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Full Length Research Paper

Financing, networking and the economic empowerment of women in the informal business sector in Eritrea

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Hardly any research is available regarding women entrepreneurs in the informal business sector in Eritrea. Results based on a survey of 1,607 women drawn from 12 cities in 6 regions indicate that in setting up an informal business the main sources of initial capital are: the owner's cash savings; loans from friends and relatives; and interest free credit from suppliers, based on trust. On the positive side, half of the survey respondents indicated that their initial capital had increased since startup, while a significant number stated that it had remained the same, and in a few cases respondents indicated that their initial capital had decreased. Furthermore, it has been noted that Ukub (Rotating Saving and Credit Associations), a form of non-interest bearing savings is a traditional way of network for saving money. Since the majority of the respondents indicated that they purchase their merchandise/raw materials from the formal sector, these informal businesses are assisting formal businesses by serving as important channels of distribution. However, the evidence also reveals that a lack of funds, a lack of demand for products, high cost of materials, and municipal and national laws (and regulations) governing the informal sector represent key problems faced by informal business owners.

Key words: Women, informal sector, financing, networking, economic empowerment, Eritrea.

INTRODUCTION

Women are becoming important players in the informal economy. The informal sector is the primary source of employment (selling directly to consumers), contract labour (producing for another organisation regularly), and casual labour (working on and off for another organisation) (Ramani et al., 2013). The informal economy is very large in developing countries due to the working population. During the past three decades, in

most developing countries, growth of employment in the formal sector has stagnated or at best has shown a gradual increase, while the informal economy has increased significantly (Bacchetta, 2009). For instance in, India the informal economy accounts for about 93% of total employment, in Mexico about 62%, inability of the formal economy to absorb the available and in South Africa about 34% (Chen, 2005).

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However, the most prevalent forms of work are as street vendors or home-based producers. According to the World Bank, “the informal sector covers a wide range of labour market activities that combine two groups of different nature. On the one hand, the informal sector is formed by the coping behaviour of individuals and families in economic environment where earning opportunities are scarce. On other hand, the informal sector is a product of rational behaviour of entrepreneurs that desire to escape state regulation.”¹ However, over the past few decades, it has become clear that the informal economy has significant job and income generation potential (Becker, 2004). In particular, women entrepreneurs around the world are major contributors to the economy, as they are making a difference in the socio-economic arena (Iyiola and Azuh, 2014).

Despite an increasing presence in the micro, small, and medium enterprise sectors, women’s lack of access to finance remains one of the key constraints for enterprise growth (Niethammer et al., 2007). Improved access to financial instruments that are appropriate for women, as well as the provision of nonfinancial services, would help women grow and professionalize their businesses into more competitive ventures (Goheer, 2003). Goheer further argues that providing access to finance can be an important tool for the empowerment and development of women, both at the social and political levels. While not a panacea, women’s access to finance is an important tool for poverty reduction (Niethammer et al., 2007). This is particularly important not only for women’s economic empowerment in general but for increasing female employment in the private sector.

Women entrepreneurs often resort to different sources of financing than men. Their businesses tend to be concentrated in the services sector and usually only require a small initial capital outlay and less technical knowledge (UNESCAP, 2005). Carter et al. (2012) indicate that, similar to their developed country counterparts, in developing countries women’s businesses tend to be younger, smaller and created with fewer resources and, further, they usually operate from home, have low earnings, compete in crowded sectors and production is based on very scarce financial, human and physical resources.

According to Ramani et al. (2013), the traditional role of women as caretakers of children restricts the time they can invest in income generation. Furthermore, societal, religious and other norms also determine the mobility of women and with whom they may interact. This is an impediment to women because interaction within social networks is crucial for the success of business. Social networks enable women to build up their market and open new doors for gaining access to

funding. One of the most determinant factors of a successful entrepreneurial venture is the existence of a social network that not only eases credit constraints but can provide access to supply and distribution channels and help in obtaining the necessary licenses to operate (Yueh, 2009).

As in other developing countries, the number of informal businesses in Eritrea, in particular those owned by women entrepreneurs, is increasing. The Government of Eritrea launched its National Macro-Policy in 1994, which advocates for upgrading and improving the human and material capacity of the informal sector to improve efficiency and quality in the production of goods and services. Anecdotal evidence indicates that the Eritrean informal sector attracts many women and contributes a great deal to their income and employment; however, there is lack of relevant data to substantiate this belief. Hence, the main objective of this paper is to investigate the informal business run by women; its size; the number of women engaged in the sector; their income levels, and their economic and social conditions. It was with this intention in mind that this research was launched.

Since this report is the first of its kind for Eritrea, it provides new knowledge regarding the informal business sector in Eritrea in general and the participation of women in this sector in particular. This research highlights the financing, business networking, economic empowerment and constraints of women in the informal business sector. Moreover, it highlights policy interventions needed to empower women and achieve gender equality and equity.

RESEARCH METHODOLOGY

The central theme of this study is to investigate the socio-economic conditions of women in the informal business sector in Eritrea. The approach adopted included a survey and structured interviews targeted at women in the informal business sector in the six administrative regions of Eritrea (Central Region (CR), Western Region (WR), South Region (SR), Anseba Region (AR), Southern Red Sea Region (SRDR), and Northern Red Sea Region (NRDR)). A representative sample of cities from each of the six regional administration areas was selected for the purposes of the survey. Based on expert opinion, employment and logistical reasons, the approach used in selecting the cities for the survey was population size. That is, all large cities with more than 20,000 inhabitants were included in this study.

This study employs mainly quantitative data; however, qualitative data was also used to supplement the quantitative data. Data on women in the informal business sector was collected through a highly structured self-administered questionnaire designed to elicit quantitative data. Primary data was collected in each of the selected cities for all the regional areas of Eritrea. A total of 12 cities were selected for the survey. Care was taken to ensure that a representative sample of women was obtained from each region. Initially it was estimated that a sample of about 1,500 women in the informal business sector would be contacted for the study. We took the percentage distribution of women employed in the six regions working in the following five areas as our sampling base: professional/technical/ managerial; clerical; sales and services; skilled manual; and unskilled manual. However, we excluded agriculture and domestic services because, according to the

¹<http://Inweb90.worldbank.org/eca/eca.nsf/Sectors/ECSPE/2E4EDE543787A0C085256A940073F4E4?OpenDocument>

Table 1. Women in Manufacturing, Trade and Services sectors.

Sectors	1996		1998		Female	
	Male	Female	Male	Female	%	Growth rate %
Manufacturing	2,475	249	2,581	296	11	19
Trade	36,366	6,926	40,973	7,804	19	13
Services	6,527	1,531	8,145	1,910	23	25

Source: Business Licensing Office (1998). Growth rate of females is calculated by the difference between 1996 and 1998 and dividing it to 1996 figures. Total female percent is obtained by dividing the total number of females to males of both years.

International Labour Organisation (ILO), informal business is confined to non-agricultural units and non-domestic services. Thus, based on a percentage distribution, the sample desired for this study was 1,504 enterprises. However, to accommodate missing questionnaires, we decided to distribute 1,625 questionnaires. Every single questionnaire was returned and we received 1,607 usable questionnaires, which represents a 98.9 % response rate.

We also collected qualitative data in order to have an in-depth understanding of the working conditions of women operating in the informal economy and to identify the constraints they are encountering in operating their businesses. We interviewed 25 women working in the informal business sector in the Central Region, South Region, and Western Region of Eritrea.

RESULTS

Women and the economy in Eritrea

Women play an important role in the Eritrean economy. Many enterprises are owned and run by women, and women make up 30% of the workforce in manufacturing, services, and trade (Hayde, 2001). However, economic and political gender equality is still weak in Eritrea, despite the enactment of mechanisms to empower women and to inform them of their rights. This is primarily due to the women's limited access to needed resources such as credit and education. The women's organization, the National Union of Eritrean Women (NUEW) is involved in advocacy and education on key women's issues; including health, education, micro-finance, and human rights. Table 1 presents a comparative study of the number of women and men involved in the manufacturing, trade and service businesses.

According to the 1996 figures, women own 10-23% (the lowest in manufacturing and the highest in services while the figures for trade remain in the middle) of micro-enterprises in Eritrea. Women-owned enterprises account for almost two-thirds of the enterprises in the production sector (brewing local drinks; basket, broom, mat making; etc.); two-fifths in the trade sector (hotels and guesthouses, petty trade, coffee shops, and retail trade); and one-fourth in the services sector (hair salons and rental services). Female-owned enterprises account for 40% of all employment in micro, small, and medium-

sized enterprises. Women-owned enterprises tend to be smaller than those owned by men and employ primarily women workers.

Financing informal businesses

In order to assess the level of capital invested by women in the informal business sector, we asked respondents to indicate the amount of initial capital they spent to start their business. The respondents indicated that, on average, they invested Nakfa 1,454.49² in setting up their informal businesses. Regional analysis (Figure 1) reveals that the mean value of the initial capital investment is highest in the Southern Red Sea Region (Nakfa 3,121.31) and lowest in the South Region (Nakfa 784.17).

In order to ascertain the main sources of initial startup capital in the informal business sector, we also asked respondents to identify the financial source(s) used for establishing their businesses. The information presented in Table 2 reveals that the two major sources of startup financing were the owner's own cash savings (41%) and loans from friends and relatives (31%). This is not a unique Eritrean phenomenon as empirical studies in the Middle East, Pakistan and North African countries have found that women finance their businesses using personal savings and loans from friends and relatives (IFC; Roomi, 2005). The proceeds from sale of assets, such as gold and jewelry (6%) and loans from suppliers (6%) were also important sources of startup financing.

Loans from suppliers were used not only to start their businesses but also to continue operating their businesses. Many of the respondents acknowledged the ongoing support they received from suppliers of the merchandise that they were selling. Suppliers often extended trade credit to the women engaged in the informal business sector. Based on trust, they allowed the women to buy the goods on credit and gave them about two weeks to sell the goods and repay the money owed. This provides the entrepreneurs with an interest free loan and is the reason why they typically avoid commercial bank loans to finance the purchase of

² US \$1= 15 Nakfa.

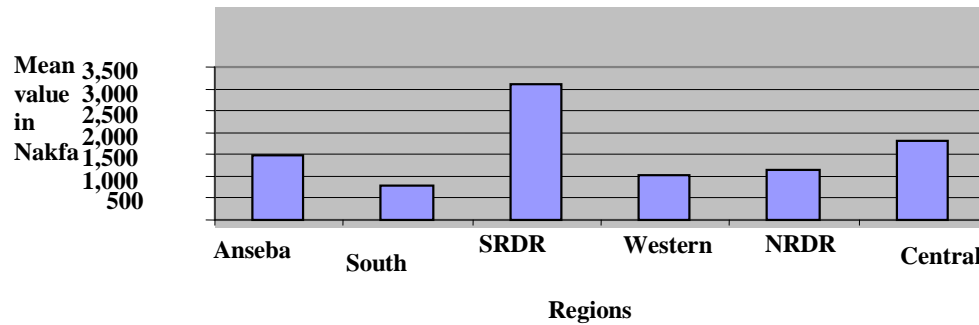


Figure 1. Mean capital invested in informal business. Source: Data survey, 2013.

Table 2. Source of capital by region.

	CR (%)	SR (%)	WR (%)	Anseba (%)	NRDR (%)	SRDR (%)	Overall (%)
Own cash savings	37	28	50	35	75	81	41
Loans from friends or relatives	36	35	20	40	19	6	31
Other	15	9	9	15	1	10	12
Sale of other assets	5	9	13	9	0	0	6
Loans from suppliers	5	11	7	0	1	0	6
Loans from micro-finance institutions	0	4	0	0	2	3	1
Inheritance	1	1	0	0	0	0	1
Loans from government institutions	1	1	0	1	1	0	1
Loans from money lenders	0	1	0	0	0	0	0
Loans from commercial banks	0	1	1	0	0	0	0
Total	100	100	100	100	100	100	100

Source: Data survey, 2013.

merchandise. The women try to sell the merchandise above cost price and retain the profit in their businesses. The profit they earn helps them to finance their daily bread, their children's education and clothes. However, the suppliers sometimes dictate the selling price of the goods and this does not allow the women to be flexible in their pricing strategy. Other financial sources used for starting an informal business include support from the Ministry of Labour and Social Welfare, support from Martyrs Trust Fund and divorce settlement proceeds. The results in Table 2 also indicate a wide variation by region in the sources of capital for financing the startup of an informal business. For example, in the Southern Red Sea region about 81% of the respondents financed their initial capital using their own savings but this only applied to 28% of the respondents from the South region. While the use of micro-financing was quite limited, 4% of respondents in the South Region indicated that they had used micro-financing arrangements from the NUEWs. One interviewee who participated in the NUEWs' micro finance program shared her experience as follows: "The initial microfinance support that I have received from NUEWs has helped me to establish my

business and to operate it profitably. I was successful and repaid my loan and its interest on time. The loan was helpful. However, the loan was a group loan and even though we did not know each other, we were asked to take the responsibility of our group members if they fail to pay. Since my group members were not able to pay, I was neither able to get a new loan nor get my deposits back. In addition, this loan is interest bearing and we resort to trade credit from our suppliers to avoid paying interests. If we had found interest free loans or grants, we would have been flexible in our pricing and we would have profited more."

Performance of the informal business sector

In order to assess the performance of their informal businesses, we asked the women entrepreneurs to indicate whether their initial capital had increased, decreased or remained the same. As shown in Table 3, the majority of respondents (50%) indicated that their initial capital had increased, while 36% of the respondents indicated that it had remained the same

Table 3. Status of capital by regions.

	CR (%)	SR (%)	WR (%)	Anseba (%)	NRDR (%)	SRDR (%)	Overall (%)
Increased	53	29	37	56	94	87	50
Remained the same	31	54	57	25	0	3	36
Decreased	14	16	5%	15	6	10	13
Other	2	1	1	4	0	0	1
Total	100	100	100	100	100	100	100

Source: Data survey, 2013.

Table 4. Women with a bank account in all regions.

Account ownership	Percent
No	91
Yes	9
Total	100

Source: Data survey, 2013.

and only a few respondents (13%) indicated that their initial capital had decreased.

Again, a regional analysis of the responses revealed considerable variation. For example, 94% of respondents from the Northern Red Sea Region indicated that their capital had increased but this only applied to 29% of respondents from the South Region. Note that the majority of respondents in the Western Region and South Region indicated that their capital had remained the same. In order to provide a more in-depth understanding of the causes for the increase or decrease in the initial capital invested in their informal businesses, we further asked respondents to explain the reason for any increase/decrease in their initial capital investment. The most important reasons provided for the increase in capital include: an increase in the number of customers (55%); an increase in the quantity of merchandise held for sale (20%), and the introduction of new products (variety) in the merchandise holdings (14%). Furthermore, the respondents that reported a decrease in their capital gave the following reasons for the decrease: severe competition in the market (23%); confiscation of merchandise by municipality police (23%); lack of a helper (16%), and various other reasons (23%), such as the theft of money deposited with people.

Banking facilities used by the informal businesses

The information presented in Table 4 shows that the majority of respondents (91%) indicated that they did not hold a bank account in their own name or in the name of their business. A regional analysis of the ownership of a bank account indicated that a higher percentage (26%)

of the respondents from SRDR owned a bank account. In CR and SR, only 10 and 9% of the respondents, respectively, indicated that they had a bank account. Over 90% of the respondents from the other regions indicated that they did not own a bank account.

Financing facilities used

In order to assess the financing facilities that women in informal businesses use we asked the respondents to identify the financing sources used for their business. Their responses indicate that 73% did not use any formal financing facility, such as banks or government institutions. Instead, many of the women relied on Ukub; a form of non-interest bearing savings. In Ukub, the members agree to contribute a fixed amount of money each month and at the end of each month one person takes the total contributions collected. This method of financing helps the women working in the informal business sector to save their cash until it is needed. Even though lots are usually drawn to determine who gets the collection each month, at times of need a member can be allowed to take the contributions upon request. About 16% of the respondents indicated that they used Ukub as a form of financing the informal business. About 8.5% of the respondents also indicated that they used bank funding to finance their operations. The responses reveal that the women are typically not using government and development institutional financial support schemes, such as micro-financing programs.

Networking in the informal business sector

Relationships with suppliers

In order to study the vertical and horizontal networking relationships the informal business owners maintain, we asked respondents about their suppliers and customers. The respondents indicated they purchase their merchandise/raw materials from formal retailers (26.4%), wholesalers (26.2%), informal retailers (19.8%), manufacturers (9%), distributors (7.8%), and other different sources (10.8%). It is very interesting to note that more

Table 5. Types of suppliers of merchandise/raw materials.

Type of supplier	Percent	Cumulative percent
Wholesalers	26.2	26.2
Formal Retailers	26.4	52.6
Informal Retailers	19.8	72.4
Manufacturers	9	81.4
Distributors	7.8	89.2
Others	10.8	100
Total	100	

Source: Data survey, 2013.

Table 6. Monthly income of respondents.

Amount of income in Nakfa.	Percent	Cumulative Percent
Less Than 300	30.1	30.1
300-500	36.9	66.9
501-1000	23.2	90.1
1001-1500	4.9	95
1501-2000	1.8	96.8
Over 2000	2	98.8
Other	1.2	100
Total	100	

Source: Data survey, 2013.

than 52.6% of the respondents indicated that they purchase their merchandise/raw materials from the formal sector of the economy. In other words, the informal businesses are assisting the formal businesses by serving as an important distribution channel. In the open interviews we also learned that people perceive the prices of goods sold on the streets as being cheaper than those sold in the formal shops. Moreover, the suppliers provide credit sales to the informal business owners based on trust. This is helping the owners of the informal businesses to sell more products and to develop good business relationships with their suppliers. Table 5 presents the type of suppliers associated with the informal business sector.

Relationship with customers

It seems that the majority of informal business customers are women. About 41.3 and 40.7% of the respondents stated that their customers are mainly women, or both men and women equally, respectively. Indeed, only 9.7% of the respondents stated that their customers are mainly men, while 3.3% mentioned children as their customers. Private, government, and other institutions only represent about 6.1% of the informal business

Table 7. Income spent.

Income spent	Percent
Myself	5.8
Families and relatives	94.2
Total	100.0

Source: Data survey, 2013.

customer base. Further, the informal business sector customers are mainly passer-bys. Some respondents also stated that, to a limited extent, they sold on credit to acquaintances such as government workers, neighbours and relatives. An interviewee reported the following: *“I get the merchandise on credit from suppliers and I also sell on credit to my acquaintances in particular those who are workers. I give them a two or three months credit and they pay when they get their salary.”*

Monthly income of informal businesses

In order to assess the income generated by working in the informal sector, we asked respondents to identify their monthly income level in categories. Their responses are provided in Table 6.

The most notable feature of Table 6 is that a very high proportion of respondents indicated that their monthly income is either less than or equal to Nakfa 500 (66.9%). Moreover, 23.2% of the respondents indicated that their monthly income is between Nakfa 501 and Nakfa 1,000. The remaining 9.9% of respondents indicated that their monthly income is above Nakfa 1,000. In addition, around 2% of the respondents stated that their monthly income exceeds Nakfa 2,000.

These figures clearly illustrate that the monthly income of informal businesses is not enough to cover the daily livelihoods of most women working in the informal business sector and their families. In effect, 75.4% of respondents stated that, their monthly income is not enough for their daily subsistence. Also, people have a general attitude that purchasing from formal businesses provides a better warranty than purchasing from the informal business sector.

Economic empowerment of women through informal business

In order to assess the economic empowerment of women working in the informal business sector, we collected information on how the entrepreneurs spend their income and whether they are generating enough profit for their families. Their responses are presented in Table 7.

As can be seen from Table 7, 94.2% of the respondents stated that their income is spent on financing the

needs of their families and relatives, while 6% of the respondents reported that they spend their income on themselves. One interviewee elaborated on the contribution of her informal business income in supporting her family as follows: *“To some extent, this business is helping us improve our life. Even though we are not saving, it is helping us get our daily bread. This business has helped us to avoid begging. It is helping us feed our children. Moreover, it is helping us both in raising money for our family and keeping our children with us here. No other job can give us this opportunity.”* In addition, three quarters of the respondents indicated that the income they derive from their informal business is not enough for their families, while one quarter of the respondents said yes it is enough.

DISCUSSION

The survey indicated that on average Nakfa 1,454.49 is invested in setting up an informal business and the main sources of initial capital are the owners' cash savings and loans from friends and relatives. Half of the survey respondents indicated that their initial capital had increased while a significant number stated that it had remained the same, and in the case of few respondents their initial capital had decreased. Given that a majority of the respondents purchase their merchandise/raw materials from the formal sector of the economy, it seems that informal businesses are assisting formal businesses by serving as an important distribution channel.

Many scholars seem to agree that informal businesses can become effective creators of employment, income and economic growth. However, informal enterprises are (in many cases) unable to realize their full potential because they lack access to: suitable work places and facilities; markets; finance; technology; information; training; and business skills. In addition, excessive government rules and regulations, together with cumbersome and costly procedures, appears to be hindering the growth of many informal businesses.

These obstacles are more or less interlinked and create a vicious cycle of poverty and high risk. For instance, an important reason for the lack of finance and other business skills within the informal business sector is because owners within this sector are typically unable to access: financial institutions, such as banks; training and education institutions; marketing and consultancy firms; etc. Indeed, these obstacles also create barriers to entry within the formal economy.

Accordingly, the current position taken by many stakeholders is that, as the informal economy is going to persist and given its contributions to national economies, governments have a responsibility to: correct policy biases against the informal sector; and develop laws, policies and programs that recognize the importance of

this sector. This does not mean that governments should not restrict and regulate the sector when and where necessary. Governments should seek to increase the productivity of the sector and improve working conditions; particularly for women.

The results from this survey provide a glimpse of the socio-economic situation of women engaged in the Eritrean informal business sector. The study also highlights some of the key problems faced by operators within the informal sector in general, and women in particular. Among the major problems faced are: a lack of funds; a lack of demand for products; high cost of materials; and municipal and national laws and regulations governing the informal sector.

Poverty caused by lack of money drove many of the women to engage in informal businesses. However, the women reported that a lack of funding is a major constraint they face in operating their businesses. The women entrepreneurs mainly use trade credit to finance their operations. However, the creditors dictate the selling price in some circumstances and also require quick payment (2-7 days). Many respondents felt that this kind of arrangement did not give them the flexibility they needed when determining their own selling prices.

Mostly the entrepreneurs are selling their products to a passerby. In addition, there is high level of competition in the informal business sector because many are resorting to informal businesses to alleviate poverty and as a means of subsistence. Moreover, during economic downturns people lack purchasing power and, therefore, primarily buy food products. Thus, they have less money to spend on clothes, which is where most of the women engaged in the informal business sector operate. At the same time, the cost of goods/raw materials they are purchasing appears to be rising which, in turn, is eroding their profit margins. Thus, a lack of demand for their products coupled with the increasing cost of raw materials is presenting a significant problem for women operating businesses in the informal sector.

In general, licensing in Eritrea is easy and most enterprises are regulated. However, one requirement for opening a business is space, which is another major constraint many women entrepreneurs also face. Due to a lack of space, many women in the informal sector are unable to get a license to trade and this impedes their operation. In summary, it appears that the most important source of assistance which could positively impact on improving the functioning of businesses within the informal sector is access to credit (finance) and goods/raw materials. Our research findings indicate that financial support in the form of loans and/or grants could help women engaged in the informal sector acquire the goods/raw materials needed for their businesses.

Microfinance appears to be the only successful model for providing non-collateral small-scale credit to operators within the informal economy. It is recommended that other sources of funding, besides their own savings, be

made available to women starting up informal businesses. Accordingly, access to Eritrean microfinance institutions could help women augment their working capital and expand their businesses.

Moreover, support programs for education, skill building and training should be made readily available to women to help them improve their business, marketing and production skills. Gender-specific and tailor-made training might be a useful strategy to address gender inequalities. Although considerable assistance is provided by the NUEW, and the Government, in the form of finance and other assistance, continuous support for this sector is crucial. The provision of favorable policies and a legal environment that lowers the cost of establishing and operating a business (such as: simplified registration and licensing procedures; appropriate rules and regulations; and reasonable and fair taxation policies) would be beneficial to women operating in the informal economy. In addition, establishing marketing cooperatives at the regional level (under the umbrella of the NUEW) to give voice to the poor women working within the informal economy could help to reduce the constraints their businesses are facing. It could also help the NUEW and the Government to more easily approach these women.

Conflict of Interests

The authors have not declared any conflict of interests.

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Full Length Research Paper

Applicability of the huff model in the estimation of market shares of supermarkets within the Tamale metropolis in Ghana

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This paper estimated the market shares of four shopping centres/super markets within the Tamale metropolis in Ghana. It employed the Huff model: a probabilistic gravitational model adopted as alternative in the computation and estimation of probabilities and attractiveness as well as the distance in mileage covered by prospective customers to the shopping centres/super markets. The research revealed that 75% of the shopping centres did not have the capacity to compute their own market shares. The computational analysis of four supermarkets under the study are as follows: Supermarket A: 33% market share, Supermarket B: 28% market share, Supermarket C 22% market share and Supermarket D: 17% market share. The paper emphasizes the need for managers of shopping centres/supermarkets to apply tested and proven scientific methods to compute their market shares.

Key words: Grocery industry, Huff model, estimation of market shares, supermarkets in Tamale - Ghana.

INTRODUCTION

Evidence from the literature regarding the Huff model points to its malleability and manipulative nature. Over the years, a series of studies on the modification of the Huff model have been carried (Kim et al., 2011) predicting potential retail markets in South Korea; (Huff, 2003) predicting consumer spatial behavior, delineating trade areas, locating retail and service facilities; (Ramanathan, 2009) 'Estimating relative attractiveness of locations using data envelopment analysis failing to include its applicability in the estimation of market shares. This paper seeks to estimate the Market shares of four selected shopping centres within the Tamale metropolis

in Ghana using the Huff Model. This model was employed to compute and estimate three-dimensional elements - the distance covered in mileage by customers to these centres, the attractiveness and probability as well as their expenditure budgets. Key computational requirement necessary for the operation of this model include (i) the size of the shopping centres, (ii) the propensity of customers to travel and (iii) the populations of the four (4) selected communities within the catchment areas of the shopping centres.

The fundamental objective of every firm is to improve upon its existing market share.

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Among other things, companies pursue this objective by appealing to larger demographics, lowering prices or through aggressive mass advertising campaigns. Unfortunately in Ghana market share calculation and its implication on the future prospects on firms and their operation is quite low most especially among small and medium scale enterprises. What seems to be the overall objectives of SMEs especially in Ghana is the proclivity to survive rather than the intricacies of market share calculations. Supermarket owners are mostly interested in estimating their volume of sales and profits on daily and weekly basis. However, the fundamental problem associated with this volume approach is that, it does not portray the actual performance of the company since sales are only one element amongst the several parameters that determines how much the company is able to obtain from the market. Another problem with this volume approach is that it requires the total volume of sales figures from the entire grocery industry which is unavailable at the statistical services in Ghana, signifying that any calculations of the market share without this vital parameter would render the outcome unreliable. The consequences thereof include; (i) erroneous and inaccurate sales forecasting values, (ii) unreliable predictive assumptions, (iii) poor decision-making at management level (iv) and likely reduction in the profitability levels and others.

In the light of the enunciated problems aforementioned, this paper seeks to adopt the Huff model to address the inefficiencies and complexities involved in market share estimation of super markets in Ghana.

Introduced over some forty years ago, the Huff model is suitable for the formulation and evaluation of business location decisions analysis. It has been tested and proven to be viable and reliable, hence, can assist management to take sound decisions that can impact positively on the fortunes of a company. This model is constructively manipulative and conceptually appealing. It is easy to operationalize and is applicable to a wide range of problems in predicting outcomes that would have hitherto been difficult (Huff and McCallum, 2008). This tool has been used by analysts and academics to, among other things, estimate market potential, define and analyze trade areas, evaluate market penetration, assess economic impact, predict consumer shopping selections, profile and target consumers, forecast sales of existing and potential outlets and assess the impact of environmental changes (Huff and McCallum, 2008).

Literature review

Scientists' knowledge and understanding of the world is often presented in the form of models. The scientific method is one of creating, verifying and modifying models of the world. The goal of the scientific method is to simplify and explain the complexity and confusion of the world. The applied scientist and technologist then use

these scientific models to predict and control the world (Stockburger, 1998).

Models

A model is 'a representation containing the essential structure of some object or event in the real world' (Stockburger, 1998). The representation may take two major forms: (i) Physical, as in model airplane or architect's model of building (ii) Symbolic, as in a natural language, a computer programme, or a set of mathematical equations. In which ever form these models may appear, they often form the basis for taking strategic business decisions. A business model is "the content, structure, and governance of transactions designed so as to create value through the exploitation of business opportunities" (Zott et al., 2010). Models are a representation of a system that allows for investigation of the properties of the system and, in some instances predictions of future outcomes (Stockburger, 1998). Models are normally used both in quantitative and technical analysis and in other cases for fundamental analysis. Evidence from the literature shows that models are either abstract or quasi-abstract in nature. Psillos (2011) reinforced this position by arguing that "Idealization and abstraction are indispensable for the construction of theoretical representations of worldly systems, but their products - the models are not worldly systems. What exactly models are, might still be a matter of dispute, but a central thought is that models (or at least some models) are abstract entities".

The Huff model

The Huff model is a gravitational model based on Newton's Law of Gravity. The probability of a given customer shopping at a particular super market becomes greater as the size of that supermarket increases and the distance or travel time to the super market decreases (Huff and McCallum, 2008). Gravity models are based on the assumptions that a certain radius or group of customers within a radius are drawn to stores in a particular area on the basis of variables such as distance to the super market, distance between supermarkets, relative population, store size etc. Huff's model was originally intended as a tool to forecast trading area size. Extensions to the model are commonly made to change the forecast output to retail demand. Such extensions include the number of customers, expenditure levels, and the number of trips made by the consumer to purchase goods within a specified time frame (Vinturrella, 2004). Considering Huff's probability and market size variables into a market share produces a more intuitive form of the model. Following the ideas of Francica (2002), the Huff model was described widely as the industry standard for

determining the probability of a retail location to attract customers.

Extensions to the Huff model

One major criticism against the original Huff model is that it is over-simplistic since it considers just two factors or variables in describing consumer patronage (Colome and Serra, 2001). Following this critique, some extensions to the model were made to consider additional factors in describing consumer patronage. Nakanishi and Lee (1974) extended the Huff model by including additional factors to represent a facility's attractiveness (instead of just the area as the only attractiveness attribute in the original Huff model). Subsequently, more factors have been considered in the location model, such as consumer opinion of facility image, facility appearance, number of checkout counters and credit card services to capture the attractiveness, and travel distance and physical distance for the measure of unattractiveness (Thang and Tan, 2003). A more general model considering several factors for a competitive location problem is sometimes known as the multiplicative competitiveness interaction (MCI) model (González-Benito et al., 2000; Colome and Serra, 2001).

METHODOLOGY

This study was conducted in four selected super markets within the Tamale metropolis. For the purpose of this paper, the names of these selected super markets have been withheld for ethical reasons. However, they are designated as SUPERMARKET-A, SUPERMARKET-B, SUPERMARKET-C and SUPERMARKET D. These stores were purposively sampled. This because each of these supermarkets was considered based on the location theory posited by (Plastria, 2001) as cited in (Ramanathan, 2009) among other authors. Factors like proximity to the principal streets of the Tamale metropolis and the strategic location of these supermarkets were the key factors that influenced the choice of these four. A good location therefore can lead to strong competitive advantage, because location is considered as one of the elements of the retail marketing mix that is "unique" and thus cannot be imitated by competitors" (Zentes and Morschett, 2007). Again, the population of customers within the immediate catchment areas of these supermarkets were considered for the study. These areas included; Tishegu/Moshie zongo; Sabon-Gira/Bugpeila; Foo and Sakasaka/Kalpohin/Gumani. At the time of conducting this study, the 2010 population figures for these selected communities were not available. Consequently, the researchers adopted the exponential population growth model to extrapolate the population of these selected communities from 2000 to 2010 based on the 2000 population census figures. 200 customers, who were randomly sampled, participated in the study. This afforded each customer an equal opportunity of participation in the study. In computing the market share of these supermarkets, the three fastest selling products from each supermarket were identified from the database of scannable barcodes systems. The floor sizes of each of these supermarkets were established by using the engineering designs of these facilities whilst the information on the distances in millage from these catchment areas to the supermarkets was obtained from the Office of Urban Roads Department in the Tamale Metropolis.

Algorithms of the Huff model

In the Huff model, the probable demand from population Centre i that will be attracted to retail location j is estimated as per the following steps (Fitzsimmons and Fitzsimmons, 2004).

Step 1: Attractiveness of a facility is expressed as:

$$A_{ij} = \frac{S_j}{T_{ij}^\lambda} \quad 1$$

Where A_{ij} is the attraction to facility j for customers in area i , S_j is the size of the Supermarket in the study area (e.g., square feet), T_{ij} is the travel time from area i to facility j and λ is a parameter reflecting propensity to travel ($\lambda > 0$). For the purpose of this study λ is assumed to be 3 which is an average figure between 3.19 and 2.72. It also assumed that customers exhibit similar demographic characteristics and equal shopping behavior (Susilawati, Yakobus, & Sulistyawati, 2002). Normally travel time is assumed to be proportional to the distance travelled. The study is assuming that the distances to the various shopping centres from the catchment areas are equidistant and customers do not rely on the same mode of transportation to these shopping centres.

Step 2: If there are several facilities competing for the patronage of the same set of customers, the probability P_{ij} of customers in an area i travelling to a particular facility j is computed as:

$$P_{ij} = \frac{A_{ij}}{\sum_{j=1}^n A_{ij}} \quad 2$$

Step 3: The annual customer expenditures E_{jk} for a product class k at a facility j is calculated as:

$$E_{jk} = \sum_{i=1}^r (P_{ij} C_i B_{ik}) \quad 3$$

Where C_i is the number of customers in area i , B_{ik} is the average annual amount budget for product class k for customers in area i and r is the number of customer areas in the region or the number of statistical areas. In this case study k represents the products like salt, milk, soap, Milo, Toothbrush Tooth paste, etc that customers buy at the shopping facility.

Step 4: Finally, the market share M_{jk} captured by facility j of product class k is calculated as:

$$M_{jk} = \frac{E_{jk}}{\sum_{i=1}^r (C_i B_{ik})} \quad 4$$

DISCUSSION AND PRESENTATION OF RESULTS

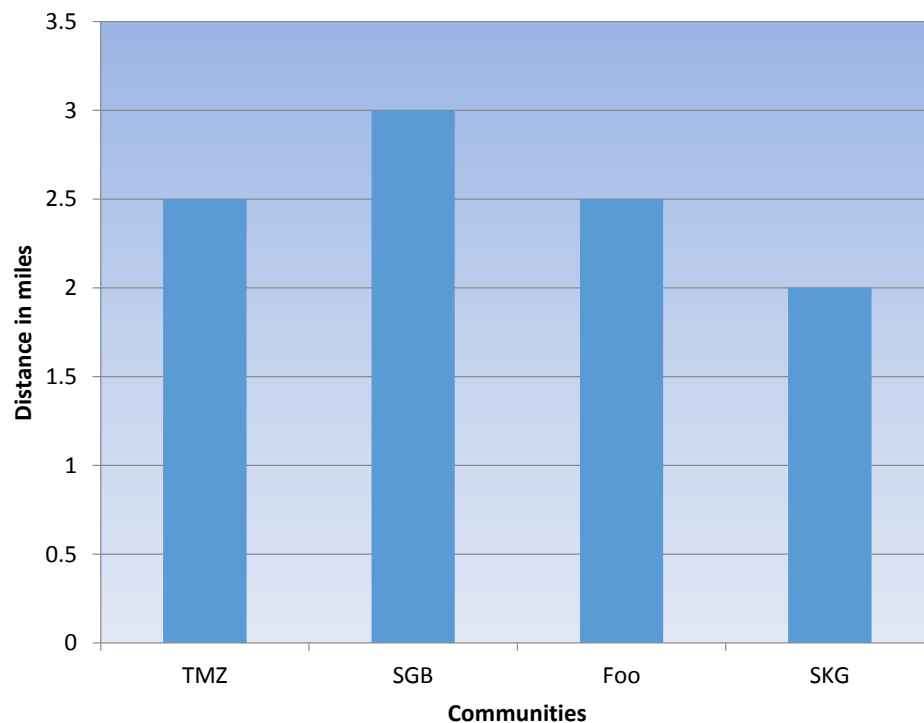
Computational analysis

The selected communities for the study included Tishegu/

Table 1. Attractiveness (A_{ij}).

Shopping centres	Communities location				λ	Size S_i
	Tishegu/Moshie/ Zongo: Avm(2.5 miles)	Sabon-Gira/ Bug peila ; Avm(3mls)	Foo: Avm (2.5miles)	Sakasaka/Kalp ohin/Gumani. Avm (2miles)		
Supermarket A	1.920	1.111	1.920	3.750	3	30m
Supermarket B	1.600	0.925	1.600	3.125	3	25m
Supermarket C	1.280	0.740	1.280	2.500	3	20m
Supermarket D	0.960	0.556	0.960	1.875	3	15m
Total	5.60	3.332	5.760	9.375		

Proximity of communities to Shopping centres

**Figure 1.** Proximity of commodities to shopping centres/supermarkets.

Moshie zongo (TMZ), Sabon-Gira/Bugpeila (SGB), Foo and Sakasaka/Kalpohin/Gumani (SKG) as represented by the attached codes. The calculation of the estimates of attractiveness of the customers from the four communities of the case study to the various shopping centres can be found in Table 1. The value of attractiveness was obtained by dividing the size of the shop by the value of the average mileage travelled by the customer to the supermarket. For instance the attractiveness of a customer from Tishegu/Moshie zongo to supermarket A.

Attractiveness of customers from the communities to the shopping centres

Table 1 shows the attractiveness of customers from the four selected communities to the four study supermarkets. Customers from Sakasaka/Kalpohin/Gumani (SKG) are more attracted (9.375) to the shopping centres than any of the selected communities and the least (3.332) being customers from Sabon-Gira/Bugpeila(SGB).

The bar chart in Figure 1 shows the proximity of the communities to the shopping centres. It revealed that

Table 2. Probability (P_{ij}).

Supermarkets	Location of communities			
	Tishegu/Moshie Zongo	Sabon-Gira/Bugpeila	Foo	Sakasaka/Kalpohin/Gumani
Supermarket A	0.3333	0.3343	0.3333	0.4000
Supermarket B	0.2778	0.2776	0.27778	0.3333
Supermarket C	0.2222	0.2221	0.2222	0.2667
Supermarket D	0.1667	0.1669	0.1667	0.2000

Table 3. Population census (2000) population figures of the communities.

Cluster communities	2000 Population
Tishegu/Moshie Zongo (TMZ)	24,757
Sabon-Gira/Bugpeila (SGB)	19,757
Foo	851
Sakasaka/Kalpohin Gumani (SKG)	33,345

communities which were relatively closer to these shopping centres patronized relatively more of the products of these supermarkets. This is obvious because it is consistent with the location theory (Stockburger, 1998). For example, SKG community is closest and SGB appears farthest relative to FOO and TMZ communities, hence, accounting for the high level of attractiveness registered by Supermarket A.

Probability of a customer from a given geographical area

The probability of a customer from a given geographical area brings into perspective the propensity of a customer to go to a chosen shopping centre amongst the four. The tendency that a customer will select amongst these shops probably one of two to buy products even though the remaining shops sell similar products, can only be estimated using probabilities. Therefore, this is connoted by the expression $P_{ij} = \frac{A_{ij}}{\sum_{i=0}^m A}$, This ratio measures the probability of a customer from a given geographical area i travelling to a particular shopping facility j . The probabilities of the various communities were estimated as shown in Table 2. Out of the four selected shopping centres, it is difficult to determine the one that customers will visit, hence, the significance of the table. The tendency of a customer getting attracted to Supermarket A from Tishegu/Moshie zongo (TMZ) is estimated as 0.3333 which is bigger in predictive terms than the same customer visiting Supermarket D with a probability value of 0.1667. Therefore, the predictive ability associated with a probability value that is higher is more accurate than one which is smaller since it will have a lower predictive

ability (Table 3). The population growth rate for Northern Region is estimated at 2.8% (Ghana Statistical Service, 2000). The exponential population model was applied to extrapolate population for 2010 (Table 4).

$$\begin{aligned} X_t &= X_0 e^{\lambda t} \\ \text{Where;} \quad X_t &= \text{Population at time } t \\ X_0 &= \text{Initial population} \\ \lambda &= \text{Growth rate} \\ t &= \text{time} \end{aligned}$$

Expenditure budget (E_{ik})

An estimate of the annual consumer expenditure for a product class at a prospective shopping facility can be calculated as; $E_{ik} = \sum_{n=0}^m (P_{ij} C_i B_{ik})$

Where

P_{ij} = Probability of a consumer from a given geographical area i travelling to a shopping facility j calculated by means of the stated equation.

C_i = number of consumers at a geographical area i

B_{ik} = average annual amount budgeted by consumer a geographical area i for a product class and k

m = number of geographical areas.

Average monthly budget of individual customers were estimated and used for the computation of their monthly expenditure. The estimation was arrived at by using the fastest selling item. The data for the calculation of the customers' expenditure budget was derived from the database of the four shopping centres. The results from the table above indicate that the highest expenditure

Table 4. Extrapolated population figures for 2010.

Cluster communities	Population (2000)	Projected population (2010)	
Tishegu/Moshie Zongo	24,757	24757e ^(0.28)	32,757
Sabon-Gira/ Bugpeila	19,757	19757e ^(0.28)	26,141
Foo	851	851e ^(0.28)	1,126
Sakasaka/Kalpohin /Gumani	33,345	33,345e ^(0.28)	44,120

Table 5. *E_{jk}* Expenditure Budget.

Shopping centres	Expenditures of customers from the communities			
	Tishegu/Moshie Zongo(GH¢)	Sabon-Gira/ Bugpeila(GH¢)	Foo(GH¢)	Sakasaka Kalpohin/Gumani(GH¢)
Supermarket A	545,895.40	436946.81	18,764.76	882,400.00
Supermarket B	454,994.73	362,837.08	15,640.14	735,259.80
Supermarket C	363,930.27	290,295.80	2,509.86	588,340.20
Supermarket D	273,029.59	218,146.64	9,385.21	441,200.00
Total	GH¢1,637,849.80	GH¢1,308,226.20	GH ¢56,300	GH ¢2,647,200

Table 6. (*M_{jk}*) Market shares of shopping centres/supermarkets.

Shopping centres	Total	Market share in percentage(%)
Supermarket A	1,884,007	33
Supermarket B	1,568,731.7	28
Supermarket C	1,255,076.1	22
Supermarket D	94,176.44	17
Total	5,649,576.00	

Supermarket A> supermarket B> supermarket C> supermarket D.

budget of (GH¢1,637,849.80) emanated from Tishegu/ Moshie zongo (TMZ) community whilst the lowest expenditure budget (GH ¢56,300) came from the FOO community (Table 5).

Market shares of the Supermarkets

The market shares estimation is computed by:

$$M_{jk} = \frac{E_{jk}}{\sum_{i=1}^r (C_i B_{ik})}$$

Where;

M_{jk} = Market share of the shopping centre *j* in the case study of the customer budget for item *k*

E_{jk} = Customer expenditure for a product class *k* at a facility *j*,

C_i = The number of customers in area *i*

For instance, the market share of supermarket A is derived by dividing the total expenditure of one community by the summation of all the four communities' expenditure.

The results show that Supermarket A has the highest market share (33%) followed by Supermarket B (28%), Supermarket (22%) and eventually Supermarket D (17%) (Table 6).

Conclusion

Evidence from this paper points to the fact that shopping centres with very large floor spaces tend to attract more customers relative to shopping centres with smaller floor space. Again it is clear from the study that the culture or habits of market share calculation among owners of shopping centres within the Tamale metropolis is low. This could be attributable to the fact that the proclivity to survive rather than the intricacies of market share calculations remains the immediate preoccupation of

owners of these shopping centres.

The immediate emphasis of the owners of these centres is the volume of sales and profits on daily and weekly basis hence the finding of this paper that owners of shopping centres within the Tamale metropolis did not understand the implications and relevance of market share to their operations did not come to this paper as a surprise.

RECOMMENDATIONS

Most business executives should be given the rightful exposure about how to calculate their market shares with in-built Huff model software through seminars, training programmes, discussion and specially organized fora.

Executives of supermarkets should take into cognizance the floor size of their supermarkets since the larger the floor size, the more attractive the super market is to prospective customers. For tax purposes, it is recommended that Government revenue agencies could adopt this model to help them track down firms or SMEs that have the habit of evading tax.

Though the habit of market share calculation among owners of shopping centres within the Tamale metropolis is low, this statement may not be generalized for the entire country since Tamale is situated in the rural northern part of the country where the average per capita income is relatively low.

It is also recommended that sales discounts and aggressive promotions and advertising campaigns be adopted by owners of these shopping centres to boost their sales and subsequently market shares.

Conflict of Interests

The authors have not declared any conflict of interests.

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