered as early married and who were married at or after age 18, were considered as late married. Eighteen years was selected as the cut off position for defining the position of marriage as this is the legal female age at marriage in Bangladesh. For logical reasons, women married untimely were carefully planned as the 'successes' and coded as 1. Late married women, conversely, were measured as 'failures' and were coded as 0.

Variables, illustrated major alliance with age at marriage in chi-square tests were selected as explanatory variables. Respondents' work status, their education level, creed, region of dwelling, partners' educational level, wealth index were measured as explanatory variables. Exposure to the media of the respondent was finally excluded from the ultimate scrutiny as it was found to have an insignificant impact on early marriage in bivariate chi-square test.

III. Results

Basic information of the respondents' age at first marriage with some essestial variable is listed in table1. This investigation confirmed that the early marriage is highest (21.4%) in Dhaka.

Table 1 : The distribution of respondents by age at first marriage and other variables

Variables and their categories	Age at first marriage Late married (%)	Early married (%)	Total (%)
Division			
Barisal	11.2	13.3	13.1
Chittagong	18.6	17.5	17.7
Dhaka	20.4	21.4	21.3
Khulna	12.9	15.9	15.6
Rajshahi	16.0	19.3	18.9
Sylhet	20.9	12.5	13.5
Respondent education			
No education	23.9	57.1	53.0
Primary	29.4	33.4	32.9
Secondary	8.7	6.0	6.3
Higher	38	3.6	7.8
Husband,s education			
No education			
Primary	14.0	35.4	32.8
Secondary	14.6	27.9	26.2
Higher	27.8	26.2	26.4
	43.6	10.5	14.6
Media			
No	28.9	53.4	50.6
yes	71.1	46.6	49.4
Place of residence			
Rural	41.3	65.2	62.2
Urban	58.7	34.8	37.8
Religion			
Muslim	83.9	91.2	90.3
Nonmuslim	16.1	8.8	9.7
Wealth index			
Poor	14.4	37.1	34.3
Middle	30.4	40.3	39.1
rich	55.2	22.6	26.6
Respondent's Work status			
Unemployed	71.1	67.6	68.0
Agriculture/poultry/home			
Labour	8.1	17.9	16.7
Business/	10.9	11.6	11.5
professional	9.8	2.9	3.8

division and the lowest (12.3%) in Sylhet. There was considerable differentiability in percentage of early marriage in the context of respondents' education level. Women with no education exposed the highest (57.1 %) percentage to get married as early as quickly whereas that percentage (3.6%) for higher educated women was ignorable. The output of our study strongly supported the common phenomenon that the women living in rural (65.2%) area get married soon. Being most of the people living in Bangladesh Muslims, it was usual to have a larger portion from that religion group in the sample but the analysis presented the remarkable portion (91.2%) of occurring early marriage in Muslim people comparing with non-muslim groups. Women categorized as middle class based on the measurement of wealth index, unemployed were found to have early marriage with a far crying difference of percentage from their particular variables grouping. Women who were economically solvent, who were in different profession were found to report for getting married after 18 years old at a soaring entitlement.

Bivariate analysis suggested that a considerable involvement ($\chi^2 = 82.62, \mathrm{df} = 5, \mathrm{p} < 0.05$) between division from where the sample was drawn and dichotomous variable of age at first marriage. Respondents' education level, a very important variable

significantly impacted on this dichotomous variable ($\chi^2 = 2.06E3, df = 3, p < 0.05$). In bivariate analysis, the other variables media, place of the residence, Partner's teaching, creed, wealth indicator, respondents working status appeared to be influential impact on early marriage because of having large chi-square standards and $p<0.05$ for every cases.

In identifying explanatory variables for insertion in the logistic regression, 8 variables were considered, namely division, respondents' work status, education level, religion, wealth index, partners' educational level, expose to media and their residential place.

These variables were initially tested via chi-square test with binary categorized variable of age at first marriage like the dependent variable. Only those showing significance were integrated in the initial logistic model. All variables included in the model are categorical. The model retained seven variables, including division, respondents' work status, education level, religion, wealth index, partners' educational level and their residential place as significant variable with results descripted in Table 2.

Table 2 : Initial binary logistic Regression model with all selected independent Variables

Predictors	Coefficient B	p	Odds ratio
Division			
Barisal	1.258	.000	3.518
Chittagong	0.826	.000	2.285
Dhaka	1.059	.000	2.883
Khulna	1.405	.000	4.076
Rajshahi	1.359	.000	3.892
Sylhet *			
Respondent Education			
No education	2.547	.000	12.79
Primary	2.077	.000	7.980
Secondary	1.565	.000	4.783
Higher *			
Husband's Education			
No education	.731	.000	2.078
Primary	.680	.000	1.974
Secondary	.337	.002	1.401
Higher*			
Media			
No			
Yes *	.018	.853	1.018
Region			
Rural			
Urban *	.403	.000	1.496
Religion			
Muslims			
Non Muslims *	.852	.000	2.343
Wealth index			
Poor			
Middle	.438	.002	1.549
Rich *	.305	.002	1.356
Respondents Occupation			
Unemployed	.473	.002	1.605
Agriculture / Home / Poultry			
Labour	.398	.033	1.490
Profession*	.341	.057	1.407

***** *Reference category*

Table 2 reports B coefficients and odds ratios for the variables retained in the initial model, with residential place of the respondents proving to be particularly significant in predicting early marriage on the part of participants. Women living in the rustic area were 1.49 times apt marry before reaching 18 as those breathing in inner-city area. Respondents who attained primary, secondary and higher level of education were found to get married early12.79, 7.980, 4.783 times more liable than the women who had no education.

Participants working status significantly predicted their age at initial marriage. Professional candidates showed less interest where unemployed women were studied as one and half times (1.60) more than the category preceded before.

Since media appeared as an irrelevant variable in the initial logistic regression, another model retaining all variables but media was conducted to observe if there was any momentous distinction connecting these models and the result from this reduced model, intended in table-3.

Table 3 : Reduced logistic regression model

Predictors	B	P	Odds ratio
Division			
Barisal	1.303	0.000	3.680
Chittagong	0.883	0.000	2.418
Dhaka	1.088	0.000	2.967
Khulna	1.392	0.000	4.024
Rajshahi	1.357	0.000	3.884
Sylhet*			
Respondents' Education level			
No education			
Primary	2.550	0.000	12.802
Secondary	2.077	0.000	7.978
Higher *	1.634	0.000	5.126
Husband Education level			
No education			
Primary	0.743	0.000	2.102
Secondary	0.717	0.000	2.047
Higher *	0.338	0.001	1.402
Region			
Rural	0.367	0.000	1.443
Urban *			
Religion			
Muslim	0.755	0.000	2.128
Nonmuslim*			
Wealth Index			
Poor	0.421	0.000	1.524
Middle	0.246	0.006	1.278
Rich *			
Respondents Occupation			
Unemployed	0.409	0.005	1.505
Agriculture/home/poltry	0.390	0.029	1.476
Labour			
Professional*	0.327	0.057	1.387

** Reference category*

With a view to selecting a best model to predict early marriage well, Forward stepwise Logistic Regression and Backward Stepwise Logistic regression were incorporated in this analysis. Both approaches supported the reduced logistic regression by eliminating the insignificant variable (media) in their final iteration.

IV. Conclusions

The first major objective of the study is to investigate the impact of the determinants on the early female age at first marriage. Among all independent characteristics education plays a fundamental role on age at first marriage. This study proved that higher educated women have lower risk of early marriage than lower educated women. Like respondent's education, husband's education has similar effects on age at first marriage. Hence education is being the prime catalyst in this process because increase in educational attainment is likely to significant effect on age at first marriage. Religion has also positive effect on early marriage. Among Muslim percentage of early marriage is highest and lowest among the non Muslim. There are six different divisions (district of respondent's) in Bangladesh in. The behavior manners and cultures are more or less dissimilar in the divisions and hence age at first marriage is unlike. From the analysis we see that highest percentage of early marriage in Khulna region and closely later location Rajshahi region. One of the

important reasons of high percentage of early marriage in Rajshahi and Khulna division is that the literacy rate in both regions is relatively lower. On the other hand, the lowest percentage of early marriage is in Sylhet division and the second lowest is in Chittagong division. Here it is concluded that the economic status of the population lived in Sylhet and Chittagong division. Although Dhaka is the capital of Bangladesh the percentage of early marriage is higher than Sylhet and Chittagong division. One of the vital points of this situation that there are many slum areas in Dhaka city, teenage marriage much more higher within the slum females, which severally affects the age at first marriage of the women of Dhaka division. Economic status is also an important determinant of early marriage. Percentage of early marriage is highest among the poorest and lowest among the richest.

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Profitability and Constraints of Three Major Fisheries Enterprises in Kano State, Nigeria

By M. A. Dambatta, O. A. Sogbesan, A. A Tafida, M. A Haruna & A. U. Fagge
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Abstract- The study focused on the socio economic and profitability of major fisheries enterprises in Kano State, Nigeria. The socio-economic characteristics of the stake holders along the fisheries enterprises and profitability were described. It also identified and described the marketing channel of fresh and smoked fish in the study area. Gross margin analysis to assess the profitability of the business was determined. The constraints were also described and the factors that influence customer preferences in the study area identified. Primary data were collected from 30 fishermen, 30 processors and 20 consumers using questionnaire and analyzed statistically. The result of the study showed that male dominated fishing (52.3%), while female processing (47.5%). The gross margin analysis showed profitability values of N 74,350 for fishermen during raining period.

Keywords: *profitability, constraints, enterprises, kano state, fishery.*

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M. A. Dambatta [α], O. A. Sogbesan [σ], A. A Tafida [ρ], M. A Haruna [ω] & A. U. Fagge [¥]

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Keywords: profitability, constraints, enterprises, kano state, fishery.

I. Introduction

Fish is an important source of protein to the teeming population in Nigeria. Fish could be regarded as one of the major sources of animal protein in the country. According to Adekoya (2004), Fish represents about 55% of the protein sources intake of Nigerians. A large population of Nigeria is fish consumers with a demand estimated at about 1.4 million metric tons per annum. With a projected fish demand of 1.755 million metric tons in Nigeria (assuming a annual per capital fish consumption of 12.5kg and human population of 140.45 million, in the year 2000) and a total annual domestic production figure of less than 450,000metric tons, Nigeria has a fish supply deficit of about one million tons (Tobor, 1991). However, a demand supply gap of at least 0.7 million metric tons exists annually with imports making up the shortfall at a cost of about 2.0 million US dollars every five years (Miller and Atanda, 2004). Domestic fish production of about 500, 000 metric tons is supplied by artisanal fisher folks (estimated at about 85% despite over fishing in many water bodies across the country). Fish farmers (1%) and industrial capture fisheries (14%) (FDF, 2005) Fish is a popular, highly nutritious aquatic vertebra, which serves as a delicacy to most of the sub-Sahara Africa providing over 18% of total animals protein intake worldwide, with share as high as 40-60% in some West African states (FAO, 2002). Approximately 200 million Africans rely on fish as an important part of their diet. Ten million houses directly derive income from fish production, such as processing or trade. Yet the enormous potentials of fisheries to help feed and improve the nutritional status of the rapidly increasing population of Africa is greatly under-realized and precious aquatic resources are being degraded (World Fish Center, 2008).Fish is the cheapest animal's protein source in Nigeria, and smoked fish in particular has the potential to solve the pervasive protein shortage owing to its relative affordability compared with fresh fish. Boosting smoked fish consumption will entails retail price reduction, which is achievable only if the market for smoked fish operates efficiently (Taiwo, 2008).Fish as a food plays an important role in our diet. It provides vitamins such as A, B, C and D, contributes a considerable portion of the protein diet for many countries particularly developing ones. The human body utilizes protein from fish better than the protein from milk, beef, pork, chicken etc. Fish is also valued as a source of omega-3-fatty acids which is essential for the development of the brain and retina (Eyo, 2001).

II. Materials and Methods

a) Description of the Study Area

The study was carried out in Kano State; where freshwater fishes have a very old history due to availability of numerous freshwater bodies in the State. The state lies on latitude 10°33´N to 12°37´N and Longitude 7°40´E to 9°29´E. It is within Sudan Savannah zone. The total land area of the State is

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20,709 square kilometer. The mean daily maximum and minimum temperatures are 33.1°C and 15.85°C, respectively. Kano State is bordered to the north and northwest by Katsina State, to the east and northeast by Jigawa State, to the south by Bauchi State and to the southwest by Kaduna State. According to official Gazettes of the Federal Republic of Nigeria (2007), the State had a population of Nine million, Three hundred and Eighty Three thousand Six hundred and Eighty-two (9,383,682) inhabitants, with an annual growth rate of 3.3% who are mainly Hausa and Fulani by tribe (NPC, 2006). Agriculture is the major employment of labor in the State with many citizens involved in farming, fishing and marketing of aquatic resources such as fish, frogs either dried, smoked or other fish by-products. Major crops grown in the State include Millet, Sorghum, Cowpea, Corn, Wheat, Cotton, Gum Arabic, Groundnut and Rice, fish and fish products available in the State, while rearing of animals like cattle, horses, goat and sheep are as well prominent (Rim, 1992).The State has quite a large number of fish markets(up to sixteen). These include rural and urban markets where smoked and dry fishes are assembled. Most of the markets operate weekly or twice a week with the exception of city markets, which operate on daily basis. Next to farming are non-farm activities such as building, construction works, and so on. About twenty percent (20%) of the people engage in these activities to either supplement their income from farming, fishing or those from the privates or public sectors. Kano State has relatively abundant surface water resources in form of rivers, dams, lakes, reservoirs; up to sixteen freshwater resources owe to the Lake Chad Basin (L.C.B) which is the most productive in Africa, they comprise of Tiga Dam, Watari Dam, Kusalla Dam, Kanya Dam, Thomas Dam, Challawa Dam, Wasai Dam (Mbagwu, 1994). These rivers are sources of water for irrigation, domestic uses, fishing and transportation (Mbagwu, 1994). Kano State is currently made up of forty four (44) Local Government Areas (LGAs) and the State is agriculturally classified into three (3) zones by the Kano State Agricultural and Rural Development Authority, (KNARDA, 1995).

b) Sampling Techniques, Locations and Sizes

i. *Sampling Techniques*

The sampling frame for the data collection comprised of fishermen, processors, and consumers, in the three selected zones of Kano State in accordance with the existing Agricultural Development programme (ADPs) Zones in the State. Purposive sampling technique was used for sampling the respondents in the study area. The first stage involved purposive selection of one local government area from each zone based on relative abundance of hydrological features.

ii. *Sampling Locations*

On that basis of zoning and hydrological features three local government areas were selected as sampling locations (Table 1).

iii. *Sampling Sizes*

The second stage, involve simple random selection of respondents from the three selected landing sites. However, 30 each of fishermen, processors (Women) and 20 consumers were used. The distribution of these respondents within the purposively selected study sites was based on the proportion of the respondents in the site. A total of eighty (80) respondents were covered by the survey as shown on Table 1.

Table 1 : Study Location and Distribution of Respondents in each of the Selected Zone

ADPs	Location / Actors Fisher	Hydrological Features	Sample Size
I	Bebeji / Rano L.G. (Fisherman).	Tiga Dam	30
II	Kunchi L.G (Processors).	Ghari Dam	30
III	Gwale L.G. (Consumers).	Mai Allo Dam	20
	Total		80

c) Data Collection and Analytical Tools

i. *Methods of data collection*

Primary data were used for this study. The data were collected with the aid of structured questionnaire administered to the randomly selected respondents. The data on the socio-economic characteristics of the respondents, marketing costs returns, processing cost and data on fishing operations; as well as constraints militating against fish marketing in the study area, were collected using

Structured questionnaire was prepared; the items were tested for reliability and validity before been used for collections of the primary data. Three different types of questionnaire were used for each of the stakeholders: Fisherman, Processors and Consumers. Eighty (80) questionnaires were distributed to the targeted respondents. Data collection activities during these days include very early morning visits to landing sites to interview fishermen. Processors and Consumers were interviewed at different convenient time of the respondent.

ii. *Analytical tools*

The tools of analysis used for this study are:

- Descriptive Statistics and Simple Percentages,
- Profitability (Gross Margin), and
- Net Income (NI)

iii. *Descriptive Statistical and Simple Percentages*

Frequencies tables and percentages were used to describe the socio-economic characteristics of the respondents. The characteristics include the Age, Marital Status, Education Attainment, and Occupation, Fishing experience and Sex among others.

iv. *Profitability Analysis of Stakeholders*

The budgetary technique was used to determine the gross margin income at each stage of the chain. This was used estimating as the gross margin is in accordance with Kaplinsky (2000):

$$\text{Gross Margin} = \frac{\text{Revenue- Cost of Goods Sold}}{\text{Revenue}}$$

III. Results and Discussion

a) Socio-economic characteristic of respondents

The result of the study indicated that majority of the fishermen have ages range between 41 – 48 years which have the highest percentage (46.25%) followed by 33 – 40years and 49 -56 years (16.25%), then followed by 25 -32 years (11.25%), then 57 -64 years (8.75%), and least percentage of 1.25% was registered on age range of between 65 -72 years. The implication of this finding is that middle aged people take part more in fishing activities than old aged and younger ones in the study area. This has to do with the fact that young adult or middle aged people are more energetic and may have better entrepreneurial drive in the society. It's so because at these aged range people are more energetic and healthier. This tally with the finding of Malgwi (2000) in his study of economics of fish production in Maiduguri metropolitan area, where he revealed that most of the fishermen are in their middle aged .This is also in line with findings of Bello (2000) and George *et al.(*2010) that age had a positive correlation with Agricultural Productivity. The result shown that 50.00% had household size of 1-6 members followed by 31.25% with household size of 7 – 12 members, then 12.5% have a household size of 13 – 18, thus majority of the respondents in the study area are having less household because the business is more of middle aged who have less family size than the old ones. "Middle aged people participate more fishery enterprise in Kano State. This result are similar to the findings of Fabusoro *et al.* (2007) who reported that average household size in Africa was about 9 person. Gender is an important socio-economic parameter, according to either male or female (Lahai *et al.,* 2000). The study revealed that both male and female were involved in all activities of fishing such as Fishing, processing, marketing and consumption with male having the majority (52.5%) , while female constitute (47.5%) of the respondents; although female participate in processing and marketing than other activities (Sule and Raji, 2006). Education is very important in every aspect of life and plays vital role in Aquaculture development; in enhancing easy assimilation, awareness and receptivity to innovation (Adams *et al*., 1987) so as to improve fish production. The result indicated the educational status of the respondents with majority having secondary education (31.25%) followed by Qur'anic education with (30.00%) This signifies that majority of the respondents had Qur'anic education due to the dominance of Islamic religion in the study area. With those having tertiary education having the least percentage of (7.5%). This findings is in line with that of Mele (2007), following his study of economic analysis of fresh fish marketing in Dadin kowa, Gombe, State where he found that majority of the respondents had formal education. Marital status described individual as married, single, divorced and widowed and this means single individuals may have more helping hands (Olubanjo *et.al.,* 1994). The result revealed the marital status of the respondents with 7.5% as married and divorced respectively, widowed 5.0% and majority are single with 80.00%. This implies that fishing activities is dominated by single respondents. This may be due to socio – cultural and religious factors in the study area. These agree with the findings of Mohammed, (2011) in evaluation of poultry eggs marketing in Kuje area council where 95% of the respondents were single. Fishing experience is the number of years that the fishermen spent in fishing business. The longer the experience in the business, the better the performances in fishing activities. The result indicated that most of the respondent (36.66%) had fishing experience of 16 – 20 years, 26.66 % of the respondents had fishing experience of 11 – 15 years and 23.33% of the respondents had fishing experience of 21 – 25 years, while 10.00% of the respondents had fishing experience of 6 – 10 years (least percentage). With this experience, it implies that the fishermen can manage their fishing activities and risk and make sound decision to enhance their performance.

Table 2 : Socio – Economic characteristics of Actors along Fisheries enterprises.

Variable	Category	Frequency	Percentage (%)
Age Range	25 – 35	9	11.25
	36 – 46	13	16.25
	47 – 57	37	46.25
	48 – 58	13	16.25
	59 -69	7	8.75
	70 - 80	1	1.25
	Total	80	100
Mean = 39.4	Min = 20	Max = 42	SD = ±5.67

House hold size	1 - 6	40	50.00
	7 –12	25	31.25
	13 –18	10	12. 5
	19 – 24	3	3.75
	25 – 30	2	2.5
	Total	80	100
Mean = 7.3	Min = 2.1	Max = 23	SD = ±4.11

Source: Field Survey; 2014

Table 3 : Gender and Educational Status

Variables	Category	Frequency	Percentage (%)
Gender	Male	42	52.5
	Female	38	47.5
	Total	80	100
Educational Status	Primary	15	18.75
	Secondary	25	31.25
	Tertiary	6	7.5
	Qur'anic	24	30.00
	Adult	10	12.5
	Total	80	100

Sources: Field Survey, 2014.

Table 4 : Fishing Experiences of the Respondents

Experiences (Year)	Frequency		Percentage (%)
1 – 5	3		10.00
6 – 10	1		3.33
11 – 15	8		26.66
16 – 20	11		36.66
21 - 25	7		23.33
Total	30		100.00
Mean=14	Min=4.23	Max=26	SD=±4.62

Source: Field Survey, 2014.

Table 5 : Profitability of Fish Caught and Value / Week

Qty of fish caught/ Commission paid (Week/kg)		Average Profit (N)	Frequency		Selling Price N 400/kg	Selling Price N250/kg	Cost Price	Labour
1-2	1.5	2	1200	750	100	150	200	
3-4	3.5	6	8400	5250	100	150	2900	
5-6	4.5	3	5400	3375	100	150	1775	
7-8	7.5	8	24000	15,000	100	150	8750	
9-10	9.5	7	26600	16,625	100	150	9725	
11-12	11.5	4	18400	11,500	100	150	6650	
Total		30	N84000	N52500	N600	N900	N30, 000	

Source: Field Survey (2014)

%Profit = Profit/Selling Price X100
= 30,000/84,000 X100
= 35.71%

b) Production Constraints

The major constraints of the fishermen in the study area were found to be shrinking nature of the dams (63.33%) as they witness gross reduction in catches over the years since they noticed that the catches are also reducing, 13.33% identified high cost

of fishing gears as their constraint, while 3.33% advanced loses due to deterioration as their problem; while 20.00% of the respondents identified lack of capital to the fishermen as the major constraint. The preferred solution of the aforementioned problems as suggested by the fishermen includes more water should be allocated to the dam so as to increase its level, 50.00%, 13.3% want availability of fishing gears at cheaper price as the solution to their problems. 3.33% demanded for provision of means of storage to avoid spoilage of catches. 33.33% wants provision of loan by Government or Commercial banks at lower interest rate as their solution to inadequate capital. Majority of the fish processors 66.66% identified inadequate credit facility as their major challenges in the business. Whereas 26.66% of them identified inefficient processing facilities, the remaining 6.66% identified poor sale as their constraints. Accordingly, several solutions were proffered by the processors and 60.00% of them want provision of credit at lower interest and road to be repaired and secured throughout the state and beyond, 20.00% want improved modern processing facilities made available to them as solution to the problem and finally, the remaining, 20.00% want the development of the marketing system in the study area as well as uniform price system. Consumers are the end users of fishery enterprise and also the main target of all the stakeholders have their own thinking of the problems of fish as it affects their own role in the enterprise. For instant 65.00% of them sees high cost of fish as the major problem leading to reduction in their purchasing power, 10.00% mentioned fish – pin problems as it leads to injury or even loss of life and therefore, they have to take their valuable time to remove the pin before or after cooking it, 15.00% complained that the deteriorating nature of fish is their major constraints in fish consumption and also 10.00% highlighted poor sanitary condition of the fish market and marketing as their major constraints. Accordingly, in order to address the several problems by the consumers, enough credit facilities should be provided to boost the production at least by 50.00%. 10.00% suggested that number of exporting fin fish to the various water body should be minimized 30.00% want improved modern processing facilities made available to them as the solution, finally the remaining 10.00% have good hygienic condition as the proper solution to their constraints.

Table 6 : Fishermen Constraints in Kano State

Fishing Constraint	Frequency	Percentage (%)
Restrictions by the dam	10	33.33
Aquatic vegetation menace	4	13.33
Reduction in catches (sizes and numbers)	8	26.67
High cost of fishing gears	4	13.33
Losses due to deterioration	1	3.33
Inadequate capital	3	10.00
Total	30	100.00

Source: Field Survey (2014)

Table 7 : Constraints of the Fish Processors in Kano State

Processors constraints	Frequency	Percentage (%)
Inadequate credit facility	16	53.33
Inadequate processing facilities	8	26.66
Poor sale	2	6.66
Poor road linkages	4	13.33
Total	30	100.00

Source: Field Survey (2014)

Table 8 : Constraints of the Fish Processors in Kano State

Processors constraints	Frequency	Percentage (%)
Inadequate credit facility	16	53.33
Inadequate processing facilities	8	26.66
Poor sale	2	6.66
Poor road linkages	4	13.33
Total	30	100.00

IV. Summary, Conclusion and Recommendations

The study examined the socio-economic and profitability of fishery enterprises in Kano state, Nigeria. Multistage sampling technique as employed to select a total of 80 stakeholders along the fishery enterprise, 30 fishermen, 30 processors and 20 consumers. The sampling was based on purposive and simple random selection technique. The collected data were subjected

to both descriptive statistics mainly. The study further attempted to describe the socio – economic characteristics of actors (Fishermen, processors and final consumers) along the fisheries enterprises, estimated the profitability by the actors along the fisheries enterprises, determined the consumer preference to fish in the study area and finally identified the major constraints, as well as possible solution for all actors in the fishery enterprise. Based on the results presented, it can be concluded that fishermen, processors in the study area were operated on small scale, because both have low level of formal education and limited financial resources to use modern techniques of catching fish and processing along the fishery enterprise. Fishermen in the study area were found to be productive because they gave a mean gross margin return of #74350 at the period of raining season. All the stakeholders were found to be relatively efficient to the business operation. Dwindling of the dams, lack of effective processing and storage facilities, inadequate credit facilities, high cost of transportation, bad road network were identified as the major problem prevailing among the actors in the fishery enterprise in Kano state. The study recommends that fishermen and processors level of capital should be increased through increasing their access to loan and credit facilities. Fishermen and processors should be encouraged to form co-operative organization at all level. Credit facilities/institution should be made available to the fishermen and processors through their co-operative organization. Provision of good road network and other infrastructural facilities that link rural marketers with urban markets. Government should make a policy that will ensure access to major fishing gears at the subsidized rate to the fishermen in the study area. This will encourage the participation of more fishermen in the fishing business.

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Measuring Sustainability of Best Practices in Logistics Chains

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Abstract- Previously firms mainly based on financial performance to assess their progress. Thenceforth, maturity of logistic chain must be evaluated from a more comprehensive performance including, economic, environmental and social dimensions.

As we know, each logistic chain is characterized by several best practices, so the purpose of this paper is to determine the sustainable performance of each one from these best practices.

Aware that logistic chain performance should balance economic profitability with respect for natural environment and social performance, with objective to satisfy all stakeholders, the authors propose a mathematical approach to assess the performance. This mathematical approach was tested in a logistics chain of automobile industry.

Keywords: logistic chain, best practice, sustainable development, sustainable criteria, composite sustainable development index.

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Measuring Sustainability of Best Practices in Logistics Chains

A. Haddach [α], M. Ammari [σ] & Laïla Ben Allal [ρ]

Abstract- Previously firms mainly based on financial performance to assess their progress. Thenceforth, maturity of logistic chain must be evaluated from a more comprehensive performance including, economic, environmental and social dimensions.

As we know, each logistic chain is characterized by several best practices, so the purpose of this paper is to determine the sustainable performance of each one from these best practices.

Aware that logistic chain performance should balance economic profitability with respect for natural environment and social performance, with objective to satisfy all stakeholders, the authors propose a mathematical approach to assess the performance. This mathematical approach was tested in a logistics chain of automobile industry.

The results indicate that the proposed module can be used as a tool to evaluate sustainability of each logistic chain whatever the field of activity.

Till now, there are a very few number of tools that take account the three sustainable dimensions (economic, environmental and social) in the same time to measure sustainability of best practices in logistics chains. This study proposes a mathematical module to approach this subject.

Keywords: logistic chain, best practice, sustainable development, sustainable criteria, composite sustainable development index.

I. Introduction

The main objective in logistics chains management was to improve industrial competitiveness by minimizing costs, providing level of service required by customer, effectively allocating activities on actors of production, distribution and transport. Currently, logistics chains must integrate two new dimensions in their performance: their impact on society and on environment. logistics chains must develop methods and approaches to consider and measure their impacts on economic, environmental and social levels and analyze interactions between these impacts. Traditional mechanisms for performance measurement, such as costs, do not give logistics chains a clear view on consequences of their management practices. Approaches available today are mainly focused on environmental sphere, when the reality of impacts of logistic chain management practices is more complex, integrating the three dimensions of sustainable development (economic, environmental and social). It's true that public institutions encourage firms to make development sustainable a strategi issue. In logistic chain, sustainable development is a transversal concept that affects all stakeholders who have different and sometimes conflicting goals. Performance is complex to master given different processes to consider, various stakeholders to integrate and various dimensions in which stakes are declined. To take into account all logistics chains impacts, it is essential to develop a comprehensive performance evaluation method of logistics chains. This method must be consistent with specificities of each stakeholder. The difficulty in logistic chain is to measure interactions between the three dimensions of sustainable performance. To address this problem of measuring the sustainable performance of best practices in logistics chains, it is pertinent to ask the following questions: why consider sustainability in logistics chains? What are the motivations of logistics chains to develop a sustainable approach? What are the specificities of sustainable issues in logistics chains?

II. Logistic Chain

a) Definition

There are in literatures many definitions of logistic chain. Of these, we adopt the following ones: logistic chain refers to a network consisting of various units business (suppliers, subcontractors, manufacturers, distributors, retailers, etc.) to provide a product or service for end customer, from the supplier's supplier involving three types of flows: physical, informational and financial (American Production Inventory Control Society, 2010). Physical flows relate to all materials that pass through the logistic chain from upstream to downstream (raw materials, intermediate products and finished products). Other materials can flow from downstream to upstream, such as containers, packaging, pallets, product returns or end-of-life products in the case of reverse logistics. Information flows concern exchange of information and data between actors of chain (stocks and outstanding level, customer demand, etc.) which are made in both sense. Finally, financial flows are the cash flows associated with the physical flow [1].

b) logistic chain management

Like logistic chain, the concept of logistic chain management has led to several definitions:

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"Supply chain management is an integrated management approach, which is to lead a whole, the flow of material and information from suppliers to end users, as well as the return flow through planning tools and decision support." [2].

"Supply chain management is a set of approaches used to effectively integrate suppliers, producers, distributors, so that merchandise is produced and distributed in the right quantity, at the right place and at the right time in order to minimize costs and ensure the service level required by customer." [3].

c) Decision-making levels

logistic chain management is a widely studied topic in scientific literature, we will approach it from a sustainable point of view, which today is more innovative.

We can classify decisions about logistic chain management in three categories [4]:

Strategic decision concerns decisions taken by senior management and are the guidances on long term, from six months to several years.

Tactical decision is concerned with decisions taken by the firms executives over the medium term that is to say from a few weeks to few months.

Operational decision has a more limited scope in space and in time. These are decisions taken by team leaders during day or week.

III. Sustainable Development

a) Concept of Sustainable development

The concept of sustainable development has its origins from the 18th century with concerns about the consumption of the Earth's resources, expressed for example in the work of Malthus on the relationship between the growth dynamics of the population and production. Most recent origins of sustainable development dates back to the work of the Club of Rome which is known worldwide in 1972 by the famous Meadows report "The Limits to Growth".

The term "sustainable development" does not appear until early 1980s as part of development of the World Conservation Strategy.

b) Sustainability criteria

The concept of sustainable development encompasses three dimensions - economic, environmental and social - united by a set of trade-offs.

Economic criteria: because of the unequal distribution of the wealth produced between countries and between social strata within a country, the economic challenge is to restore the economy's place in society.

Environmental criteria: they mainly concern: global warming and its consequences, biodiversity erosion, depletion of natural resources and pollution.

Social criteria: they include among others, the increase in global inequality, poverty and access to basic needs.

IV. Sustainable Development in Firms and in Logistics Chains

a) Criteria of sustainable performance

Traditionally, criteria taken into account to assess supply chains and firms performance are related to financial aspects, flexibility, responsiveness, quality and reliability [5].However, taking into account environmental and social concerns in the context of CSR (Corporate Social Responsibility) change performance assessment. This must indeed be extended to consider all three dimensions of sustainable development, in line with the principles of triple bottom. There is still no consensus on what should be performances environmental and social. They depend in fact on several variables as industrial sector, country of location of activities, etc. It is therefore difficult to characterize sustainable performance. Nevertheless, there are several international standards (SCOR repository, GRI (Global Reporting Initiative) , ISO 26000 , etc.) and works in literature that provide economic, environmental and social criteria more or less common and generic that can be adapted.

b) Methods for evaluating sustainable performance

The most numerous approaches are qualitative, they include literature reviews, conceptual models and case studies. Quantitative approaches are the mathematical models.

i. *Literature reviews*

Despite international efforts to measure sustainable development, few indexes have a comprehensive approach taking into account the three dimensions of sustainability and in most cases, the emphasis is on one of the three aspects [6]. Interaction between logistic chain and sustainability is intended to optimize total cost, including the impacts of resource depletion and exponential waste production and pollutants, rather than the current cost of a product [7]. Value creation in context of sustainable development comes from the importance of collaboration between players in logistic chain [8].

ii. *Conceptual models*

Most conceptual models found in the literature focus on methodologies and frameworks to adopt, to select and develop indicators to measure the sustainable performance. after analyzing the most recognized standards for sustainable development, including GRI and ISO 14301 (ISO 2004), a selection of indicators to measure sustainable performance of production was offered [9]. Then a detailed guide in eight steps of implementation of these indicators was proposed [10]. There is a method for assessing the degree of sustainability of a business operation [11].

The goal of this method is to select a number of indicators that meet four criteria: they must be consistent with the company's business, reflect objectivity, they must be balanced and all indicators selected should represent the concept of sustainable development. More recently the integration of information, other than financial, appeared in the performance measure as a necessity.

iii. *Case studies*

Following an analyzes based on 89 of automotive industries within China, the main motivations for firms to engage in CSR strategy are the regulatory pressures, those of the market and also internal factors of firm [12]. In addition, results of these analyze put forward a slight correlation between implementation of CSR practices and environmental and economic performance but a lack of connection with the financial performances. Many studies based on Chinese [13] and United States [14] firms gave a similar conclusions.

iv. *Mathematical models*

To assess the sustainable performance, many authors present models of aggregation of indicators. In this domain, exist a model to assess the sustainable performance through a comprehensive composite index (I_S), which includes three sub-indices corresponding respectively to economic, environmental and social performances [15]. Also there is a method for the development of a composite index of sustainable performance in steel field [16], based on three lasting performance and AHP (Analytic Hierarchy Process) method. Despite international research efforts on assessing the sustainable performance, only a very small number of approaches take into account the three dimensions of social responsibility in firms and (Singh et al., 2009). Indeed, there is not, nowadays, an available model permet to integrate overall assessment in terms of logistics chains management. Social dimension is poorly represented in existing indices.

V. Proposal of a Module to Evaluate Sustainable Development of Best Practices in Logistics Chains

a) Sustainable criteria

To measure sustainable performance of practices in logistic chain, and thus facilitate decision-making, we propose an analytical evaluation model.We propose to characterize each dimension of sustainable development by a number of criteria (Table 1).

We based our selection of criteria on the three recommended requirements by [17]:

1) *Completeness:* we must not it has too few criteria; otherwise, it means that some assessment elements were not taken into account.
2) *Non-redundant:* it should not be that there are criteria that are duplicated, thus more than necessary.
3) *Consistency:* global preferences (all criteria) are consistent with local preferences (for a single criteria).

Table 1 : Characterization model of sustainable performance

Dimension	Criteria
Economic	Financial Performance (FP) Quality (QL) Reliability (RL) Reactivity (RC) Flexibility (FL)
Environmental	Environmental management (EM) Pollution (PL) Use of Resources (UR) Natural environment (NE) Dangerous substances (DS)
Social	Labor rights (LR) Work conditions (WC) Health and security (HS) consumers (CN) Community involvement (CI)

b) Best practices of logistic chain management

The literature provides many definitions of best practices of logistic chain, among them, we adopt the following one:

"... A process, a technique, innovative use of technology, equipment or resource that has generated a significant improvement in cost, quality, performance, safety, environment or other measurable factor impacting the organization" [18].

All proposed definitions emphasizes different aspects of concept of best practice. From these definitions, we hold that a best practice is formalised, effective and reusable.

c) *Maturity scale of practices*

We can characterize maturity of a practice by two properties: stability and scope:

Stability of practice refers to regularity of implementation thereof by the firm, it can be occasional or systematic.

Scope of practice means the circumference over which it extends. It can only apply to a few products / services or all of the products / services.

Because a practice occasionally installed on some products will not generate the same impacts that a practice consistently implemented on all products of logistic chain, we propose four degrees of practices maturity in logistic chain , which are as follows (Fig. 1):

Degree 0: practice is little or no implemented. Therefore, its implementation will not impact significantly the criteria.

Degree 1: occasionally, this practice is in place for certain products / services of the logistic chain.

Degree 2: practice is implementing systematically for selected product / service or occasionally for all products / services.

Degree 3: practice is implementing consistently for all of its products / services.

d) *Impacts assessment scale*

Simultaneously assess the economic, environmental and social impacts, be very complicated because of scales that are very different,that is way we propose to evaluate the impact of each management practice

(P_K) following a scale of three qualitative values:

$\{+1\}$ If impact of practice (P_K) is seen as positive on a given criteria.

$\{-1\}$ If impact of practice (P_K) is seen as negative on a given criteria.

$\{0\}$ If impact of practice (P_K) is seen as neutral on a given criteria.

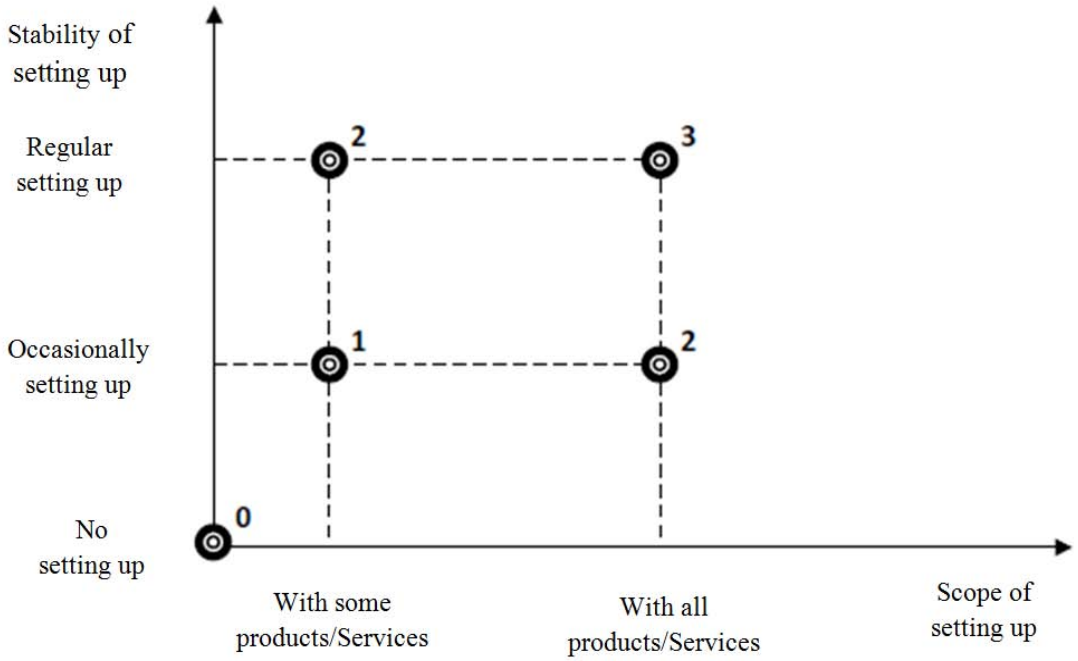

Fig. 1 : Maturity of practices implementation [22]

e) *Assessment model for sustainable performance*

When aggregating we face a difficulty which affects the inequality of importance of sustainable criteria (corporate strategy, industry type, ...) which suggests to weight criteria to express their relative importance . To do this we use the principle of weighting of AHP method. AHP method is simple to use and allows to take into account both quantitative and qualitative criteria. Furthermore, the lack of objectivity in assessing relative importance of criteria is reduced [19]. We adopt this method to calculate a composite sustainability performance index (I_S) own to achievement of a given activity in logistic chain.

The method of calculating the composite sustainability performance index is prepared in three steps (Fig. 2), and is divided into several parts (Fig. 3).

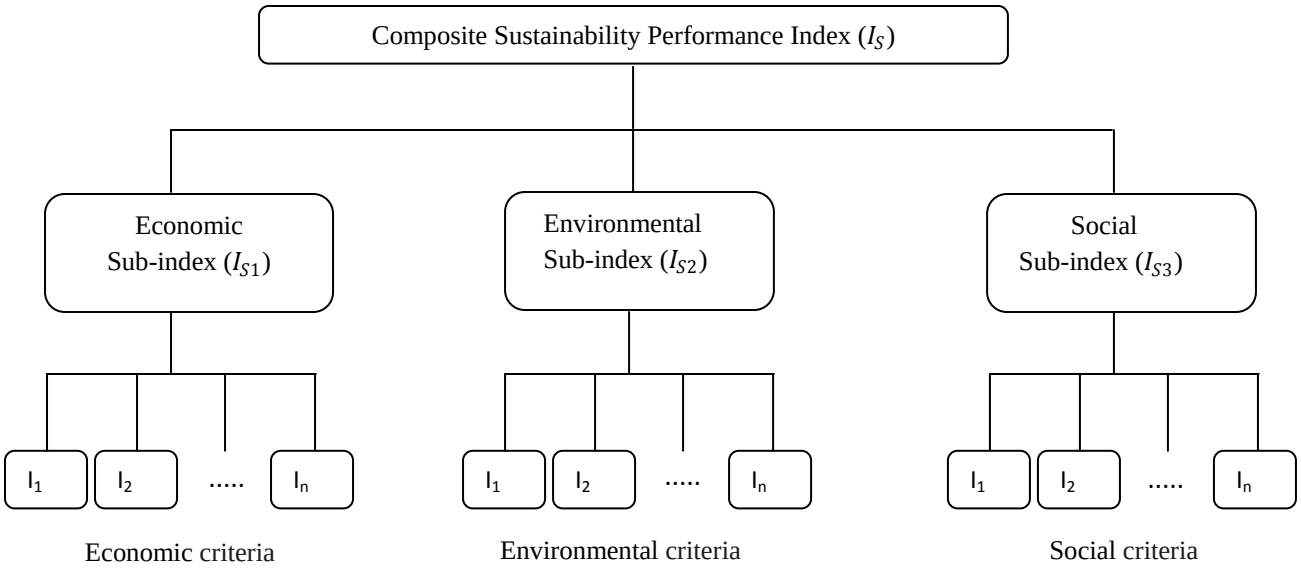

Fig. 2 : Generic hierarchy scheme for calculation of composite sustainable development index (I_S)

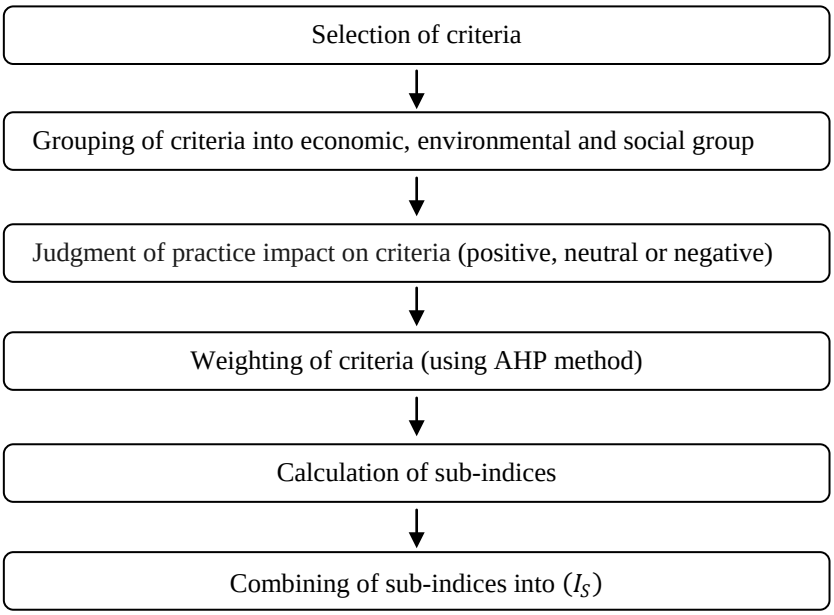

Fig. 3 : Calculation procedure of (I_S)

Step 1

We define $I(P_K, Eco_i)$ impact measurement of practice (P_K) on the i[th] economic criteria as follows:

$$I(P_K, Eco_i) \in \{-1\,;0\,;+1\}\ \forall k$$

$$where\ i: sustainable\ criteria\ \ and\ 1 \le i \ll 5$$

We do the same thing for environmental and social criteria:

$$I(P_K, Env_i) \in \{-1\,;0\,;+1\}\ \forall k$$

$$where\ i: sustainable\ criteria\ \ and\ 1 \le i \ll 5$$

$$I(P_K, Soc_i) \in \{-1\,;0\,;+1\}\ \forall k$$

$$where\ i: sustainable\ criteria\ \ and\ 1 \le i \ll 5$$

To take into account the importance of implementation of a given practice in the logistic chain, we propose to evaluate the weighted impact of each practice on the three sustainable dimensions:

$$W_{id} = Weighted\ impact\ (P_K, Env_i)$$
$$= I(P_K, Eco_i) \times w(P_K)$$
$$where\ w(P_K) \in \{0, \dots, 3\}\,; -3 \le W_{id} \le +3$$

$$W_{id} = Weighted\ impact\ (P_K, Env_i)$$
$$= I(P_K, Env_i) \times w(P_K)$$
$$where\ w(P_K) \in \{0, \dots, 3\}\,; -3 \le W_{id} \le +3$$

$$W_{id} = Weighted\ impact I\ (P_K, Soc_i)$$
$$= I(P_K, Soc_i) \times w(P_K)$$
$$where\ w(P_K) \in \{0, \dots, 3\}; -3 \leq W_{id} \leq +3$$

Step 2

For each sustainable dimension d (d ∈{Eco, Env, Soc}), we build a matrix A = (n x n); n= 5 where criteria of each dimension are compared 2 by 2 by the decision maker.

The comparisons are made by posing the question which of two criteria i and j is more important with respect to the sustainable development. The intensity of preference is expressed on a factor scale from 1 to 9 (Table 2). The value of 1 indicates equality between the two criteria while a preference of 9 indicates that one criteria is nine times more important than the one which it is being compared. This scale was chosen, because in this way comparisons are being made within a limited range where perception is sensitive enough to make a distinction. In the matrix A,if criteria i is "p-times" the importance of criteria j, then, necessarily, criteria j is "1/p-times" the importance of criteria i. where the diagonal $a_{ii} = 1$ and reciprocal property $a_{ji} = \left(\frac{1}{a_{ij}}\right)$ $where\ i, j = 1, \dots, n$

Weight of criteria i of sustinable dimension d (w_{id}) is given by the formula:

$$w_{id} = \frac{\sum_{j=1}^{n} \frac{a_{ij}}{\sum_{k=1}^{n} a_{kj}}}{n}$$

Table 2 : Comparison scale of AHP method [23]

Preference factor, p	Importance definition
1	Equal importance
3	Moderate importance of one over another
5	Strong or essential importance of one over another
7	Very strong or demonstrated importance of one over another
9	Extreme importance of one over another
2,4,6,8	Intermediate values
Reciprocal, 1/p	Reciprocal for inverse comparison

One disadvantage of AHP method outlined in literature [20] is the problem of intransitivity preferences. Indeed, pairwise comparison may lead to the non-transitivity that can not be removed as part of AHP method.

However, perfect consistency rarely occurs in practice. In AHP method the pairwise comparisons in a judgment matrix are considered to be adequately consistent if the corresponding consistency ratio (CR) is less than 10% [21] . CR coefficient is calculated as follows: first a consistency index (CI) needs to be estimated. This is done by adding the columns in the judgment matrix and multiply the resulting vector by the vector of priorities (i.e., the approximated eigenvector) obtained earlier. This yields an approximation of the maximum eigenvalue, denoted by λ_{max} . Then, CI value is calculated by using the formula:

$$CI = (\lambda_{max} - n)/(n-1)$$

Next, CR is obtained by dividing CI by random consistency index (RI) as given in table 3.

Table 3 : RI values for different values of n

n	1	2	3	4	5	6	7	8	9
RI	0	0	0.58	0.90	1.12	1.24	1.32	1.41	1.45

Otherwise matrix A should be evaluated:

$$CR = CI/RI$$

Thus we calculate sub-indices of each sustainable dimension as follows:

$$I_{S1} = \sum_{i=1}^{n} W_{i1} \times w_{i1} \qquad -3 \ll I_{S1} \ll +3$$
$$I_{S2} = \sum_{i=1}^{n} W_{i2} \times w_{i2} \qquad -3 \ll I_{S2} \ll +3$$
$$I_{S3} = \sum_{i=1}^{n} W_{i3} \times w_{i3} \qquad -3 \ll I_{S3} \ll +3$$

Interpretation

$I_{S1} \in [-3, 0[$: selected practice has a negative economic impact on logistic chain.

$I_{S1} = 0$: selected practice does not has any economic impact on logistic chain.

$I_{S1} \in]0, +1.500[$: selected practice has a positive economic impact on logistic chain but insufficient.

$I_{S1} \in [1.500, +3]$: selected practice has a positive and sufficient economic impact on logistic chain .

$I_{S2} \in [-3, 0[$: selected practice has a negative environmental impact on logistic chain.

$I_{S2} = 0$: selected practice does not has any environmental impact on logistic chain.

$I_{S2} \in]0, +1.500[$: selected practice has a positive environmental impact on logistic chain but insufficient.

$I_{S2} \in [1.500, +3]$: selected practice has a positive and sufficient environmental impact on logistic chain.

$I_{S3} \in [-3,0[$: selected practice has a negative social impact on logistic chain.

$I_{S3} = 0$: selected practice does not has any social impact on logistic chain.

$I_{S3} \in]0,+1.500[$: selected practice has a positive social impact on logistic chain but insufficient.

$I_{S3} \in [1.500,+3]$: selected practice has a positive and sufficient social impact on logistic chain.

Step 3

Equal weights (1/3) have been attributed to each sub-index to derive (I_S). Certainly, other methods of weighting the sub-indices of (I_S) could be applied, for example by using public opinion polls or involving expert judgment. However, which makes equal weighting a sensible option.

Finally, we find composite sustainable development index (I_S), based on the following equation:

$$I_S = \frac{(I_{S1} + I_{S2} + I_{S3})}{3} \; where - 3 \leq I_S \leq +3$$

$I_S \in [-3,0[$: means that the selected practice has a negative global impact on logistic chain.

$I_S = 0$: selected practice does not has any global impact on logistic chain.

$I_S \in [1.500,+3]$: selected practice has a positive global impact on logistic chain but insufficient.

$I_S \in [1.500,+3]$: selected practice has a positive and sufficient global impact on logistic chain.

(We can use AHP method to weight the three dimensions).

IV. Application

Effectiveness of the proposed model has been tested with an application. We choose to study the impact of "Lean Manufacturing" on a automotive logistic chain within Morocco. To achieve this goal, we have determined the impact of this practice on each one from our sustainable criteria, considering that this practice is setting up in chosen logistic chain with a maturity which equals 2 (Table 4, Appendix A).

Table 4 : Practice weighting

Dimension	Criteria	Practice impact	Maturity of practice	Weighted practice
Economic dimension	Financial Performance (FP)	+1	+2	+2
	Quality (QL)	+1	+2	+2
	Reliability (RL)	+1	+2	+2
	Reactivity (RC)	+1	+2	+2
	Flexibility (FL)	+1	+2	+2
Environmental dimension	Environmental management (EM)	+1	+2	+2
	Pollution (PL)	+1	+2	+2
	Use of Resources (UR)	+1	+2	+2
	Natural environment (NE)	0	+2	0
	Dangerous substances (DS)	0	+2	0
Social dimension	Labor rights (LR)	+1	+2	+2
	Work conditions (WC)	-1	+2	-2
	Health and security (HS)	+1	+2	+2
	consumers (CN)	+1	+2	+2
	Community involvement (CI)	+1	+2	+2

Tables 5 : Calculating weights of sustainable criteria using AHP method

Economic dimension

	PF	QL	RL	RC	FL
PF	1	2	4	4	4
QL	1/2	1	2	2	2
RL	1/4	1/2	1	1	1
RC	1/4	1/2	1	1	3
FL	1/4	1/2	1	1/3	1
Sum	2.250	4.500	9	8.333	11

$\frac{a_{ij}}{\sum_{k=1}^{n} a_{kj}}$

	PF	QL	RL	RC	FL
PF	0.444	0.444	0.444	0.480	0.364
QL	0.222	0.222	0.222	0.240	0.182
RL	0.111	0.111	0.111	0.120	0.091
RC	0.111	0.111	0.111	0.120	0.273
FL	0.111	0.111	0.111	0.040	0.091

w(PF)	0.435
w(QL)	0.218
w(RL)	0.109
w(RC)	0.145
w(FL)	0.093

λ_{max}==5.155; CI=0.039; RI=5; **CR=0.008**

Environmental dimension

	EM	PL	UR	NE	DS
EM	1	1/3	1	2	2
PL	3	1	2	3	1
UR	1	1/2	1	4	1
NE	1/2	1/3	1/4	1	1
DS	1/2	1	1	1	1
Sum	6	3.166	5.250	11	6

$\frac{a_{ij}}{\sum_{k=1}^{n} a_{kj}}$

	EM	PL	UR	NE	DS
EM	0.167	0.105	0.190	0.182	0.333
PL	0.500	0.316	0.381	0.273	0.167
UR	0.167	0.158	0.190	0.364	0.167
NE	0.083	0.105	0.048	0.091	0.167
DS	0.083	0.316	0.190	0.091	0.167

w(EM)	0.195
w(PL)	0.327
w(UR)	0.209
w(NE)	0.099
w(DS)	0.169

λ_{max}==5.194; CI=0.049; RI=1.12; **CR=0.044**

Social dimension

	LR	WC	HS	CN	CI
LR	1	2	1	1	1
WC	0.500	1	0.250	1	1
HS	1	4	1	1	3
CN	1	1	1	1	3
CI	1	1	0.333	0.333	1
Sum	4.5	9	3.583	4.333	9

$\frac{a_{ij}}{\sum_{k=1}^{n} a_{kj}}$

	LR	WC	HS	CN	CI
LR	0.222	0.222	0.279	0.231	0.111
WC	0.111	0.111	0.070	0.231	0.111
HS	0.222	0.444	0.279	0.231	0.333
CN	0.222	0.111	0.279	0.231	0.333
CI	0.222	0.111	0.093	0.077	0.111

w(LR)	0.213
w(WC)	0.127
w(HS)	0.302
w(CN)	0.235
w(CI)	0.123

λ_{max}=5.292; CI=0.073; RI=5; **CR=0.065**

Appendix A : Justification of impacts of "Lean Manufacturing" on each sustainable criteria

Criteria	Practice impact	Justification
Financial Performance (FP)	+1	"Enables organizations to determine how current process steps and cycle efficiencies affect overall supply chain reliability. Details can be displayed through value stream mapping" [24].
Quality (QL)	+1	"Process cycle- value added process steps" [24].
Reliability (RL)	+1	"Lean creates and processes" [24]
Reactivity (RC)	+1	3 respondents
Flexibility (FL)	+1	4 respondents
Environmental management (EM)	+1	"Some regulatory issues can be encountered when applying lean to environmentally sensitive processes" (EPA (Environmental Protection Agency), 2003).
Pollution (PL)	+1	"Lean is highly conducive to waste minimization and pollution prevention" (EPA, 2003).
Use of Resources (UR)	+1	3 respondents
Natural environment (NE)	0	"Lean is highly conducive to waste minimization and pollution prevention" (EPA, 2003).
Dangerous substances (DS)	0	4 respondents
Labor rights (LR)	+1	"Positive impacts of LP (Lean Production) on working conditions have also been emphasized. Berggren (1992), identified a set of these impacts, such as: its egalitarian character" [25].
Work conditions (WC)	-1	"Typical principles of LP increase stress in workers and reduce their autonomy" [24].
Health and security (HS)	+1	"Positive impacts of LP on working conditions have also been emphasized. Berggren (1992), identified a set of these impacts, such as: job security" [25].
consumers (CN)	+1	3 respondents
Community involvement (CI)	+1	"Positive impacts of LP on working conditions have also been emphasized. Berggren (1992) identified a set of these impacts, such as: management giving value to workers' proposals for improvement [25].

Computing of sub-indices of each dimension and composite sustainable development index:

$$I_{S1} = (2 \times 0.435) + (2 \times 0.218) + (2 \times 0.109) + (2 \times 0.145) + (2 \times 0.093) = 2$$

$$I_{S2} = (2 \times 0.195) + (2 \times 0.327) + (2 \times 0.209) + (0 \times 0.099) + (0 \times 0.169) = 1.464$$

$$I_{S3} = (2 \times 0.213) + (2 \times 0.127) + (2 \times 0.302) + (2 \times 0.235) + (2 \times 0.123) = 1.148$$

$$I_S = (2 + 1.464 + 1.148)/3 = 1.537$$

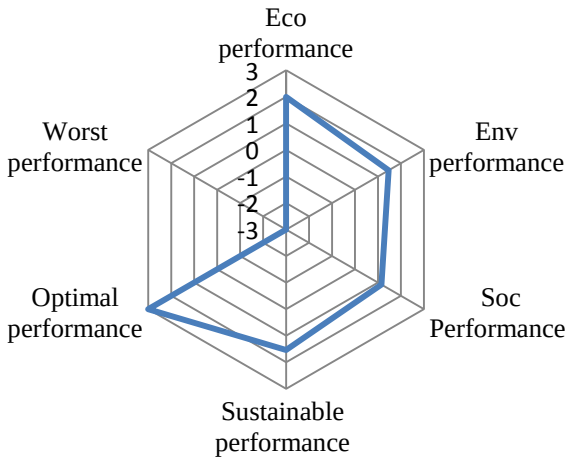

Fig. 4 : Graphical representation of results

a) Interpretation of results

We consider a practice very diffused almost in all logistics chains. Criteria of each sustainable dimension were compared in pairs (Table 6) and a weight was calculated for each one of them. Consistency of judgments matrices was also verified. Values obtained for sub-indices show the performance achieved for each sustainable dimension through this practice. Five economic, five environmental and five social indicators were aggregated into sustainability sub-indices for a logistic chain and finally combined into a composite sustainable development index (I_S).

Impact of selected practice "Lean Manufacturing" is determined following a study of academic results (Appendix A). In considered example, value of economic sub-index is the high and exceeds the average (1.500) indicating that the activity is efficient from an economic point of view and the same for the environmental sub-index.Value of social sub-index is the lower and does not exceed the average (1.500), indicating that the activity is not efficient from a social point of view. Value of aggregate index of performance of this practice is higher than average which indicates that performance level is sufficient.

b) Discussion of findings

The purpose of (I_S) is to give both a simplified and quantified expression for a more complex composition of several criteria. It can be used to inform decision-makers of development trends in logistic chain. However, it may also be included in a more targeted context, such as reflecting the status of firm regarding sustainability, providing information to critical decision processes, or possibly forming the basis for a logistic chain to head in a certain direction. This evaluation module helps to highlight opportunities for improvement and where best practices might be found. It provides early warning information and tracks sustainability of logistic chain. Decision-makers could easily interpret (I_S) and its corresponding sub-indices than trying to find a trend in many separate criteria of sustainable development. If included in the annual sustainability report, we could use this modul to present the progress of logistic chain in terms of sustainability to various parties interested in logistic chain sustainability. Also, this evaluation module if would be applied to different logistics chains, it would be possible to compare and rank them in terms of sustainability.

Based on our evaluation module of sustainable performance we can decide if we apply or not a given best practice in logistic chain following its sustainable performance calculated by (I_{S1}, I_{S2}, I_{S3} *and* I_S). In the same way and based on this evaluation module,we can also classify all best practices of a logistic chain following their sustainability.

V. Conclusion

The purpose of this article is to show the difficulties in measuring sustainable performance, fuzzy concept, presented by many authors as aggregation of

economic, environmental and social performance of a firm.

While sustainability information is typically treated separately, this paper tries to translate it into a form that corresponds to needs of decision-makers. This paper illustrates that it is possible to assess sustainable development in an integrated way that provides good guidance for decision-making. As the business case for sustainable practices becomes increasingly clear, sustainability reporting offers a measurable value to those whose business is to assess the current sustainability health of firms and influence future action. At present, content of sustainability reports tends to appear in forms and units that are not readily convertible into unique terms. The model presented in the paper promises advance in sustainability assessment of logistic chain and makes sustainability information more useful to decision-makers. Core and supplemental indicators (I_{S1}, I_{S2}, I_{S3}) when combined into composite sustainable development index (I_S) can be used to reflect the achievements of logistic chain towards sustainability.

Even though further development is called for, it is evident that this model for sustainable development assessment has the potential to become very useful as one of the tools available. The combination of better assessment methods is likely to continue this movement towards a new generation of integrated sustainability performance reports.

VI. Acknowledgments

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Conflict of Interest Statement

The two authors certify that they have *NO* affiliations with or involvement in any organization or entity with any financial interest, or non-financial interest in the subject matter or materials discussed in this manuscript.

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- The "FARSS" is a dignified title which is accorded to a person's name viz. Dr. John E. Hall, Ph.D., FARSS or William Walldroff, M.S., FARSS.

FARSS accrediting is an honor. It authenticates your research activities. After recognition as FARSB, you can add 'FARSS' title with your name as you use this recognition as additional suffix to your status. This will definitely enhance and add more value and repute to your name. You may use it on your professional Counseling Materials such as CV, Resume, and Visiting Card etc.

The following benefits can be availed by you only for next three years from the date of certification:

FARSS designated members are entitled to avail a 40% discount while publishing their research papers (of a single author) with Global Journals Incorporation (USA), if the same is accepted by Editorial Board/Peer Reviewers. If you are a main author or co-author in case of multiple authors, you will be entitled to avail discount of 10%.

Once FARSB title is accorded, the Fellow is authorized to organize a symposium/seminar/conference on behalf of Global Journal Incorporation (USA). The Fellow can also participate in conference/seminar/symposium organized by another institution as representative of Global Journal. In both the cases, it is mandatory for him to discuss with us and obtain our consent.

You may join as member of the Editorial Board of Global Journals Incorporation (USA) after successful completion of three years as Fellow and as Peer Reviewer. In addition, it is also desirable that you should organize seminar/symposium/conference at least once.

We shall provide you intimation regarding launching of e-version of journal of your stream time to time.This may be utilized in your library for the enrichment of knowledge of your students as well as it can also be helpful for the concerned faculty members.

The FARSS can go through standards of OARS. You can also play vital role if you have any suggestions so that proper amendment can take place to improve the same for the benefit of entire research community.

As FARSS, you will be given a renowned, secure and free professional email address with 100 GB of space e.g. johnhall@globaljournals.org. This will include Webmail, Spam Assassin, Email Forwarders,Auto-Responders, Email Delivery Route tracing, etc.

The FARSS will be eligible for a free application of standardization of their researches. Standardization of research will be subject to acceptability within stipulated norms as the next step after publishing in a journal. We shall depute a team of specialized research professionals who will render their services for elevating your researches to next higher level, which is worldwide open standardization.

The FARSS member can apply for grading and certification of standards of their educational and Institutional Degrees to Open Association of Research, Society U.S.A.
Once you are designated as FARSS, you may send us a scanned copy of all of your credentials. OARS will verify, grade and certify them. This will be based on your academic records, quality of research papers published by you, and some more criteria. After certification of all your credentials by OARS, they will be published on your Fellow Profile link on website https://associationofresearch.org which will be helpful to upgrade the dignity.

The FARSS members can avail the benefits of free research podcasting in Global Research Radio with their research documents. After publishing the work, (including published elsewhere worldwide with proper authorization) you can upload your research paper with your recorded voice or you can utilize chargeable services of our professional RJs to record your paper in their voice on request.

The FARSS member also entitled to get the benefits of free research podcasting of their research documents through video clips. We can also streamline your conference videos and display your slides/ online slides and online research video clips at reasonable charges, on request.

The FARSS is eligible to earn from sales proceeds of his/her researches/reference/review Books or literature, while publishing with Global Journals. The FARSS can decide whether he/she would like to publish his/her research in a closed manner. In this case, whenever readers purchase that individual research paper for reading, maximum 60% of its profit earned as royalty by Global Journals, will be credited to his/her bank account. The entire entitled amount will be credited to his/her bank account exceeding limit of minimum fixed balance. There is no minimum time limit for collection. The FARSS member can decide its price and we can help in making the right decision.

The FARSS member is eligible to join as a paid peer reviewer at Global Journals Incorporation (USA) and can get remuneration of 15% of author fees, taken from the author of a respective paper. After reviewing 5 or more papers you can request to transfer the amount to your bank account.

MEMBER OF ASSOCIATION OF RESEARCH SOCIETY IN SCIENCE (MARSS)

The ' MARSS ' title is accorded to a selected professional after the approval of the Editor-in-Chief / Editorial Board Members/Dean.

The "MARSS" is a dignified ornament which is accorded to a person's name viz. Dr. John E. Hall, Ph.D., MARSS or William Walldroff, M.S., MARSS.

MARSS accrediting is an honor. It authenticates your research activities. After becoming MARSS, you can add 'MARSS' title with your name as you use this recognition as additional suffix to your status. This will definitely enhance and add more value and repute to your name. You may use it on your professional Counseling Materials such as CV, Resume, Visiting Card and Name Plate etc.

The following benefitscan be availed by you only for next three years from the date of certification.

MARSS designated members are entitled to avail a 25% discount while publishing their research papers (of a single author) in Global Journals Inc., if the same is accepted by our Editorial Board and Peer Reviewers. If you are a main author or co-author of a group of authors, you will get discount of 10%.

As MARSS, you will be given a renowned, secure and free professional email address with 30 GB of space e.g. johnhall@globaljournals.org. This will include Webmail, Spam Assassin, Email Forwarders,Auto-Responders, Email Delivery Route tracing, etc.

We shall provide you intimation regarding launching of e-version of journal of your stream time to time.This may be utilized in your library for the enrichment of knowledge of your students as well as it can also be helpful for the concerned faculty members.

The MARSS member can apply for approval, grading and certification of standards of their educational and Institutional Degrees to Open Association of Research, Society U.S.A.

Once you are designated as MARSS, you may send us a scanned copy of all of your credentials. OARS will verify, grade and certify them. This will be based on your academic records, quality of research papers published by you, and some more criteria.

It is mandatory to read all terms and conditions carefully.

AUXILIARY MEMBERSHIPS

Institutional Fellow of Global Journals Incorporation (USA)-OARS (USA)

Global Journals Incorporation (USA) is accredited by Open Association of Research Society, U.S.A (OARS) and in turn, affiliates research institutions as "Institutional Fellow of Open Association of Research Society" (IFOARS).

The "FARSC" is a dignified title which is accorded to a person's name viz. Dr. John E. Hall, Ph.D., FARSC or William Walldroff, M.S., FARSC.

The IFOARS institution is entitled to form a Board comprised of one Chairperson and three to five board members preferably from different streams. The Board will be recognized as "Institutional Board of Open Association of Research Society"-(IBOARS).

The Institute will be entitled to following benefits:

The IBOARS can initially review research papers of their institute and recommend them to publish with respective journal of Global Journals. It can also review the papers of other institutions after obtaining our consent. The second review will be done by peer reviewer of Global Journals Incorporation (USA) The Board is at liberty to appoint a peer reviewer with the approval of chairperson after consulting us.

The author fees of such paper may be waived off up to 40%.

The Global Journals Incorporation (USA) at its discretion can also refer double blind peer reviewed paper at their end to the board for the verification and to get recommendation for final stage of acceptance of publication.

The IBOARS can organize symposium/seminar/conference in their country on behalf of Global Journals Incorporation (USA)-OARS (USA). The terms and conditions can be discussed separately.

The Board can also play vital role by exploring and giving valuable suggestions regarding the Standards of "Open Association of Research Society, U.S.A (OARS)" so that proper amendment can take place for the benefit of entire research community. We shall provide details of particular standard only on receipt of request from the Board.

The board members can also join us as Individual Fellow with 40% discount on total fees applicable to Individual Fellow. They will be entitled to avail all the benefits as declared. Please visit Individual Fellow-sub menu of GlobalJournals.org to have more relevant details.

We shall provide you intimation regarding launching of e-version of journal of your stream time to time. This may be utilized in your library for the enrichment of knowledge of your students as well as it can also be helpful for the concerned faculty members.

After nomination of your institution as "Institutional Fellow" and constantly functioning successfully for one year, we can consider giving recognition to your institute to function as Regional/Zonal office on our behalf.
The board can also take up the additional allied activities for betterment after our consultation.

The following entitlements are applicable to individual Fellows:

Open Association of Research Society, U.S.A (OARS) By-laws states that an individual Fellow may use the designations as applicable, or the corresponding initials. The Credentials of individual Fellow and Associate designations signify that the individual has gained knowledge of the fundamental concepts. One is magnanimous and proficient in an expertise course covering the professional code of conduct, and follows recognized standards of practice.

Open Association of Research Society (US)/ Global Journals Incorporation (USA), as described in Corporate Statements, are educational, research publishing and professional membership organizations. Achieving our individual Fellow or Associate status is based mainly on meeting stated educational research requirements.

Disbursement of 40% Royalty earned through Global Journals : Researcher = 50%, Peer Reviewer = 37.50%, Institution = 12.50% E.g. Out of 40%, the 20% benefit should be passed on to researcher, 15 % benefit towards remuneration should be given to a reviewer and remaining 5% is to be retained by the institution.

We shall provide print version of 12 issues of any three journals [as per your requirement] out of our 38 journals worth $ 2376 USD.

Other:

The individual Fellow and Associate designations accredited by Open Association of Research Society (US) credentials signify guarantees following achievements:

- The professional accredited with Fellow honor, is entitled to various benefits viz. name, fame, honor, regular flow of income, secured bright future, social status etc.

- In addition to above, if one is single author, then entitled to 40% discount on publishing research paper and can get 10%discount if one is co-author or main author among group of authors.
- The Fellow can organize symposium/seminar/conference on behalf of Global Journals Incorporation (USA) and he/she can also attend the same organized by other institutes on behalf of Global Journals.
- The Fellow can become member of Editorial Board Member after completing 3yrs.
- The Fellow can earn 60% of sales proceeds from the sale of reference/review books/literature/publishing of research paper.
- Fellow can also join as paid peer reviewer and earn 15% remuneration of author charges and can also get an opportunity to join as member of the Editorial Board of Global Journals Incorporation (USA)
- • This individual has learned the basic methods of applying those concepts and techniques to common challenging situations. This individual has further demonstrated an in–depth understanding of the application of suitable techniques to a particular area of research practice.

Note :

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- In future, if the board feels the necessity to change any board member, the same can be done with the consent of the chairperson along with anyone board member without our approval.
- In case, the chairperson needs to be replaced then consent of 2/3rd board members are required and they are also required to jointly pass the resolution copy of which should be sent to us. In such case, it will be compulsory to obtain our approval before replacement.
- In case of "Difference of Opinion [if any]" among the Board members, our decision will be final and binding to everyone.

"

Process of submission of Research Paper

The Area or field of specialization may or may not be of any category as mentioned in 'Scope of Journal' menu of the GlobalJournals.org website. There are 37 Research Journal categorized with Six parental Journals GJCST, GJMR, GJRE, GJMBR, GJSFR, GJHSS. For Authors should prefer the mentioned categories. There are three widely used systems UDC, DDC and LCC. The details are available as 'Knowledge Abstract' at Home page. The major advantage of this coding is that, the research work will be exposed to and shared with all over the world as we are being abstracted and indexed worldwide.

The paper should be in proper format. The format can be downloaded from first page of 'Author Guideline' Menu. The Author is expected to follow the general rules as mentioned in this menu. The paper should be written in MS-Word Format (*.DOC,*.DOCX).

The Author can submit the paper either online or offline. The authors should prefer online submission.Online Submission: There are three ways to submit your paper:

(A) (I) First, register yourself using top right corner of Home page then Login. If you are already registered, then login using your username and password.

(II) Choose corresponding Journal.

(III) Click 'Submit Manuscript'. Fill required information and Upload the paper.

(B) If you are using Internet Explorer, then Direct Submission through Homepage is also available.

(C) If these two are not conveninet , and then email the paper directly to dean@globaljournals.org.

Offline Submission: Author can send the typed form of paper by Post. However, online submission should be preferred.

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MANUSCRIPT STYLE INSTRUCTION (Must be strictly followed)

Page Size: 8.27" X 11'"

- Left Margin: 0.65
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- Top Margin: 0.75
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- Font type of all text should be Swis 721 Lt BT.
- Paper Title should be of Font Size 24 with one Column section.
- Author Name in Font Size of 11 with one column as of Title.
- Abstract Font size of 9 Bold, "Abstract" word in Italic Bold.
- Main Text: Font size 10 with justified two columns section
- Two Column with Equal Column with of 3.38 and Gaping of .2
- First Character must be three lines Drop capped.
- Paragraph before Spacing of 1 pt and After of 0 pt.
- Line Spacing of 1 pt
- Large Images must be in One Column
- Numbering of First Main Headings (Heading 1) must be in Roman Letters, Capital Letter, and Font Size of 10.
- Numbering of Second Main Headings (Heading 2) must be in Alphabets, Italic, and Font Size of 10.

You can use your own standard format also.
Author Guidelines:

1. General,

2. Ethical Guidelines,

3. Submission of Manuscripts,

4. Manuscript's Category,

5. Structure and Format of Manuscript,

6. After Acceptance.

1. GENERAL

Before submitting your research paper, one is advised to go through the details as mentioned in following heads. It will be beneficial, while peer reviewer justify your paper for publication.

Scope

The Global Journals Inc. (US) welcome the submission of original paper, review paper, survey article relevant to the all the streams of Philosophy and knowledge. The Global Journals Inc. (US) is parental platform for Global Journal of Computer Science and Technology, Researches in Engineering, Medical Research, Science Frontier Research, Human Social Science, Management, and Business organization. The choice of specific field can be done otherwise as following in Abstracting and Indexing Page on this Website. As the all Global

Journals Inc. (US) are being abstracted and indexed (in process) by most of the reputed organizations. Topics of only narrow interest will not be accepted unless they have wider potential or consequences.

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Authors should follow the ethical guidelines as mentioned below for publication of research paper and research activities.

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Authorship: The authors and coauthors should have active contribution to conception design, analysis and interpretation of findings. They should critically review the contents and drafting of the paper. All should approve the final version of the paper before submission

The Global Journals Inc. (US) follows the definition of authorship set up by the Global Academy of Research and Development. According to the Global Academy of R&D authorship, criteria must be based on:

1) Substantial contributions to conception and acquisition of data, analysis and interpretation of the findings.

2) Drafting the paper and revising it critically regarding important academic content.

3) Final approval of the version of the paper to be published.

All authors should have been credited according to their appropriate contribution in research activity and preparing paper. Contributors who do not match the criteria as authors may be mentioned under Acknowledgement.

Acknowledgements: Contributors to the research other than authors credited should be mentioned under acknowledgement. The specifications of the source of funding for the research if appropriate can be included. Suppliers of resources may be mentioned along with address.

Appeal of Decision: The Editorial Board's decision on publication of the paper is final and cannot be appealed elsewhere.

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3. SUBMISSION OF MANUSCRIPTS

Manuscripts should be uploaded via this online submission page. The online submission is most efficient method for submission of papers, as it enables rapid distribution of manuscripts and consequently speeds up the review procedure. It also enables authors to know the status of their own manuscripts by emailing us. Complete instructions for submitting a paper is available below.

Manuscript submission is a systematic procedure and little preparation is required beyond having all parts of your manuscript in a given format and a computer with an Internet connection and a Web browser. Full help and instructions are provided on-screen. As an author, you will be prompted for login and manuscript details as Field of Paper and then to upload your manuscript file(s) according to the instructions.

To avoid postal delays, all transaction is preferred by e-mail. A finished manuscript submission is confirmed by e-mail immediately and your paper enters the editorial process with no postal delays. When a conclusion is made about the publication of your paper by our Editorial Board, revisions can be submitted online with the same procedure, with an occasion to view and respond to all comments.

Complete support for both authors and co-author is provided.

4. MANUSCRIPT'S CATEGORY

Based on potential and nature, the manuscript can be categorized under the following heads:

Original research paper: Such papers are reports of high-level significant original research work.

Review papers: These are concise, significant but helpful and decisive topics for young researchers.

Research articles: These are handled with small investigation and applications

Research letters: The letters are small and concise comments on previously published matters.

5.STRUCTURE AND FORMAT OF MANUSCRIPT

The recommended size of original research paper is less than seven thousand words, review papers fewer than seven thousands words also.Preparation of research paper or how to write research paper, are major hurdle, while writing manuscript. The research articles and research letters should be fewer than three thousand words, the structure original research paper; sometime review paper should be as follows:

Papers: These are reports of significant research (typically less than 7000 words equivalent, including tables, figures, references), and comprise:

(a)Title should be relevant and commensurate with the theme of the paper.

(b) A brief Summary, "Abstract" (less than 150 words) containing the major results and conclusions.

(c) Up to ten keywords, that precisely identifies the paper's subject, purpose, and focus.

(d) An Introduction, giving necessary background excluding subheadings; objectives must be clearly declared.

(e) Resources and techniques with sufficient complete experimental details (wherever possible by reference) to permit repetition; sources of information must be given and numerical methods must be specified by reference, unless non-standard.

(f) Results should be presented concisely, by well-designed tables and/or figures; the same data may not be used in both; suitable statistical data should be given. All data must be obtained with attention to numerical detail in the planning stage. As reproduced design has been recognized to be important to experiments for a considerable time, the Editor has decided that any paper that appears not to have adequate numerical treatments of the data will be returned un-refereed;

(g) Discussion should cover the implications and consequences, not just recapitulating the results; conclusions should be summarizing.

(h) Brief Acknowledgements.

(i) References in the proper form.

Authors should very cautiously consider the preparation of papers to ensure that they communicate efficiently. Papers are much more likely to be accepted, if they are cautiously designed and laid out, contain few or no errors, are summarizing, and be conventional to the approach and instructions. They will in addition, be published with much less delays than those that require much technical and editorial correction.

The Editorial Board reserves the right to make literary corrections and to make suggestions to improve briefness.

It is vital, that authors take care in submitting a manuscript that is written in simple language and adheres to published guidelines.

Format

Language: The language of publication is UK English. Authors, for whom English is a second language, must have their manuscript efficiently edited by an English-speaking person before submission to make sure that, the English is of high excellence. It is preferable, that manuscripts should be professionally edited.

Standard Usage, Abbreviations, and Units: Spelling and hyphenation should be conventional to The Concise Oxford English Dictionary. Statistics and measurements should at all times be given in figures, e.g. 16 min, except for when the number begins a sentence. When the number does not refer to a unit of measurement it should be spelt in full unless, it is 160 or greater.

Abbreviations supposed to be used carefully. The abbreviated name or expression is supposed to be cited in full at first usage, followed by the conventional abbreviation in parentheses.

Metric SI units are supposed to generally be used excluding where they conflict with current practice or are confusing. For illustration, 1.4 l rather than 1.4 × 10-3 m3, or 4 mm somewhat than 4 × 10-3 m. Chemical formula and solutions must identify the form used, e.g. anhydrous or hydrated, and the concentration must be in clearly defined units. Common species names should be followed by underlines at the first mention. For following use the generic name should be constricted to a single letter, if it is clear.

Structure

All manuscripts submitted to Global Journals Inc. (US), ought to include:

Title: The title page must carry an instructive title that reflects the content, a running title (less than 45 characters together with spaces), names of the authors and co-authors, and the place(s) wherever the work was carried out. The full postal address in addition with the e-mail address of related author must be given. Up to eleven keywords or very brief phrases have to be given to help data retrieval, mining and indexing.

Abstract, used in Original Papers and Reviews:

Optimizing Abstract for Search Engines

Many researchers searching for information online will use search engines such as Google, Yahoo or similar. By optimizing your paper for search engines, you will amplify the chance of someone finding it. This in turn will make it more likely to be viewed and/or cited in a further work. Global Journals Inc. (US) have compiled these guidelines to facilitate you to maximize the web-friendliness of the most public part of your paper.

Key Words

A major linchpin in research work for the writing research paper is the keyword search, which one will employ to find both library and Internet resources.

One must be persistent and creative in using keywords. An effective keyword search requires a strategy and planning a list of possible keywords and phrases to try.

Search engines for most searches, use Boolean searching, which is somewhat different from Internet searches. The Boolean search uses "operators," words (and, or, not, and near) that enable you to expand or narrow your affords. Tips for research paper while preparing research paper are very helpful guideline of research paper.

Choice of key words is first tool of tips to write research paper. Research paper writing is an art.A few tips for deciding as strategically as possible about keyword search:

- One should start brainstorming lists of possible keywords before even begin searching. Think about the most important concepts related to research work. Ask, "What words would a source have to include to be truly valuable in research paper?" Then consider synonyms for the important words.
- It may take the discovery of only one relevant paper to let steer in the right keyword direction because in most databases, the keywords under which a research paper is abstracted are listed with the paper.
- One should avoid outdated words.

Keywords are the key that opens a door to research work sources. Keyword searching is an art in which researcher's skills are bound to improve with experience and time.

Numerical Methods: Numerical methods used should be clear and, where appropriate, supported by references.

Acknowledgements: Please make these as concise as possible.

References

References follow the Harvard scheme of referencing. References in the text should cite the authors' names followed by the time of their publication, unless there are three or more authors when simply the first author's name is quoted followed by et al. unpublished work has to only be cited where necessary, and only in the text. Copies of references in press in other journals have to be supplied with submitted typescripts. It is necessary that all citations and references be carefully checked before submission, as mistakes or omissions will cause delays.

References to information on the World Wide Web can be given, but only if the information is available without charge to readers on an official site. Wikipedia and Similar websites are not allowed where anyone can change the information. Authors will be asked to make available electronic copies of the cited information for inclusion on the Global Journals Inc. (US) homepage at the judgment of the Editorial Board.

The Editorial Board and Global Journals Inc. (US) recommend that, citation of online-published papers and other material should be done via a DOI (digital object identifier). If an author cites anything, which does not have a DOI, they run the risk of the cited material not being noticeable.

The Editorial Board and Global Journals Inc. (US) recommend the use of a tool such as Reference Manager for reference management and formatting.

Tables, Figures and Figure Legends

Tables: Tables should be few in number, cautiously designed, uncrowned, and include only essential data. Each must have an Arabic number, e.g. Table 4, a self-explanatory caption and be on a separate sheet. Vertical lines should not be used.

Figures: Figures are supposed to be submitted as separate files. Always take in a citation in the text for each figure using Arabic numbers, e.g. Fig. 4. Artwork must be submitted online in electronic form by e-mailing them.

Preparation of Electronic Figures for Publication

Even though low quality images are sufficient for review purposes, print publication requires high quality images to prevent the final product being blurred or fuzzy. Submit (or e-mail) EPS (line art) or TIFF (halftone/photographs) files only. MS PowerPoint and Word Graphics are unsuitable for printed pictures. Do not use pixel-oriented software. Scans (TIFF only) should have a resolution of at least 350 dpi (halftone) or 700 to 1100 dpi (line drawings) in relation to the imitation size. Please give the data for figures in black and white or submit a Color Work Agreement Form. EPS files must be saved with fonts embedded (and with a TIFF preview, if possible).

For scanned images, the scanning resolution (at final image size) ought to be as follows to ensure good reproduction: line art: >650 dpi; halftones (including gel photographs) : >350 dpi; figures containing both halftone and line images: >650 dpi.

Color Charges: It is the rule of the Global Journals Inc. (US) for authors to pay the full cost for the reproduction of their color artwork. Hence, please note that, if there is color artwork in your manuscript when it is accepted for publication, we would require you to complete and return a color work agreement form before your paper can be published.

Figure Legends: Self-explanatory legends of all figures should be incorporated separately under the heading 'Legends to Figures'. In the full-text online edition of the journal, figure legends may possibly be truncated in abbreviated links to the full screen version. Therefore, the first 100 characters of any legend should notify the reader, about the key aspects of the figure.

6. AFTER ACCEPTANCE

Upon approval of a paper for publication, the manuscript will be forwarded to the dean, who is responsible for the publication of the Global Journals Inc. (US).

6.1 Proof Corrections

The corresponding author will receive an e-mail alert containing a link to a website or will be attached. A working e-mail address must therefore be provided for the related author.

Acrobat Reader will be required in order to read this file. This software can be downloaded

(Free of charge) from the following website:

www.adobe.com/products/acrobat/readstep2.html. This will facilitate the file to be opened, read on screen, and printed out in order for any corrections to be added. Further instructions will be sent with the proof.

Proofs must be returned to the dean at dean@globaljournals.org within three days of receipt.

As changes to proofs are costly, we inquire that you only correct typesetting errors. All illustrations are retained by the publisher. Please note that the authors are responsible for all statements made in their work, including changes made by the copy editor.

6.2 Early View of Global Journals Inc. (US) (Publication Prior to Print)

The Global Journals Inc. (US) are enclosed by our publishing's Early View service. Early View articles are complete full-text articles sent in advance of their publication. Early View articles are absolute and final. They have been completely reviewed, revised and edited for publication, and the authors' final corrections have been incorporated. Because they are in final form, no changes can be made after sending them. The nature of Early View articles means that they do not yet have volume, issue or page numbers, so Early View articles cannot be cited in the conventional way.

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6.4 Author Material Archive Policy

Please note that if not specifically requested, publisher will dispose off hardcopy & electronic information submitted, after the two months of publication. If you require the return of any information submitted, please inform the Editorial Board or dean as soon as possible.

6.5 Offprint and Extra Copies

A PDF offprint of the online-published article will be provided free of charge to the related author, and may be distributed according to the Publisher's terms and conditions. Additional paper offprint may be ordered by emailing us at: editor@globaljournals.org .

Before start writing a good quality Computer Science Research Paper, let us first understand what is Computer Science Research Paper? So, Computer Science Research Paper is the paper which is written by professionals or scientists who are associated to Computer Science and Information Technology, or doing research study in these areas. If you are novel to this field then you can consult about this field from your supervisor or guide.

TECHNIQUES FOR WRITING A GOOD QUALITY RESEARCH PAPER:

1. Choosing the topic: In most cases, the topic is searched by the interest of author but it can be also suggested by the guides. You can have several topics and then you can judge that in which topic or subject you are finding yourself most comfortable. This can be done by asking several questions to yourself, like Will I be able to carry our search in this area? Will I find all necessary recourses to accomplish the search? Will I be able to find all information in this field area? If the answer of these types of questions will be "Yes" then you can choose that topic. In most of the cases, you may have to conduct the surveys and have to visit several places because this field is related to Computer Science and Information Technology. Also, you may have to do a lot of work to find all rise and falls regarding the various data of that subject. Sometimes, detailed information plays a vital role, instead of short information.

2. Evaluators are human: First thing to remember that evaluators are also human being. They are not only meant for rejecting a paper. They are here to evaluate your paper. So, present your Best.

3. Think Like Evaluators: If you are in a confusion or getting demotivated that your paper will be accepted by evaluators or not, then think and try to evaluate your paper like an Evaluator. Try to understand that what an evaluator wants in your research paper and automatically you will have your answer.

4. Make blueprints of paper: The outline is the plan or framework that will help you to arrange your thoughts. It will make your paper logical. But remember that all points of your outline must be related to the topic you have chosen.

5. Ask your Guides: If you are having any difficulty in your research, then do not hesitate to share your difficulty to your guide (if you have any). They will surely help you out and resolve your doubts. If you can't clarify what exactly you require for your work then ask the supervisor to help you with the alternative. He might also provide you the list of essential readings.

6. Use of computer is recommended: As you are doing research in the field of Computer Science, then this point is quite obvious.

7. Use right software: Always use good quality software packages. If you are not capable to judge good software then you can lose quality of your paper unknowingly. There are various software programs available to help you, which you can get through Internet.

8. Use the Internet for help: An excellent start for your paper can be by using the Google. It is an excellent search engine, where you can have your doubts resolved. You may also read some answers for the frequent question how to write my research paper or find model research paper. From the internet library you can download books. If you have all required books make important reading selecting and analyzing the specified information. Then put together research paper sketch out.

9. Use and get big pictures: Always use encyclopedias, Wikipedia to get pictures so that you can go into the depth.

10. Bookmarks are useful: When you read any book or magazine, you generally use bookmarks, right! It is a good habit, which helps to not to lose your continuity. You should always use bookmarks while searching on Internet also, which will make your search easier.

11. Revise what you wrote: When you write anything, always read it, summarize it and then finalize it.

12. Make all efforts: Make all efforts to mention what you are going to write in your paper. That means always have a good start. Try to mention everything in introduction, that what is the need of a particular research paper. Polish your work by good skill of writing and always give an evaluator, what he wants.

13. Have backups: When you are going to do any important thing like making research paper, you should always have backup copies of it either in your computer or in paper. This will help you to not to lose any of your important.

14. Produce good diagrams of your own: Always try to include good charts or diagrams in your paper to improve quality. Using several and unnecessary diagrams will degrade the quality of your paper by creating "hotchpotch." So always, try to make and include those diagrams, which are made by your own to improve readability and understandability of your paper.

15. Use of direct quotes: When you do research relevant to literature, history or current affairs then use of quotes become essential but if study is relevant to science then use of quotes is not preferable.

16. Use proper verb tense: Use proper verb tenses in your paper. Use past tense, to present those events that happened. Use present tense to indicate events that are going on. Use future tense to indicate future happening events. Use of improper and wrong tenses will confuse the evaluator. Avoid the sentences that are incomplete.

17. Never use online paper: If you are getting any paper on Internet, then never use it as your research paper because it might be possible that evaluator has already seen it or maybe it is outdated version.

18. Pick a good study spot: To do your research studies always try to pick a spot, which is quiet. Every spot is not for studies. Spot that suits you choose it and proceed further.

19. Know what you know: Always try to know, what you know by making objectives. Else, you will be confused and cannot achieve your target.

20. Use good quality grammar: Always use a good quality grammar and use words that will throw positive impact on evaluator. Use of good quality grammar does not mean to use tough words, that for each word the evaluator has to go through dictionary. Do not start sentence with a conjunction. Do not fragment sentences. Eliminate one-word sentences. Ignore passive voice. Do not ever use a big word when a diminutive one would suffice. Verbs have to be in agreement with their subjects. Prepositions are not expressions to finish sentences with. It is incorrect to ever divide an infinitive. Avoid clichés like the disease. Also, always shun irritating alliteration. Use language that is simple and straight forward. put together a neat summary.

21. Arrangement of information: Each section of the main body should start with an opening sentence and there should be a changeover at the end of the section. Give only valid and powerful arguments to your topic. You may also maintain your arguments with records.

22. Never start in last minute: Always start at right time and give enough time to research work. Leaving everything to the last minute will degrade your paper and spoil your work.

23. Multitasking in research is not good: Doing several things at the same time proves bad habit in case of research activity. Research is an area, where everything has a particular time slot. Divide your research work in parts and do particular part in particular time slot.

24. Never copy others' work: Never copy others' work and give it your name because if evaluator has seen it anywhere you will be in trouble.

25. Take proper rest and food: No matter how many hours you spend for your research activity, if you are not taking care of your health then all your efforts will be in vain. For a quality research, study is must, and this can be done by taking proper rest and food.

26. Go for seminars: Attend seminars if the topic is relevant to your research area. Utilize all your resources.

27. Refresh your mind after intervals: Try to give rest to your mind by listening to soft music or by sleeping in intervals. This will also improve your memory.

28. Make colleagues: Always try to make colleagues. No matter how sharper or intelligent you are, if you make colleagues you can have several ideas, which will be helpful for your research.

29. Think technically: Always think technically. If anything happens, then search its reasons, its benefits, and demerits.

30. Think and then print: When you will go to print your paper, notice that tables are not be split, headings are not detached from their descriptions, and page sequence is maintained.

31. Adding unnecessary information: Do not add unnecessary information, like, I have used MS Excel to draw graph. Do not add irrelevant and inappropriate material. These all will create superfluous. Foreign terminology and phrases are not apropos. One should NEVER take a broad view. Analogy in script is like feathers on a snake. Not at all use a large word when a very small one would be sufficient. Use words properly, regardless of how others use them. Remove quotations. Puns are for kids, not grunt readers. Amplification is a billion times of inferior quality than sarcasm.

32. Never oversimplify everything: To add material in your research paper, never go for oversimplification. This will definitely irritate the evaluator. Be more or less specific. Also too, by no means, ever use rhythmic redundancies. Contractions aren't essential and shouldn't be there used. Comparisons are as terrible as clichés. Give up ampersands and abbreviations, and so on. Remove commas, that are, not necessary. Parenthetical words however should be together with this in commas. Understatement is all the time the complete best way to put onward earth-shaking thoughts. Give a detailed literary review.

33. Report concluded results: Use concluded results. From raw data, filter the results and then conclude your studies based on measurements and observations taken. Significant figures and appropriate number of decimal places should be used. Parenthetical remarks are prohibitive. Proofread carefully at final stage. In the end give outline to your arguments. Spot out perspectives of further study of this subject. Justify your conclusion by at the bottom of them with sufficient justifications and examples.

34. After conclusion: Once you have concluded your research, the next most important step is to present your findings. Presentation is extremely important as it is the definite medium though which your research is going to be in print to the rest of the crowd. Care should be taken to categorize your thoughts well and present them in a logical and neat manner. A good quality research paper format is essential because it serves to highlight your research paper and bring to light all necessary aspects in your research.

Informal Guidelines of Research Paper Writing

Key points to remember:

- Submit all work in its final form.
- Write your paper in the form, which is presented in the guidelines using the template.
- Please note the criterion for grading the final paper by peer-reviewers.

Final Points:

A purpose of organizing a research paper is to let people to interpret your effort selectively. The journal requires the following sections, submitted in the order listed, each section to start on a new page.

The introduction will be compiled from reference matter and will reflect the design processes or outline of basis that direct you to make study. As you will carry out the process of study, the method and process section will be constructed as like that. The result segment will show related statistics in nearly sequential order and will direct the reviewers next to the similar intellectual paths throughout the data that you took to carry out your study. The discussion section will provide understanding of the data and projections as to the implication of the results. The use of good quality references all through the paper will give the effort trustworthiness by representing an alertness of prior workings.

Writing a research paper is not an easy job no matter how trouble-free the actual research or concept. Practice, excellent preparation, and controlled record keeping are the only means to make straightforward the progression.

General style:

Specific editorial column necessities for compliance of a manuscript will always take over from directions in these general guidelines.

To make a paper clear

· Adhere to recommended page limits

Mistakes to evade

- Insertion a title at the foot of a page with the subsequent text on the next page
- Separating a table/chart or figure - impound each figure/table to a single page
- Submitting a manuscript with pages out of sequence

In every sections of your document

· Use standard writing style including articles ("a", "the," etc.)

· Keep on paying attention on the research topic of the paper

· Use paragraphs to split each significant point (excluding for the abstract)

· Align the primary line of each section

· Present your points in sound order

· Use present tense to report well accepted

· Use past tense to describe specific results

· Shun familiar wording, don't address the reviewer directly, and don't use slang, slang language, or superlatives

· Shun use of extra pictures - include only those figures essential to presenting results

Title Page:

Choose a revealing title. It should be short. It should not have non-standard acronyms or abbreviations. It should not exceed two printed lines. It should include the name(s) and address (es) of all authors.

Abstract:

The summary should be two hundred words or less. It should briefly and clearly explain the key findings reported in the manuscript--must have precise statistics. It should not have abnormal acronyms or abbreviations. It should be logical in itself. Shun citing references at this point.

An abstract is a brief distinct paragraph summary of finished work or work in development. In a minute or less a reviewer can be taught the foundation behind the study, common approach to the problem, relevant results, and significant conclusions or new questions.

Write your summary when your paper is completed because how can you write the summary of anything which is not yet written? Wealth of terminology is very essential in abstract. Yet, use comprehensive sentences and do not let go readability for briefness. You can maintain it succinct by phrasing sentences so that they provide more than lone rationale. The author can at this moment go straight to shortening the outcome. Sum up the study, with the subsequent elements in any summary. Try to maintain the initial two items to no more than one ruling each.

- Reason of the study - theory, overall issue, purpose
- Fundamental goal
- To the point depiction of the research
- Consequences, including definite statistics - if the consequences are quantitative in nature, account quantitative data; results of any numerical analysis should be reported
- Significant conclusions or questions that track from the research(es)

Approach:

- Single section, and succinct
- As a outline of job done, it is always written in past tense
- A conceptual should situate on its own, and not submit to any other part of the paper such as a form or table
- Center on shortening results - bound background information to a verdict or two, if completely necessary
- What you account in an conceptual must be regular with what you reported in the manuscript
- Exact spelling, clearness of sentences and phrases, and appropriate reporting of quantities (proper units, important statistics) are just as significant in an abstract as they are anywhere else

Introduction:

The **Introduction** should "introduce" the manuscript. The reviewer should be presented with sufficient background information to be capable to comprehend and calculate the purpose of your study without having to submit to other works. The basis for the study should be offered. Give most important references but shun difficult to make a comprehensive appraisal of the topic. In the introduction, describe the problem visibly. If the problem is not acknowledged in a logical, reasonable way, the reviewer will have no attention in your result. Speak in common terms about techniques used to explain the problem, if needed, but do not present any particulars about the protocols here. Following approach can create a valuable beginning:

- Explain the value (significance) of the study
- Shield the model - why did you employ this particular system or method? What is its compensation? You strength remark on its appropriateness from a abstract point of vision as well as point out sensible reasons for using it.
- Present a justification. Status your particular theory (es) or aim(s), and describe the logic that led you to choose them.
- Very for a short time explain the tentative propose and how it skilled the declared objectives.

Approach:

- Use past tense except for when referring to recognized facts. After all, the manuscript will be submitted after the entire job is done.
- Sort out your thoughts; manufacture one key point with every section. If you make the four points listed above, you will need a least of four paragraphs.

- Present surroundings information only as desirable in order hold up a situation. The reviewer does not desire to read the whole thing you know about a topic.
- Shape the theory/purpose specifically - do not take a broad view.
- As always, give awareness to spelling, simplicity and correctness of sentences and phrases.

Procedures (Methods and Materials):

This part is supposed to be the easiest to carve if you have good skills. A sound written Procedures segment allows a capable scientist to replacement your results. Present precise information about your supplies. The suppliers and clarity of reagents can be helpful bits of information. Present methods in sequential order but linked methodologies can be grouped as a segment. Be concise when relating the protocols. Attempt for the least amount of information that would permit another capable scientist to spare your outcome but be cautious that vital information is integrated. The use of subheadings is suggested and ought to be synchronized with the results section. When a technique is used that has been well described in another object, mention the specific item describing a way but draw the basic principle while stating the situation. The purpose is to text all particular resources and broad procedures, so that another person may use some or all of the methods in one more study or referee the scientific value of your work. It is not to be a step by step report of the whole thing you did, nor is a methods section a set of orders.

Materials:

- Explain materials individually only if the study is so complex that it saves liberty this way.
- Embrace particular materials, and any tools or provisions that are not frequently found in laboratories.
- Do not take in frequently found.
- If use of a definite type of tools.
- Materials may be reported in a part section or else they may be recognized along with your measures.

Methods:

- Report the method (not particulars of each process that engaged the same methodology)
- Describe the method entirely
- To be succinct, present methods under headings dedicated to specific dealings or groups of measures
- Simplify - details how procedures were completed not how they were exclusively performed on a particular day.
- If well known procedures were used, account the procedure by name, possibly with reference, and that's all.

Approach:

- It is embarrassed or not possible to use vigorous voice when documenting methods with no using first person, which would focus the reviewer's interest on the researcher rather than the job. As a result when script up the methods most authors use third person passive voice.
- Use standard style in this and in every other part of the paper - avoid familiar lists, and use full sentences.

What to keep away from

- Resources and methods are not a set of information.
- Skip all descriptive information and surroundings - save it for the argument.
- Leave out information that is immaterial to a third party.

Results:

The principle of a results segment is to present and demonstrate your conclusion. Create this part a entirely objective details of the outcome, and save all understanding for the discussion.

The page length of this segment is set by the sum and types of data to be reported. Carry on to be to the point, by means of statistics and tables, if suitable, to present consequences most efficiently.You must obviously differentiate material that would usually be incorporated in a study editorial from any unprocessed data or additional appendix matter that would not be available. In fact, such matter should not be submitted at all except requested by the instructor.

Content

- Sum up your conclusion in text and demonstrate them, if suitable, with figures and tables.
- In manuscript, explain each of your consequences, point the reader to remarks that are most appropriate.
- Present a background, such as by describing the question that was addressed by creation an exacting study.
- Explain results of control experiments and comprise remarks that are not accessible in a prescribed figure or table, if appropriate.
- Examine your data, then prepare the analyzed (transformed) data in the form of a figure (graph), table, or in manuscript form.

What to stay away from

- Do not discuss or infer your outcome, report surroundings information, or try to explain anything.
- Not at all, take in raw data or intermediate calculations in a research manuscript.
- Do not present the similar data more than once.
- Manuscript should complement any figures or tables, not duplicate the identical information.
- Never confuse figures with tables - there is a difference.

Approach

- As forever, use past tense when you submit to your results, and put the whole thing in a reasonable order.
- Put figures and tables, appropriately numbered, in order at the end of the report
- If you desire, you may place your figures and tables properly within the text of your results part.

Figures and tables

- If you put figures and tables at the end of the details, make certain that they are visibly distinguished from any attach appendix materials, such as raw facts
- Despite of position, each figure must be numbered one after the other and complete with subtitle
- In spite of position, each table must be titled, numbered one after the other and complete with heading
- All figure and table must be adequately complete that it could situate on its own, divide from text

Discussion:

The Discussion is expected the trickiest segment to write and describe. A lot of papers submitted for journal are discarded based on problems with the Discussion. There is no head of state for how long a argument should be. Position your understanding of the outcome visibly to lead the reviewer through your conclusions, and then finish the paper with a summing up of the implication of the study. The purpose here is to offer an understanding of your results and hold up for all of your conclusions, using facts from your research and generally accepted information, if suitable. The implication of result should be visibly described. Infer your data in the conversation in suitable depth. This means that when you clarify an observable fact you must explain mechanisms that may account for the observation. If your results vary from your prospect, make clear why that may have happened. If your results agree, then explain the theory that the proof supported. It is never suitable to just state that the data approved with prospect, and let it drop at that.

- Make a decision if each premise is supported, discarded, or if you cannot make a conclusion with assurance. Do not just dismiss a study or part of a study as "uncertain."
- Research papers are not acknowledged if the work is imperfect. Draw what conclusions you can based upon the results that you have, and take care of the study as a finished work
- You may propose future guidelines, such as how the experiment might be personalized to accomplish a new idea.
- Give details all of your remarks as much as possible, focus on mechanisms.
- Make a decision if the tentative design sufficiently addressed the theory, and whether or not it was correctly restricted.
- Try to present substitute explanations if sensible alternatives be present.
- One research will not counter an overall question, so maintain the large picture in mind, where do you go next? The best studies unlock new avenues of study. What questions remain?
- Recommendations for detailed papers will offer supplementary suggestions.

Approach:

- When you refer to information, differentiate data generated by your own studies from available information
- Submit to work done by specific persons (including you) in past tense.
- Submit to generally acknowledged facts and main beliefs in present tense.

Please carefully note down following rules and regulation before submitting your Research Paper to Global Journals Inc. (US):

Segment Draft and Final Research Paper: You have to strictly follow the template of research paper. If it is not done your paper may get rejected.

- The **major constraint** is that you must independently make all content, tables, graphs, and facts that are offered in the paper. You must write each part of the paper wholly on your own. The Peer-reviewers need to identify your own perceptive of the concepts in your own terms. NEVER extract straight from any foundation, and never rephrase someone else's analysis.

- Do not give permission to anyone else to "PROOFREAD" your manuscript.

- Methods to avoid Plagiarism is applied by us on every paper, if found guilty, you will be blacklisted by all of our collaborated research groups, your institution will be informed for this and strict legal actions will be taken immediately.)
- To guard yourself and others from possible illegal use please do not permit anyone right to use to your paper and files.

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Topics	Grades		
	A-B	**C-D**	**E-F**
Abstract	Clear and concise with appropriate content, Correct format. 200 words or below	Unclear summary and no specific data, Incorrect form Above 200 words	No specific data with ambiguous information Above 250 words
Introduction	Containing all background details with clear goal and appropriate details, flow specification, no grammar and spelling mistake, well organized sentence and paragraph, reference cited	Unclear and confusing data, appropriate format, grammar and spelling errors with unorganized matter	Out of place depth and content, hazy format
Methods and Procedures	Clear and to the point with well arranged paragraph, precision and accuracy of facts and figures, well organized subheads	Difficult to comprehend with embarrassed text, too much explanation but completed	Incorrect and unorganized structure with hazy meaning
Result	Well organized, Clear and specific, Correct units with precision, correct data, well structuring of paragraph, no grammar and spelling mistake	Complete and embarrassed text, difficult to comprehend	Irregular format with wrong facts and figures
Discussion	Well organized, meaningful specification, sound conclusion, logical and concise explanation, highly structured paragraph reference cited	Wordy, unclear conclusion, spurious	Conclusion is not cited, unorganized, difficult to comprehend
References	Complete and correct format, well organized	Beside the point, Incomplete	Wrong format and structuring

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