Effects of Recycling Strategy on Firm Performance: A Survey of Publishing Firms in Kenya

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Abstract: *This is an empirical research focusing on the effect of recycling strategy on the performance of publishing firms in Kenya. There are about 14 million school going children and adult learners in Kenya who use various educational publications every year, in addition to about a million newspaper and magazine readers. Kenya is also the regional publishing powerhouse in East and Central Africa with newspaper publications selling in the whole region. Likewise, text book publishers in Kenya dominate the regional market. The industry contributes about 10% of the GDP and one of the fastest growing in the manufacturing sector. Unfortunately, Kenya does not produce most of the raw materials for publishing. All paper materials used in Kenya are imported, and the costs are rising with the reliability of the sources dwindling. In addition, the publishing industry in Kenya is faced with high rate of waste and returns. The study focused on the effect of adopting recycling strategy as possible solution to the dwindling raw materials, increasing costs and high rate of returns. It used stratified random sampling approach and a descriptive research design. The study population consisted of 357 firms from which a sample of 189 firms was taken and 138 responses were obtained. The data collection instrument was pre-tested informed design and layout of the questionnaire before launching the final test. To test the hypotheses, data analysis was done and the findings and recommendations made to solve the research problem.*

Keywords; *Recycling, Publishing, Firm Performance, Reverse supply chain strategies*

1. INTRODUCTION

Kenya is home to the regional publishing houses, both in the text book industry, periodical publications and promotional materials. According to Kenya Publishers association, its 28 members distribute their products in Eastern Africa consisting of Kenya, Rwanda, Tanzania, Uganda, Democratic Republic of Congo, Malawi and Zambia. A few like Longhorn Publishers and Oxford University have distribution in South Africa. On periodicals, local media houses like Nation Media Group has publications circulating in Uganda, Rwanda, Tanzania and Kenya. With the World Bank reporting modest economic growth rate above 5% for the region in 2011 (Gok, 2012), and an increasing middle class, the industry is positioned for growth, which will definitely call for more innovative ways of accessing raw materials and energy.

While publishing plays a critical role in disseminating news, information, entertainment and educational materials, Elmas & Erdogmus (2011) noted that the industry has one of the highest rates of returned products. Cheng & Wu (2006) found that publishing firms deal in products with very short shelf life, just below a day for newspapers and hardly a month for magazines. Even educational text books are used within a semester or a year before the users outlive them. This means publishing firms have to employ huge resources in obtaining raw materials for continuous publications. De Brito (2004) and Gobbi (2011) agree on high costs and scarcity of raw materials as major challenges, especially for the publishing industry, implying that in the short run, the industry has to cope with high production costs leading to low profit margins (Cheng, 2006), and interrupted production due to dwindling source of raw materials. Innovative application of reverse supply chain strategies as suggested by Klapolva (2012) including recycling, re-use, waste reduction and reselling of returns and wastes could improve the performance of the publishing firms and ensure sustainable exploitation of the publishing materials.

2. STATEMENT OF THE PROBLEM

Publishing firms play a critical role in disseminating news, information and entertainment. World Bank (2008) estimates that about 5,000 people in Kenya are directly employed in this sector, with

another 20,000 indirectly deriving their livelihood from the sector. About 14 million school going children use published books in Kenya every year. The publishing industry contributes significantly to the economy, which is about 5% of Kenyan GDP in 2010 (GoK, 2012).Publishing is one of the key sectors in the manufacturing industry in Kenya which the government expects to grow at 10% per annum for the Vision 2030 to be realized (GoK, 2007). Already educational publishing has grown in leaps and bounds. For instance, the Kenyan government's introduction of free primary education and subsidized secondary education has led to unprecedented growth in educational publishing industry (Rotich, 2005). However, this growth is in doubt given the industry is faced with challenges of increasing cost of raw materials (Gobbi, 2011), dwindling source of raw materials (Jack *et al*, 2010), high returns occasioned by unique distribution arrangement of published products in which distributors return unsold products at publisher's cost (Rogers, 2009).

Gobbi (2011) and Li &Olorunniwo (2008) suggest that applying recycling strategy could address this situation. A comprehensive literature review on recycling in publishing by Ellram (2006) shows that most of the research has focused on environmental aspects. Wu & Dunn (2005) adds that the factors influencing adoption of recycling activities differ from those of traditional supply chain. In Kenya, there has been minimal research on application of recycling by publishing firms (Kamande, 2011). In deed the existing research had not provided clear evidence and a broader picture on the link between recycling and firm performance. The study therefore investigated the effect of recycling strategy on performance of publishing firms in Kenya.

3. RESEARCH OBJECTIVE AND HYPOTHESIS

The objective of the study was to determine whether recycling strategy influenced performance of publishing firms in Kenya. The study on the recycling strategy was guided by hypothesis:

(H_0): Recycling strategy does not have significant effect on firm performance

4. THEORETICAL REVIEW

For this study, reverse supply chain theories Transaction Cost Economics and Resource based view were identified. Transaction Cost Economics (TCE) specifies the conditions under which a firm should manage an economic exchange internally within its boundary or externally through inter-organizational arrangement (Li *et al*, 2006). TCE focuses on minimizing the total transaction costs of producing and distributing a particular good or service. According to Srivastava (2006), the external (or macro) environment comprises four sectors, namely input (referring to suppliers), regulatory (referring to government and interested aggregators such as lobbying groups), output (referring to buyers), and competitive (referring to competitors). The internal environment consists of strategic factors (such as strategic costs, overall quality, customer service, environmental concerns, and legislative concerns) and operational factors like recycling. The reverse supply chain strategies synchronize with the TCE in maximizing on firms internal resources to remain competitive (Deshmukh *et al*., 2006) and profitable (Gobbi, 2008). Application of recycling strategy has been found to lead to higher than average return on investment (Gunasekaran, Patel and McCaughey, 2004), improved cycle time (Hult, KetchenJr and Slater, 2004), higher marketing performance (Li, Ragu-Nathan, Ragu-Nathan and Rao, 2006), greater efficiency and effectiveness (Spekman, Kamauff Jr and Myhr, 1998; Tan *et al*., 1999), and improved firm financial performance over competitors.

A firm's resources and capabilities include all financial, physical, human and organizational assets used in a firm to develop manufactures and deliver products or services to the customers. These resources create a sustainable competitive advantage for a firm if they have the following characteristics: Value adding (Valuable), rareness (Scarce), Costly to imitate and non-tradable (limited transferability). Cooper *et al* (2011) identifies scarcity of raw materials for publishing and the overall cost saving of reverse supply chain strategies. RBV also accounts for the incorporation of reverse supply chain as part of long-term company business strategies by some large corporations in order to attain sustainable competitive advantage (Porter, 1980).And Li (2006) notes that publishing firms which perfect the application of recycling enhance their competitiveness in both efficiency and profitability.

5. SECONDARY RESEARCH

In Baker (2008), recycling is defined as the process to change waste, used or returned products into new products to prevent waste of potentially useful materials, reduce the consumption of fresh raw materials, reduce energy usage, and reduce air pollution (Lysons, 2006). Ellram (2006) noted that the process of recycling as well as reusing the recycled material proves to be advantageous for many reasons as it reduces amount of waste sent to landfills, conserves natural resources, saves energy, reduces greenhouse gas emissions, and helps create new jobs. Recycled materials can also be converted into new products that can be consumed again such as paper, plastic, and glass (Zhu, 2008). To an individual firm, this translates to cost savings and new streams of income (Blumberg, 2005), which should improve the profitability.

While trying to trace the origins of recycling practice, De Brito (2004) found that recycling has been a common practice for most of human history, with recorded advocates as far back as Plato in 400 BC. During periods when resources were scarce, archaeological studies of ancient waste dumps show less household waste (such as ash, broken tools and pottery) -implying more waste was being recycled in the absence of new material. Coming to modern times, Gobbi (2008) observed that recycling is a key component of modern waste reduction and is recognized internationally. Cheng (2006) looked at the role of recycling from quality assurance and found that there are some ISO standards related to recycling such as ISO 15270:2008 for plastics waste and ISO14001:2004 for environmental management control of recycling practice.

In Li (2007), recycling one ton of newsprint saves about 1 ton of wood while recycling one tonne of printing or copier paper saves slightly more than two tonnes of wood. However, from environmental view, it has been estimated that recycling half the world's paper would avoid the harvesting of 20 million acres (81,000 km²) of forestland. In Li (2007), the call for recycling is so critical that there is an international recycling symbol, usually printed on packages of most products that can be recycled.
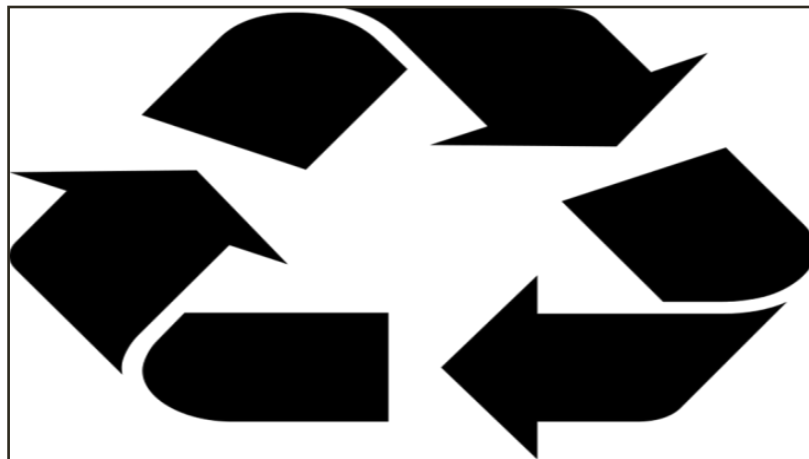

Figure5.1. *International recycling symbol*

5.1. Source: Retzlaff-Roberts (1997)

The arrows pointing anticlockwise symbolizes direction of recycling wastes and returned products (Retzlaff-Roberts, 1997).Rogers (2009) and Cheng (2006) contend that recycling reduces amount of waste sent to landfills, conserves natural resources, saves energy, reduces greenhouse gas emissions, increases compliance and helps create new jobs. To an individual firm, this translates to cost savings and new streams of income (Blumberg, 2005), which should improve the profitability. Ellram *et al* (2006) and Wang (2005) both agree that the process of recycling as well as reusing the recycled material proves to be advantageous for many reasons as it reduces amount of waste sent to landfills, conserves natural resources, saves energy, reduces greenhouse gas emissions, and helps create new jobs. Recycled materials can also be converted into new products that can be consumed again such as paper, plastic, and glass (He, 2005). To an individual firm, this translates to cost savings and new streams of income (Blumberg, 2005), which should improve the profitability. This led to the following hypothesis:

(H_0): Recycling strategy does not have significant effect on firm performance

6. EMPIRICAL REVIEW

Rogers and Tibben-Lembke (2002) observed that recycling accounts for approximately four percent of the total logistics costs in the publishing industry. In the retail and manufacturing sectors, it is estimated that recycling accounts for 5-6 percent of total logistics costs. Kang'e the (2013), discussed the role of recycling in e-waste management in East Africa and found environmental sustainability, economic prosperity and social value recovery of consumers by individual firms, market expansion through appealing waste management policies, assets optimal utilization, product or environmental returns, as the outcomes of recycling. Another perspective is given by Staurt*et al* (2005) who suggests cost reduction across the supply chain as a major contribution of recycling. On their part, Elmas and Erdogmus (2011) summarize the importance of recycling as positive environmental impact, legal compliance, competitiveness advancement and improved customer service.

A number of researches in the recent past also focused on barriers of adoption of recycling strategy. Rogers and Tibben-Lembke (2001), identify the main barrier for recycling relative to other issues: recycling does not receive priority within the company. Another barrier is company policies which might be motivated by fearing the danger of market cannibalization or brand damaging, the company clearly avoids implementing return policies. This is shared by Fernandez (2004) who portends that lack of systems to receive incoming goods and proceed with inspection, registration, and recovery option selection also remains a barrier. Other barriers according to Rogers and Tibben-Lembke (2001) include competitive issues management inattention, personnel resources and financial resources required for implementing new systems and processes requires investments in terms of personnel training and financial resource usage. Gobbi (2008) also adds the limitation of the mandatory product take back legislations, especially in Europe, when legislation does not provide incentives.

7. RESEARCH METHODOLOGY

Tronvoll*et al* (2011) asserts that supply chain researchers have adopted a number of ontological paradigms, including realism to describe their own perspective of the worldview under investigation where each is linked to an epistemology that deals with how the world is perceived and the relationship between the researcher and the known view. According to Easter by-Smith *et al.* (2002) the arguments among social scientists can be mapped by looking at three main ontological positions: representationalism (positivism), relativism and nominalism. Cooper & Schindler (2006) added a fourth position in which they argue that realism asserts the idea that facts are out there just waiting to be discovered. The study adopted positivism approach in order establish the effect of the reverse supply chain variables an accurate reflection of reality in order to predict an outcome and thereby control the strategies to the benefit of organizational performance.

In order to clearly examine the effect of recycling strategy on organizational performance,the study adopted a descriptive research design. As explained by Fei& Isa (2010) and Orotho (2003), this method of research is preferred because a researcher is able to collect data to answer questions concerning the current status of the subject of study. The study focused on publishing firms in Kenya as the unit of analysis. From this, 357 publishing firms as listed in Printers, Publishers and Stationers directory in Kenya formed the target population (List of publishers, 2013). In each publishing firm, the head of supply chain was the unit of observation. Given the study looked at recycling strategy, the head of supply chain was most suitable, given this is the operational driver of strategy at operational level. The sampling frame of this study is a list of 357 publishing firms in Kenya appearing in the Printers, Publishers and stationer's directory as at July 2013, while two-step sampling involving stratified sampling followed by purposive sampling was applied. From the 357 firms a sample of 189 firms was selected, and distributed across the strata according to different sectors in publishing. The working sample was guided by Yumane's formula as used in Fei (2010).

$$n = \frac{N}{1 + N(e)^2} = 357/1 + 357(0.05)^2 = 189$$

Where n = the number of samples, N = the total population size, and e =1- Confidence level (the margin of error).

While both interview and questionnaire augurs very well with descriptive research design (Saunders, 1997), a questionnaire was the most appropriate for wider outreach within a relatively shorter time. Questionnaire also enables respondents to reflect and put well thought and structured responses which can be compared with other respondents. Therefore, a questionnaire was used to collect the data linking the recycling strategy to firm's profitability as a performance measure. To ascertain the validity and reliability of the proposed questionnaire, a pilot was conducted on 19 respondents, which was about 10% of the sample frame, in line with recommendation by Corbin (2008) and Kothari (2004).

The results of the research were both qualitative and quantitative. The data collected was keyed in and analyzed using SPSS, and descriptive statistics presented on each research question, followed by requisite analysis of the data and finally inferential analysis using correlation and regression.

8. RESEARCH FINDINGS AND DISCUSSION

From a sample of 189 heads of supply chain, 138 questionnaires were received back which constituted 73.02%, which according to Creswell (2008), response rate above 60% issufficient for descriptive research. Related studies like 'Reverse Supply Chain for commercial returns' byBlackburn *et al* (2005) had 68% response rate. Similarly, Guide *et al* (2006) conducted a study on 'Time value of commercial product returns' which had a response rate of 71%. Hanafi*et al* also had a response rate of 70% in a study on 'Reverse logistics for end of life product', in addition to Creswell's (2008) threshold of atleast 60%, the study's response rate is within the norm of related studies.

To ascertain the validity and reliability of the proposed questionnaire, a pilot study was conducted on 19 respondents, which was about 10% of the sample frame, in line with recommendation by Corbin (2008) and Kothari (2004). Cronbach Alpha test was conducted to test the reliability of the research questionnaires as suggested by Zikmund (2003) and recycling scored 0.897 which is good. Different aspects of validity were considered including content related validity, criterion related validity and construct related validity. Exploratory factor analysis was employed to check the dimensionality of the questionnaire. The instrument met the required reliability threshold to deliver the intended purpose.

8.1. Descriptive Findings on Recycling Strategy

In order to understand the recycling practices adopted by various publishing firms in dealing with the wastes and returns, respondents were given various options of potential practices that can be applied. From the feedback, the firms employed multiple practices, withquality sorting and establishing returns network being practiced by 67% and 65% of the firms respectively as per Table 4.1 below;

Table8.1. *Recycling practices adopted*

Practice	Frequency	Percentage Value
Quality sorting	92	67%
Modern recycling technology	90	65%
Outsourcing	34	25%
Establishing collection points	69	50%

8.2. Responses on the Influence of Recycling Strategy

On whether recycling strategy had influence on firm performance, various performance indicators influenced by Recycling strategy were proposed. Respondents were asked to identify extent to which they agreed with proposition that recycling strategy influenced each of the various performance indicators. Of all the reverse supply chain strategies proposed in this study, 94.9% of the respondents confirmed recycling strategy as a significant factor influencing performance of publishing firms, as per Table 8.1 above. All the respondents agreed with the strategy as significant contributor to firm performance with improved man hour savings having a mean score of 4.04, as the least score and employee awareness on cost savings at mean score of 4.75   Table 4.11 below summarizes the respondents' feedback;

Table8.2. *Responses on the influence of recycling strategy*

Performance Indicator	1	2	Percent 3	4	5	Mean	Standard Deviation
Materials management	-	-	5.8%	27.9%	66.2%	4.45	0.618
Production costs	0.7%	0.73%	1.5%	28.7%	68.4%	4.63	0.630
Product range	0.7%	5.2%	14.9%	69.9%	24.3%	4.18	0.543
Man hours	0.7%	0.7%	13.2%	64.0%	21.3%	4.04	0.665
Machine hours	0.7%	0.7%	14.7%	62.5%	21.3%	4.03	0.677
Staff Motivation	0.7%	1.5%	13.2%	51.5%	33.1%	4.15	0.756
Carboncredit earnings	-	0.73%	0.73%	38.1%	60.5%	4.58	0.552
Machine utilization	-	0.73%	16.4%	42.5%	40.3%	4.22	0.742
Environmental conservation	-	-	4.5%	31.6%	63.9%	4.59	0.578
Social responsibility	-	0.73%	3.0%	24.6%	71.6%	4.67	0.572
Employee awareness	-	-	0.73%	22.4%	76.9%	4.75	0.482

Key

1- No influence at all

2- Influence to very small extent

3- Influence to small extent

4- Significant influence

5- Influence to very large extent

8.3. Requisite Analysis

While the pilot study and the descriptive analysis indicate good data collection instrument and possible relationships between the variables, Field (2005) observes that the data collected should be pretested to establish whether further analysis would yield the desired relationships. There are several methods that can be used, but this study will be limited to Normality Test. Given the unit of analysis was head of supply chain or equivalent, the data obtained ought to be more or less standard. Field (2005) observed that normal data if plotted should reflect a normal probability curve. In Dancey (2004), a quantile-quantile plot (Q-Q plot) test can be used to test for normality by plotting standardized data against the standard normal distribution. The correlation between the sample data and normal quantiles, or measurers of the goodness of fit shows how well the data is modelled by a normal distribution. For normal data the points plotted in the Q-Q plot should fall approximately on a straight line, indicating high positive correlation. To test the data collected, hypothesis was developed for each reverse supply chain strategy (independent variable), data plotted and results obtained as follows;

To test for normality with reference to the data obtained on Recycling strategy, the data was keyed into SPSS and the Q-Q Plot test as per Figure 8.1belowshows the distribution of standard data was normal. This implies that the data collected for Recycling strategy passed the goodness of fit (Dancey, 2004).
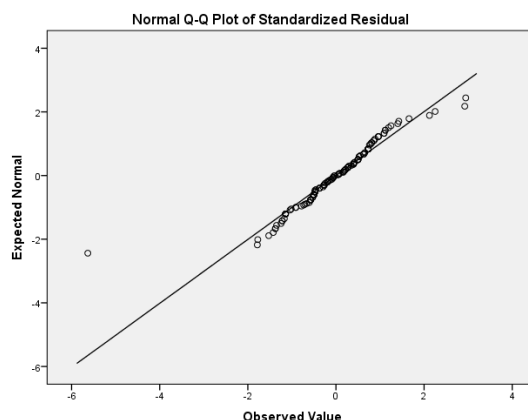

Figure8.1. *Q-Q plot test for data on recycling strategy*

8.4. Inferential Analysis

From the requisite analyses above, the data obtained yielded the desired relationships. In Saunders (2007) inferential analysis is used to generalize the results obtained from a sample, back to the population. In the study, the inferential findings are used to describe the relationship between reverse supply chain strategies and performance of publishing firms in Kenya. While there are many methods of inferential analysis, Pearson correlation and multiple regressions model models have been used. Both models are suitable in descriptive research design where there are many variables, and focus is on relationships, nature and extent of influence among the variables (Field, 2005).

8.5. Correlation Analysis

Gujarati (2007) simplifies correlation as the measure of linear relationship between variables, which could either be positive or negative. A hypothesis was developed to guide the research as follows;A Null hypothesis *(H₀); Recycling strategy does not have significant effect on firm performance.* Alternative hypothesis *(H₁); Recycling strategy has significant effect on firm performance.* Recycling Strategy had a coefficient correlation with firm performance of .395 which was above zero. The null hypothesis was then rejected and the alternative hypothesis accepted. Further, Dancey (2004) contends that this is a significant correlation. The study therefore found that there is a significant association between Recycling strategy and firm performance

Table8.3. *Correlation coefficient of Recycling strategy and firm performance*

Strategies	Recycling	Firm Performance
Recycling	1	
Firm Performance	.395**	1

8.6. Regression Analysis

To regress the effect of recycling strategy on firm performance, the following model was used;$y = \beta_0 + \beta_1 x_1 + \varepsilon$ **Where;**y is the dependent variable -firm performance, β_0(Alpha) is constant or intercept, $\beta_1$is the slopeor change in firm performance given a unit change in Recycling strategy, $X_1$is the independent variable –Recycling strategy.The findings show that calculated P-value < 0.5 at 95% confidence level, implying Null hypothesis *(H₀)*; Recycling strategy does not have significant effect on firm performanceis rejected, Alternative hypothesis *(H₁)*; Recycling strategy has significant effect on firm performance is accepted.The value of variance $R^2 = 0.281$ implies that 28.1% of Firm performance is influenced by Recycling strategy. The F-value = 122.417 and P-value <0.05 shows that Recycling strategy statistically significantly influence firm performance. From the analysis above, the regression model would be as follows;*Firm Performance = 1.590 + 0.694 x Recycling Strategy*

Comparing the recycling strategy analysis to the theoretical review, the findings agree with the tenets of Total Cost Economics theory (TCE), in which recycling strategy offers greater efficiency and effectiveness (Tan *et al*., 1999), and improved firm financial performance over competitors. Kangethe (2013), Ellram (2011) and Gobbi (2008) all observed that recycling is significant competitive strategy that may be employed by a firm, in line with the Resource based View theory.

Table8.4. *Regression of Recycling strategy and Firm Performance*

Strategy	Parameter estimate	Std. Error	t-Value	P>|t|
Recycling	.694	.063	11.064	<0.05
Intercept	1.590	.276	5.765	<0.05

Table8.5. *Model Summary*

Measure	Statistics
R^2	0.281
R^2- Adjusted	0.277
P-Value	<0.05
F-Value	122.417

9. SUMMARY OF FINDINGS AND RECOMMENDATIONS

The study found that recycling strategy had significant influence on performance of publishing firms in Kenya. Correlation analysis of effect of recycling strategy on firm performance yielded a positive

correlation coefficient score of 0.395, which according to Dancey (2004) is significant. Regression analysis of recycling strategy on firm performance found that recycling strategy had 28.1% influence on firm performance as shown in the analysis of value of variance $R^2 = 0.281$. The regression analysis yielded a relationship model: *Firm Performance* = 1.590 + 0.694 x *Recycling Strategy.* This finding compares with a study byBanar (2009), in which recycling was found to have many strategic benefits including; reducing the consumption of fresh raw materials, reducing energy usage, and reducing air pollution. Lysons (2006) and Ellram (2006) also noted that the process of recycling is advantageous for many reasons as it reduces amount of waste sent to landfills, conserves natural resources, saves energy, reduces greenhouse gas emissions, and helps create new jobs. Recycled materials can also be converted into new products that can be consumed again such as paper, plastic, and glass (Zhu, 2008). To an individual firm, this translates to cost savings and new streams of income (Blumberg, 2005), which should improve the profitability.

From the findings above, the study recommends to entrepreneurs to adopt recycling strategy and set up intermediary businesses, capitalizing on wastes and returns from the mainstream publishing firms. Within the publishing supply chains, the study recommends that publishing firms to embrace recycling as an investment for improved performance, thereby moving towards sustainable growth which is one of the foundations of Kenyan Vision 2030.

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