



Simultaneous Optimisation of Supply Networks in the Floriculture Industry in Kenya: A Qualitative Research Process

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ABSTRACT

This paper presents the qualitative research process used in developing a conceptual model for simultaneous optimisation of supply networks of the floriculture industry. This involved interviews with floriculture industry stakeholders to identify the key success factors. Content analysis was mainly used in arriving at: a summary of the key success factors in the floriculture industry; the relationships that exist among the different variables; the possible constraints that may be faced in developing a conceptual model for managing supply networks for simultaneous optimization in a complex adaptive environment; and a proposed conceptual model for managing supply networks for simultaneous optimisation. The process of content analysis involved the following series of steps: deciding on the level of analysis; deciding how many concepts to code for; deciding whether to code for the existence or frequency of the concept; deciding how to distinguish among the concepts; developing rules for coding texts; deciding what to do with irrelevant information; coding texts; and analysing the results. This phase of the study was fundamental in answering the study sub-questions on: what are the key success factors that influence performance of the floriculture industry in Kenya?, what are the relationships between the key success factors that influence the performance of the floriculture industry in Kenya? what are the factors that will indicate performance of the floriculture industry from a traditional perspective (supplier – customer)?, are there differences in factors to be considered for the embedded and free agents performance in the floriculture industry, end to end and within country?, what needs to be considered in developing a conceptual model for simultaneous optimisation of supply networks, end to end and within country? The findings and results of the study point at: financing; key success factors (supply value chain); country specific benefits; transport; research and development as positively influencing the performance of the floriculture industry in Kenya.

Key words: Content analysis; Supply Network Optimisation; Simultaneous Optimisation

1.0 INTRODUCTION

Floricultural exports are the source of Kenya's biggest export earning, surpassing tourism as of the year 2008. The value of the exports rose from Ksh. 1 billion in 1990 to a record over Ksh. 43 billion in 2008. The annual growth in the sector has averaged over 10% for the past five years and is projected to continue. Hence, the economic stability of the country is dependent on the continued success of the industry (HCDA, 2008). Floriculture in particular is estimated to employ over 100,000 people directly, while indirect employees in transport, packaging, inputs etc are approximately 1.2 million people who derive a livelihood from the export industry. The fact that this employment is in the rural areas is very important, as it not only stems rural urban migration but also contributes to poverty alleviation, a major focus of the government (Kenya Economic Survey, 2009).

There is need to optimise supply networks in the floriculture industry from end to end horizontally, and vertically by ensuring country specific benefits. This will call for literature review on supply chain modeling and the benefits of simultaneous optimisation. It must also be established that there is a research gap on this area particularly in a developing economy, such as Kenya. Incidentally, the supply networks of the international firms are operational in a developing economy, which further bring in the issues complexity and creates a complex adaptive environment for the networks.

The complexity of the industry emanates from dealing with a fairly perishable product where delivery time to the end customer is of essence and, to dealing with part of a first world supply chain operational in a third world. Complexity within the country arises from having a diversity of firms: those with fully embedded supply chains to those with non-embedded supply chains; small and medium scale firms; free agents; large national and multinational firms. This makes the floriculture industry operate in a complex adaptive environment (CAE). Significant benefits accrue to Kenya due to the floriculture industry, especially if this is evaluated superficially.

However, there is need to consider real situation on the ground and if it can be improved by end to end supply networks optimisation. Critical also is optimization within Kenya. Therefore, this calls for the participation of all key players in the floriculture industry in Kenya which includes: small and large firms; national and international firms; financial institutions; research institutions; universities; environmentalists; regulatory bodies; and civil societies.

2.0 RESEARCH METHODOLOGY

In this paper a detailed discussion on the findings of the qualitative phase of the research process is presented. This involved interviews** with floriculture industry stakeholders to identify the key success factors. Content analysis was mainly used in arriving at the proposed model for supply network optimisation, summary of the key success factors in the floriculture industry, the relationships that exists among the different variables and the possible constraints that may be faced in developing a conceptual model for managing supply networks for simultaneous optimisation in a complex adaptive environment.

The interviews were done with a clear agenda of topical areas and issues that were generated through literature review and theory (Lee, 1999). This led to generation of possible relationships and the establishment of a proposed model for supply networks optimization. The main variables analysed includes: internet; pollution; quality of inputs; transport; finance; research and development; operational costs; social conditions; country development; and customer responsiveness. Names are not revealed for reasons that most wanted the highest level of confidentiality by being anonymous.

The target groups for the structured interviews were stakeholders with either a direct or indirect link to the floriculture industry. In each stakeholder organization the person in charge of public relations or research and development was approached. The stakeholders that were interviewed in the stage one phase of the study included: the civil society; regulatory bodies; individual firms (international, local, large, small, embedded ; unimpeded and free agents); suppliers of plant materials; suppliers of farm inputs; financial institutions; and research firm/ institutes.

** Interviews available from author, summary and descriptions on annex I.

The initial sample will be used as a pilot and subsequent interviews will continue through referrals until a representative sample is achieved. Table 1.1 shows the final representative sample achieved through snowballing. It is cost efficient to use this method because locating respondents to acquire information may take time and finances. The main drawback, however is that some of the referrals may either be too busy and cannot be easily reached for interviewing. Informing interviewees quite in good time and booking an appointment is a way of dealing with such a limitation. Table 1.1 shows the stakeholders interviewed through snowballing which begun by interviewing an officer from Horticultural Crops Development Authority (HCDA).

Table 1.1: Sample design

Target Group	Sample Population	No. to interview
The civil society	• Lake Naivasha Riparian Association	01
	• World Wide Fund for Nature	01
	• Water and Sanitation for Urban poor	02
Regulatory bodies	• Kenya Flower Council (KFC)	01
	• Horticultural Crops Development Authority (HCDA)	02
	• National Environmental Management Authority (NEMA)	02
	• Fresh Produce Exporters Association of Kenya (FPEAK)	01
Supplier's of farm inputs	• Fertilizers and pesticides importers.	02
	• Greenhouse equipments	02
Individual farms	• Supply chain managers	10
Suppliers of plant materials	• AMIRAN Kenya	01
Financial institutions	• Kenya Commercial Bank	01
	• Cooperative Bank of Kenya	01
Research institutions	• Kenya Agricultural Research Institute (KARI)	02
	TOTAL	29

(Source: Awuor,2011)

The method adopted for qualitative data analysis is as highlighted by Babbie and Mouton (2011) which involves the following series of steps: deciding on the level of analysis; deciding how many concepts to code for; deciding whether to code for the existence or frequency of a concept; deciding how to distinguish among concepts; developing rules for coding texts; deciding what to do with irrelevant information; coding texts; and analysing the results.

This was done through content analysis of the interview sessions. The information was collected using questionnaires. Much of the recording was done through note taking and tape recording of the interview sessions.

3.0 DISCUSSION OF QUALITATIVE ANALYSIS RESULTS

3.1 Findings on the key success factor influencing the performance of the floriculture industry

The following are discussed under key success factors influencing the performance of the industry: quality of inputs; financing; country development; research and development; and customer responsiveness.

3.1.1 Quality of inputs

One of the key inputs in this industry is seeds, according to interview (1). There are three main routes through which flower farmers get seeds. One is by breeding the seeds themselves. They culture the plants using latest biotechnology to get the best seeds for planting. This can also be done through license from major breeders of branded seed varieties some of whom includes Pressman Limited, Solo Plant, Shrews and Olij Rosen.

Another option which was stated by interview (2) is direct purchase from seed breeders. Some farmers have specialized in the production of seeds for sale to flower farms. These are normally done through franchise or license as farmers prefer using tested and proven high quality seeds. The producers also produce for export especially those that require culturing. The warm climate in Kenya enables faster sprouting of the bud (in cutting) and then the cutting is exported for planting in Europe. In many cases the cutting is brought from Netherlands or any other country where climate is colder. The objective is to save on the energy cost and time. According to interview (37), the Kenya Agricultural Research Institute (KARI) breeds seed varieties that they make available to farmers. The other option farmers have for accessing quality seed is to import. There are dedicated breeders all over the world from where the farmer can buy seeds. Most seed breeders prefer to produce themselves and then export to protect patents.

Interviews (3, 1 and 2) provided evidence that seed production is a technology intensive exercise. It starts from culturing the plant using the best varieties in order to produce the best quality plant. Quality control is paramount and involves combining genes to produce the desired color, stem length and flower size. Some breeders stop here and sell the product to commercial growers who will develop the seed further and sell it to flower farmers. Lex Company in Naivasha, Kenya is one of those pure breeders that do not go into commercial seed growing but stops at the variety development stage. Pollution is managed in accordance with industry and buyer requirements and regulations. When the plant is ready, it is harvested, packed for sale, export or own use.

Other inputs includes greenhouse materials which interviews with Amiran Kenya revealed are imported from Israel and cost an average of US \$11 per square meter which includes purchase and annual maintenance. The materials have an economic useful life of 7 years on average. However, the polythene is changed after every three years.

The chemical used are mainly pesticides meant to control pests and weeds, findings which were generated from interview (4). Manufacturers of these chemicals are mainly multinational corporations with production facilities and distribution agents locally. According to interview (19), the major manufacturers are: Bayer, Syngenta and BASF. Their local distribution agents are: Amiran Kenya, Elgon Chemicals, Osho Chemicals and Farmchem among others. Fertilizer is an equally important input into flower farming. Fertilizer consumption is on average US\$ 1 per square meter per year which is at the same rate as for chemicals.

3.1.2 Financing

Preliminary findings from interviews (16, 10, 12, and 15) revealed that most banking institutions are not willing to offer credit facilities especially to the SME sector. The large players in the industry, however, enjoy good credit facilities from the banks. On the other hand, most farms complained of high interest rates on loans from commercial banks. It is therefore necessary for farmers to be facilitated to form savings and credit cooperatives (Saccos) to offer soft loans to them. The major commercial banks should also have innovative products tailored to the needs of the floriculture industry, this was according to interview (44).

The commercial banks regard the agriculture as a high risk sector and so are very cautious when it comes to loan provision as revealed through interview (16). These is not made any better by the recent occurrences in the industry such as the volcanic eruptions in Iceland that virtually cut off the industry's supply chain to European markets. This resulted in massive losses both to the industry and the country in terms of tax revenues and loss of employment. Other cases that can be sited includes the impact of global recession on the industry; the weakening of the dollar against the euro. All these shows the volatile nature and risk elements that the banking institutions associate with the floriculture industry.

3.1.3 Country development

According to interview (20), the government of Kenya has been very supportive to the flower industry. Information from HCDA confirmed that there are enough cold chains for hire by the flower farms at the airport. However, most of the big players in the industry operate their own cold chains and some, indeed the majority arrive with their flowers ready to be loaded in the planes to the various destinations worldwide.

Interview (45) also revealed that the government has made it easy for the flower farms to purchase the refrigerated trucks by removing duty on such trucks. This helps to facilitate transportation and speed of delivery since time is of essence in this industry. Duty free greenhouses also make them affordable to both the small and large farms. However, other important suggestions for government support include:

- i. government to set up an audit system for farmers and certify those who attain these standards;
- ii. government to set up and enforce quality standards;
- iii. harmonise and reduce taxation on flowers;
- iv. government to formulate a market –driven curriculum in educational institutions to support the industry;
- v. government to formulate policies and framework to facilitate e-commerce;
- vi. government should facilitate small-scale farmers to attend local and international exhibitions and trade fairs; and
- vii. government should support manufacturers to produce cheaper local fertilizers.

Interviews with most flower farms also voiced concern that the government should create conducive environment for investment in freight services and that the local authorities should maintain all feeder roads. Due to high energy costs, it is also of concern for the flower farms to harness solar energy for use as alternative source of heating during cold nights as source of energy. Some farms, especially the large international players are already getting their energy from geothermal sources, Oserian Flower farm is an example, this was revealed by interview (34).

3.1.4 Research and development

Though Kenya has the requisite technical and human capacity to serve the floriculture industry, they are not adequately financed to respond effectively to the farmers' needs. This has been attributed to lack of funds and operating facilities. During the interviews, it emerged that KARI-THIKA had introduced some flower varieties (such as moby dick, lilies, gerbera, gladiolus amongst others) which had been tested in parts of Nairobi, Eastern and Central provinces. These varieties proved popular with the small-scale farmers but the farmers lacked the capacity to continually produce these flowers and tended to rely heavily on KARI-THIKA to support their enterprises through provision of seed.

From interview (19), farmers noted that there was over-reliance on imported varieties such as roses, carnations, lilies, alstromeria amongst others for which farmers have to pay royalties. They noted that Kenya is rich in biological diversity and research should be conducted on Kenya's flora to identify and develop indigenous flower varieties for commercialization. The KARI case of moby dick is an example of how local research could be targeted to harness the country's biodiversity. It also emerged that farmers have been trying to domesticate some wild flowers such as papyrus (*Cyperus Papyrus*) on their own and called upon the researchers to support their efforts to introduce new flowers in the market.

Closely related with the need to develop indigenous flowers, farmers also strongly recommended the breeding of new flowers that could be "branded Kenyan" as per interview (22). The farmers raised concern that even though Kenya is the largest exporter of cut flowers in Africa and commanded a huge share of the EU market, the country had not bred its own flowers and still relied heavily on growing imported seeds.

According to interview (37), research in crop management technologies has concentrated on determination of spacing and nutrition requirements for a variety of flowers, while major insect pests and diseases have also been identified and documented. Integrated pest management (IPM) options for the control of soft rot disease in flowers was developed as was a tissue culture propagation protocol for lilies. Floriculture research is being done in various Kenyan Universities including: the University of Nairobi, Egerton University, Moi University, Maseno University, Jomo Kenyatta University of Agriculture and Technology (JKUAT) and Kenya Methodist University.

Interview (39) revealed current and on-going research work at the universities, some of the research projects carried out in various universities includes:

- i. effect of neem and aloe extracts on powdery mildew on rose plants (Egerton University);
- ii. effect of gibberellic acid, shade and vernalization on productivity of *Ranunculus asiaticus* (Persian buttercup) grown in the Kenyan Highlands (Egerton University);
- iii. intercropping roses and spider plant to control spider mites on rose plants (Thesis; Egerton University);
- iv. survival of propagated roses (*Rosa Hybrida*) as affected by age and storage periods of cut-wood (Maseno University);
- v. the effectiveness of glyphosates as an inhibitor of tropic responses in cut roses (Maseno University);
- vi. in vitro culture on lilies-Project (Jomo Kenyatta University of Agriculture and Technology -JKUAT);
- vii. control of erwinia soft rot in zantadeschia (JKUAT);
- viii. Calla Lily in vitro culture for hatabor rainbow bloom – Limuru (JKUAT);
- ix. evaluation of different propagation media and techniques for ornamental crops (Moi University);
- x. domestication of indigenous plants for use as ornamental crops for both small- and large-scale farmers (Moi University);

- xi. in vitro propagation and gene manipulation or ornamental crops (Moi University); and,
- xii. the use of medicinal plant extracts as biopesticides (Kenya Methodist University).

According to interview (23) the large flower growers (who dominate flower business) are private companies interested in keeping trade secrets to ensure their survival and competitiveness in the market. On the other hand, the local research system consists mostly of public institutions, such as, Kenya Agricultural Research Institute (KARI) and the universities whose mandate includes service to the nation and are obligated to disseminate any information that would help improve the livelihoods of the general populace.

The public research system therefore considers such information, knowledge and technologies as public goods. This divergent approach to information and knowledge acquisition, sharing and use undermines a close interaction and sharing of knowledge and information between the industry and the public research institutions. Moreover, the slow, bureaucratic procedures in the public research institutes undermine their ability to respond to urgent farmers' requests. Farmers' needs (such as disease outbreaks) are usually urgent and require immediate solutions. The delays from the local public research system forces farmers to seek solutions from international research establishments, this was according to interview (38).

More often, research priorities in public institutions are set by the scientific community with little attempt to involve the beneficiaries in priority setting. This tendency has led to research institutions being isolated from the immediate needs of society, according to interview (38). This approach is often motivated by the assumption that the scientists and researchers know what the farmers want. As such, research often ignores farmers' perceptions hence the outcome often does not satisfy farmers' needs. Interview findings thus highlight the need for more focused research and direct dissemination of findings to farmers, more so those in the SME sector who are often disadvantaged when it comes to adoption of new ideas.

3.1.5 Customer responsiveness and information integration

Customer responsiveness deals with the speed at which the flower farms respond to the needs of the end customer. The flower industry is now very much a "buyer-driven" global commodity chain. In such chains, retailers play the key role in governing the chain of activities that link widely dispersed producers to consumers in developed countries. While they generally do not own farms, processing facilities or importing companies, supermarkets still play a critical role in defining what is produced, where, how and by whom. Typically, they tend to shy away from buying produce from smallholder farmers, according to interview (9). Supermarkets are, of course, first and foremost business enterprises operating in a highly competitive environment with a bottom-line responsibility to their shareholders. They are not development agencies with a mandate to promote smallholder production.

Whilst the supermarkets exert greater control over the product, orders remain uncertain and fluctuating. There are no written contracts specifying quantities to be delivered each day, a strategy which enables buyers to eliminate the financial risk from their end of the chain. Although there are estimates based on previous figures, the final order is not emailed over until 10 am or later on the day of delivery. Daily life on the supplying farms is tied directly to this schedule. Once the order is confirmed, the flowers have to be picked, sorted, packed and delivered to airport pack houses in time to catch overnight flights to UK distribution centers. What this means is that employers cannot be sure beforehand how many workers are needed or for how many hours they will need to work. Growers are under extreme pressure to meet targets for the day and it is hardly surprising that this pressure is pushed down the chain to supervisors and workers.

Interview (1) revealed that sourcing from smallholder farmers can be risky and can reduce efficiency in a world of demanding and fickle consumers unwilling for example to buy red roses of uneven size. Likewise, relying solely on sales to supermarkets which have widely varying demands is also a risky strategy for smallholders. Smallholder farmers tend to be good at producing low cost and high quality labour-intensive flowers. Also, being seen to support farmers in the developing world is an astute branding move for supermarkets constantly trying to cement their "license to operate." The benefits can cut both ways. For smallholder farmers, selling to supermarket supply chains offers a price premium over local markets and gives them access to new technologies, knowledge and inputs that can dramatically increase their productivity.

Most importers predict that smaller operations will become progressively marginalized as large-scale producers invest heavily to expand operations and are able to meet the ever-increasing demands of the EU and UK regulatory framework. However, recognizing the importance of small-holder agriculture in Kenyan development, the Kenyan authorities are keen to ensure that small-holders are able to participate more fully in the cut-flower exports sector. The HCDA, assisted by donors and the private sector, are seeking ways to encourage smallholders to form producer groups, which can then be targeted for training and development. Advice and assistance on the international regulatory framework, and the improvements required in order to meet it, are a vital first step towards raising standards on small farms, particularly with respect to the use of agricultural chemicals.

Supermarkets in the UK, being increasingly concerned with ethical trading issues, are supportive of utilizing smallholders, provided that they can meet import standards, and that structures exist to monitor and audit this. Customer concerns over the apparent 'exploitation' of developing-world producers could assist this move to smallholders, as they are widely perceived to benefit from being incorporated fairly into international trade.

3.2 Findings on key factors influencing country specific benefits

The findings on key factors influencing country specific benefits to be discussed include: environmental audit; financial audit; and social audit. This was also instrumental in developing the proposed conceptual model for supply networks optimisation in the floriculture industry.

3.2.1 Environmental audit

The National Environmental Management Authority (NEMA) is the national body mandated with the responsibility of conducting environmental audits before the flower farm are given a go ahead to establish their activities. The Kenya Flower Council (KFC) also has a code of regulations to be observed by its members. The silver standard is laid out in five sections.

- i. "Farm management, responsibilities and documentation" requires growers to keep records on health and safety, worker terms and conditions, employee remuneration, wage deductions, and agrochemical stocks, application and training. It also requires growers to pay royalties to plant breeders according to international rules";
- i. "General Worker Welfare" covers worker wages, labour conditions and health and safety. The section stresses the importance of complying with national labour and health and safety legislation (particularly the Regulation of Wages and Conditions of Employment Act). In only a few instances does the code go beyond the provisions of the law and consequently few responsible flower industry employers fall foul of the code;
- ii. "Agrochemicals" covers crop protection strategies, worker protection, and the use, application, storage, transport, and disposal of pesticides. Kenyan law contained in "The Factories Act" and "The Pest Control Products Act" gives some guidance on these issues. However, the code takes most of its provisions from widely recognized principles of best agricultural practice";
- iii. "Protection of the natural environment" covers use of fertilizers, water management, soil conservation, disposal of non-hazardous waste, and the protection of wildlife and water sources. Until recently there has been little legal guidance on protecting the environment. However, in 1999 new legislation was enacted to cover a wide range of environmental issues. Implementation of the act has yet to take place and the extent to which it will affect the KFC code has yet to be fully gauged. The Kenyan flower industry continues to come under considerable criticism from environmentalists worried that pollution and over-exploitation of natural resources will permanently degrade the natural environment. The KFCs silver standard code, and more particularly the gold standard, is designed to deflect criticism from KFC members. During the course of the fieldwork for this study, several KFC members expressed the apparently genuine opinion that maintaining a sustainable natural environment was crucial to the long term future of the industry;
- iv. "Post harvest" covers health and safety, and environmental requirements that are specific to grading, packing houses and cold stores.

It is however, of much concern that there is no strict compliance with this rules as was notes in March 2010 when the fish in Lake Naivasha were virtually dieing as result of pollution of the lake. It is to be noted that Lake Naivasha has the highest concentration of flower farms in Kenya. The Lake Naivasha region is the hub of the Kenya's cut flower industry. The region is situated around 100 km northwest of Nairobi in the Great Rift Valley at an altitude of between 1,800 – 2,000m above sea level. The temperature range for the region is between 7.3 – 22.7 degrees Celsius and annual rainfall ranging from 156.0 mm/month to 1134.0 mm/month distributed throughout the year with peaks in April/May for the long rains and October/November for the short rains.

It is estimated that close 70 per cent of the country's total flower production is concentrated around Lake Naivasha. Other than the growers, the Lake Naivasha cluster comprises other key actors in the flower industry including research institutions, breeding farms, quality control and regulatory agencies, input suppliers, credit and finance institutions, trade promotion agencies and other intermediary organizations. The emergence and growth of Lake Naivasha cluster has been attributed to a number of factors. Key amongst these includes:

- i. Proximity to Jomo Kenyatta International Airport (JKIA), Nairobi: By its location along the Nairobi – Nakuru highway, approximately one hour from the city center, the Naivasha cluster has easy access to the airport making transportation easier. Nairobi is considered a major hub in the East African region and served by major airlines according Kenya an easy access into Europe and other parts of the world;
- ii. Availability of fresh water resources for irrigation: Lake Naivasha is the only fresh water lake in the whole of the Rift Valley region. Flower growing requires a lot of water for irrigation and the presence of Lake Naivasha attracted many farmers to this region. Besides the lake, there are lots of underground water resources (aquifers) which the farms drill to use for irrigation;
- iii. Large farms for large-scale commercial production: The availability of large, inhabited tracts of land with suitable soils for flower production around Lake Naivasha was another contributory factor to the development of the cluster. Historically these large tracts of land were owned (through leasehold) by white settlers such as Lord Delamere Estates which owns most of the land around Naivasha town. Both the white settlers and the government therefore leased out the fallow land to the large scale commercial flower growers; and
- iv. The soils and climate are conducive for horticultural production: Both the soils, temperature and annual rainfall range around Lake Naivasha are favourable for cut flower production.

The case of March 2010 in which a lot of fish died from the lake has gone further to confirm that environmental audit is not strictly observed. The heavily polluted and shrinking, Lake Naivasha is in dire trouble. Environmentalists say the cause is clear: flower farms. Some 60 flower farms line the entire lakeside, growing cut flowers for export largely to the EU. While the flowers industry is Kenya's largest horticultural export (405.5 million last year) it may have also produced an environmental nightmare.

Interviews (14 and 15) with environmentalists revealed that flower farms have taken water from the lake for irrigation and then dumped pesticide-waste back into the lake. Long-ignored by policymakers, the situation has recently reached a head due to thousands of fish and other freshwater organisms perishing in the lake. Fishing, once common in the lake, has since been banned. A preliminary inquiry linked the flower farms to the lake's troubles stating that the fish mortality was likely caused by low levels of dissolved oxygen. The lake is also shrinking due to a variety of factors: over-irrigation from the farms, water requirements for nearby Naviasha town, and climate change. However, it is to be noted that Lake Naivasha is a Ramsar site and Kenya has the international obligation to protect it from environmental degradation.

3.2.2 Financial audit

Initial interviews (21, 7) with members of the civil society revealed the importance of financial audit. Most members interviewed were of the opinion that the industry does not benefit Kenya much. It was estimated that less than 3% of the earnings from the industry trickle back into the country in terms of corporate social responsibility and employee welfare. However, members of the regulatory bodies were of the opinion that the flower industry is highly vilified and that no other industry in Kenya is under such expectations. Hence, financial audits by government bodies such as Kenya Revenue Authority or the Treasury would help to keep track of the exact nature of profits reaped from this industry. And what exactly comes back to Kenya in terms of taxation and social welfare.

It was gathered that this line of argument prevailed amongst members of the civil society because the major player in the industry were foreign owned, mostly in partnership with Kenyans. However, foreigners remained the principal shareholders. There has been no comprehensive study of profitability within the Kenyan flower industry. Even if there had been, there would be a need to continually revise figures in the light of rapidly changing costs and revenues. The high price of oil and the strength of the dollar have recently combined to raise production and marketing costs (particularly the cost of airfreight).

Carnation and rose markets have matured over the last decade and revenues per stem are not as large as they once were. Market preferences have changed to the extent that the production of certain varieties of rose is no longer profitable. Increased competition both from within Kenya and from other countries has increased quality requirements and reduced margins, thereby creating a market that can only be served profitably by high quality production and high volume marketing.

Despite this rather gloomy picture, flower growers still expect to make profits into the future, as indicated by the number of new greenhouses that are currently being erected around Lake Naivasha as observed by interview (21). But the business of growing flowers has become much more complicated and growers now require sophisticated market information in order to make profitable planting and marketing decisions.

3.2.3 Social audit

The issues to be addressed in social audit according to interview (21) includes: workers' relationships with supervisors and management, employee working conditions, sexual harassment and sexual favors, and the implications of employment on the ability to care for children. All of these issues are extremely important to workers, and can not be easily determined through interviews.

Focus group discussions involving the use of various activities such as ranking exercises and role-plays could be adopted. Role-plays are particularly useful for acquiring a deeper understanding of certain issues, for promoting group cohesion, and for encouraging greater participation of reticent group members. Role-plays are especially effective at eliciting the perspectives of women, who appeared to express themselves most fully in this format (Dolan, Opondo and Smith, 2003).

It is clear that adopting such a participatory approach in social auditing is more likely to build trust and to promote dialogue, and expose workplace issues that are often impossible to identify through a one-size-fits-all auditing approach. In particular, by using techniques and tools such as group discussions and visual representations, the approach has several advantages for ensuring that the voices of marginalized women workers are included (Dolan, Opondo and Smith, 2003).

It is therefore one of the aims of this research to encourage the adoption of this kind of approach to the auditing of company codes. However, to be effective in auditing, the approach must be undertaken as a process, beginning with raising awareness among employers and employees about the principles and criteria embodied in codes of conduct, followed by a series of pre-audits and audits, and ultimately leading to remedial action taken by management in order to cultivate improved management/worker relations (Smith et. al., 2003). This point to the need for a local multistakeholder approach to code implementation, which can ensure that the information derived through participatory methods is understood within a local context and acted upon (Dolan, Opondo and Smith, 2003).

3.3 Findings on constraints that could be encountered in simultaneous optimization of supply networks.

According to interview (9), small-scale flower farmers and free agents have difficulties accessing the international export market due to stringent phytosanitary standards, high freight costs, and lack of knowledge of these markets amongst other constraints. This has created room for middlemen who enter into loose agreements with farmers to buy their flowers or help them access the export markets. Preliminary interviews revealed the challenges they faced with these unregulated middlemen including low buying prices and failure to honour agreements (failing to collect produce) leading to huge losses by the farmers.

The small scale farmers and free agents it has been noted needs to form cooperatives to help them improve their bargaining positions and the government urged to facilitate the formation of these cooperative societies. The small-scale farmers need to be facilitated to negotiate legally binding contracts with the middlemen and ensure they were not exploited when entering into such agreements. The small scale farmers lack easily accessible information on various flower growing aspects including; knowledge on flower varieties per ecological zones, production technologies and marketing. Apart from lack of access to finance and information integration, a major constraint for the small farms is inability to integrate into the supply chain network of the large farms. The large farms, which are mainly multinationals have a well embedded supply network right from inputs acquisition through transportation and sales at the auctions and supermarkets in Europe.

4.0 Proposed conceptual model for supply networks optimisation

This was mainly the result of content analysis in which certain predetermined emerging issues were confirmed from literature review, theory and the interviews earlier done with industry stakeholder. It formed the basis for designing the research instrument for the phase two of the study which through statistical analysis then resulted to a revision of the model. Thus, confirming the key factors critical in the optimisation of supply networks in the floriculture industry in Kenya. Figure 4.1 presents the proposed conceptual model for supply networks optimisation in the floriculture industry in Kenya.

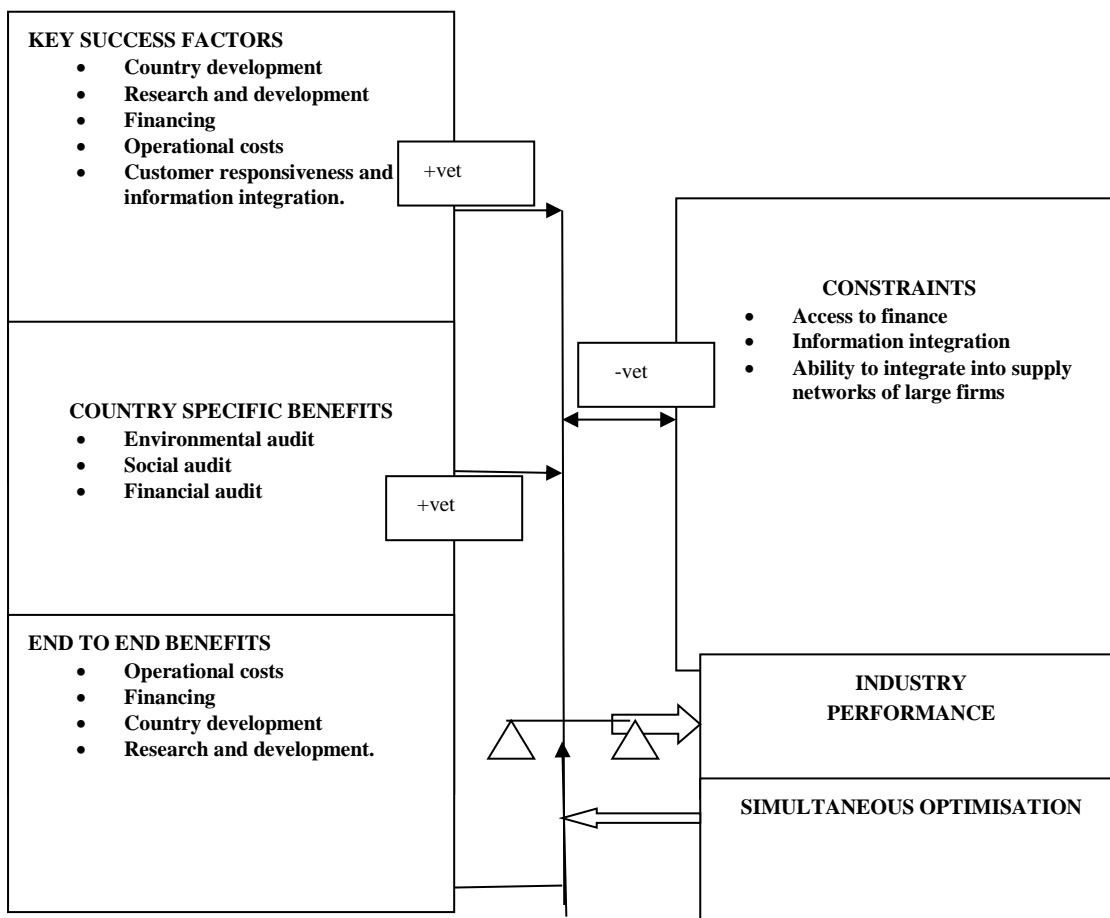


Fig. 1.1: Proposed conceptual model

5.0 CONCLUSION OF QUALITATIVE RESEARCH FINDINGS

Qualitative data analysis revealed that 64.4% of the interviewee were of the opinion that internet is important in enhancing performance in the industry. This is in terms both accessibility and affordability. Pollution is also a major concern with 60.0% of the interviewee mentioning it. Inputs to be used in the industry are also critical, both in terms of quality and affordability. Transportation and financing also emerged as important with 71.1% and 76.0% of the interviewees respectively mentioning them. Other areas having a positive impact on the industry includes; operational costs (58.0%); social conditions (66.7%); country development (76.0%); and customer responsiveness (64.4%).

The paper discussed the factors that need to be considered when designing a conceptual model for managing supply networks for simultaneous optimisation. Such factors included: country development; quality of inputs; financing; customer responsiveness; research and development. Also discussed are the factors that contribute to overall organizational performance which in this case included: return on trading investment, overall operational

costs, overall productivity growth rates and outsourcing activities and decisions. The triple bottom line benefits encompassing environmental audit, financial audit and social audit have also been discussed in relation to country specific benefits in relation to the floriculture industry in Kenya.

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Horticultural Crops Development Authority (HCDA) web site: <http://www.hcda.org>

ANNEX-1: QUALITATIVE DATA ANALYSIS

Interview	Internet	Pollution	Input	Transport	Finance	Quotations
1	I		I	I	I	“Three main routes through which flower farms get seeds for planting”.
2			I	I		“Another option of getting seeds is direct purchase from seed breeders”.
3	I	I	I	I	I	“Seed production is a technologically intensive exercise.”
4	I	I	I	I		“Chemicals used are mainly pesticides meant to control pests and weeds”.
5					II	“Banking institutions not willing to offer credit facilities to the small farms”.
6	II	II		I		“Flower farms have taken water from Lake Naivasha for irrigation and dumped pesticide waste back into the lake”.
7		I		II	I	“The civil society stresses the importance of financial audit”.
8			I		I	“Importance of addressing social audit”.
9	I	I		I	I	“Small scale farmers have difficulty accessing international markets”.
10	I		I	I	I	“High interest rates charged by banks on loans”.
11			I		I	“Importance of financial audit”
12	I			I	I	“Difficulty of accessing finance by small farmers”.
13					II	“Need for farmers to form savings and credit cooperative societies.”
14	I	I	I	I		“Need for environmental audit”
15		I	I		I	“Need for environmental audit”.
16	I			I	I	“Commercial banks regard the agric-sector as high risk for lending.”
17		I		I		“Need for environmental audit”.

18	III					“Research and development not adequately financed”.
19			II		I	“There is over-reliance on imported seeds”.
20	II	I		I	I	“The government of Kenya has been very supportive of the industry.”
21	I	I		I		“Need for social audit.”
22	I		I	I	I	“Need to have a “Kenyan brand” in the floriculture industry”
23	I	I	I	II	I	“More focus on research and development needed.”
24		I	I	I	I	“Focus on energy saving”.
25	I		I			“Research and development not adequately financed”.
26		I	I	II	I	“Need to invest more on infrastructure”.
27	I				II	“Improve on financing the sector”.
28	I	I		I		“Need for assessment of social conditions”.
29		II	I		I	“More focus on energy saving”.
30	I		II			“There is over-reliance on imported plant varieties such as roses”.
31		I	I	I	I	“Need to focus on country specific benefits”.
32		I	I	I	II	“Need for social audit”.
33	I		I			“Need for social audit”
34			I	I	I	“Some farms already getting their energy from geothermal sources.”
35		I	I	I		“Need for environmental audit”.
36	II		I	I	I	“Government to improve infrastructure”
37	I	I	II		II	“Kenya Agricultural Research Institute (KARI) has introduced some flower varieties which have been tested in some parts of the country”.
38			I	I		“Need for more focus on research and development”.
39	I	I	II	I		Listing of current levels of research on flower farming.
40		I			I	“Need to assess the extent of pollution”.
41	I			II		“The government should create a conducive environment for investment in freight services”.
42		I	I	I		“Need to assess the extent of social impact”.
43		II			I	“Organise farmers into savings and credit cooperative societies (SACCOS).
44			I		I	“Commercial banks to customise loan facilities to meet the needs of the industry”
45	I	I			I	“Government has made it easy to purchase refrigerated trucks by removal of excise duty”.
Percent	64.4%	60.0%	71.1%	71.1%	76.0%	

Interview	Research & development	Operational costs	Social conditions	Country development	Customer responsiveness
1	I	I		I	I
2	I	I	I	I	
3	I	I	I		I
4			I	I	I
5	I	I	I		
6	I			I	I
7		I	I	I	
8	II				
9		II	I	I	I
10	I	I	I	I	I
11		I			
12	I	I	I		II
13			I	I	I
14	I		I	I	
15			I	II	I
16	I	I	I		I
17		I	I		I
18	II			I	
19	I	I	I	I	I
20		I		I	I
21	I		I	I	
22	I	I	I	I	
23	I	I	I	I	
24	I			I	I
25	I	I	I		I
26				I	
27		I		I	I
28			I		I
29		I	I	I	
30	I	I			I
31			I	II	
32			II		I
33	I				
34		I	I	II	I
35				I	I

36		I		I	
37	I		I	I	I
38	II				
39	II	I	I	I	I
40			I		
41		I		II	I
42			II		I
43				I	I
44		II	I	I	I
45	I			I	I
Percent	60.0%	58.0%	66.7%	76.0%	64.4%