

SMALL-SCALE SUGARCANE CONTRACTOR ATTRIBUTES AFFECTING THEIR SERVICE QUALITY IN KWAZULU-NATAL

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Abstract

This study focuses on the attributes of small-scale sugarcane contractors that affect their quality of service as perceived by small-scale sugarcane growers (SSGs). Interviews were conducted with 114 randomly selected contractors from 10 mill group areas in KwaZulu-Natal between September 2002 and July 2003. Further interviews were conducted with SSGs for information on contractor service quality (timeliness of transport and general service, meeting of daily ratable delivery requirements, low downtime, good staff management, and minimal disagreements over service terms). Study results show that factors affecting a contractor's perceived service quality include gender, training, the quality of information used (industry-focused information sources such as the South African Sugar Association Experiment Station (SASEX) and the Ingede1, or general sources such as radio broadcasts), and sugarcane tonnage transported (size of business). Being a male contractor and having a larger business positively influence service ratings as perceived by SSGs. The importance of the quality of information used and increased training levels highlight the need for the continual provision of relevant information and training for sugarcane contractors by extension services (government, SASEX, milling companies).

Keywords: small-scale sugarcane contractors, growers, service quality

Introduction

There are about 48 000 small-scale sugarcane growers (SSGs) in the South African sugar industry (Davis, 2003). These growers form an integral part of the sugar industry and contribute an estimated 15% to the total sugarcane crop in South Africa. The viability of SSGs is important from both a rural development and economic perspective. Furthermore, mills such as Amatikulu receive a high proportion of their sugarcane (approximately 25%) from SSGs (Le Gal and Requis, 1999). A collapse of the SSG sector is therefore expected to have marked effects on the flow of sugarcane to these mills.

Small-scale sugarcane contractors are generally described as SSGs who provide essential mechanical (land preparation, crop maintenance and cane haulage tasks) (Wiseman, 2003) and/or labour (sugarcane cutting) contracting services to fellow SSGs. The productivity of these contractors is generally low, with costly delays in transportation of sugarcane and unreliability of service (Sokhela, 1999). Improving the productivity of contractors is expected to benefit not only the contractors themselves through lower costs and higher profitability, but also SSGs through higher quality services at competitive prices, and milling companies with

¹ A technical newsletter printed in Zulu, published by SASEX and distributed by Joint Venture extension staff.

a steady flow of high quality cane to the mills.

Sokhela *et al.* (1998) identify many problems that are associated with contractor management (lack of business skills), finance (lack of capital finance), and operations (inappropriate equipment). The primary focus of this study is to identify contractor attributes that have a significant effect on the quality of their service as perceived by SSGs (transport and general service timeliness, meeting of daily ratable delivery requirements, low downtime, good staff management, and minimal disagreements over service terms). This can assist sugar industry extension services in promoting these attributes through advice and training. Data for this study were collected between September 2002 and July 2003 from 114 small-scale contractors, who were randomly selected from 10 mill areas in KwaZulu-Natal. In addition, data on contractor service quality were collected through interviews with each of the sample contractor's clients or SSGs.

Sampling method

The data include the responses of a survey conducted by Joint Venture² and mill³ extension staff, who interviewed 114 small-scale contractors between September 2002 and July 2003. The study area includes 10 of the main SSG areas, namely Umzimkulu, Sezela, Eston, Maidstone, Noodsberg, Gledhow (including Glendale), Amatikulu, Entumeni, Felixton and Pongola. Some information was also gathered from 10 contractors in the Umfolozi area, although they did not form part of the random sample due to a lack of information on the contractor population. Two small-scale sugarcane areas, Malelane and Komati, were omitted because no small-scale contractors were active there. Commercial contractors service the SSGs in these two areas (4personal communication). Furthermore, information on contractor service quality was collected through interviews with each of the sample contractor's clients or SSGs. Each contractor had either one or two SSGs answering questions on the level of service quality they had provided (e.g. whether or not the contractor moved the SSG's sugarcane quickly to loading zones or mills). Due to a lack of information on grower/contractor populations, interviewers were asked to randomly select one to two growers to answer questions regarding the sample contractors' service provision.

Contractors that were interviewed included those randomly selected, with replacement, from population lists supplied for each mill area (a stratified random sample). The population was stratified by topography (three levels) and whether a contractor conducted direct or indirect haulage tasks (a total of six stratum). Due to the low number of contractors who transported high tonnages, all contractors who were listed as transporting more than 10 000 tons of cane per year were included in the sample. This was done to allow for an adequate spread of tonnage in the data. The tonnage distribution of the population and the sample were very similar, which indicates adequate representation of the population by the sample regarding tonnages.

Characteristics of respondents

The characteristics of sample respondents are presented in Table 1.

² The Joint Venture is a partnership between SASEX and the KwaZulu-Natal Department of Agriculture and Environmental Affairs, which focuses on the needs of the small-scale grower sector of the sugar industry.

³ Extension staff from Tongaat-Hulett Sugar and Illovo Sugar.

⁴ Martin Eweg, Principal Extension Specialist: Small-Scale Cane Growers, SASEX Extension Department, Mount Edgecombe, South Africa.

Table 1. Characteristics of sample small-scale sugarcane contractors, 2002/03 (n=114).

| General characteristics | | Education distribution | |
|---|------|------------------------|----|
| Mean age in years | 52 | No education (%) | 17 |
| Mean experience in years | 10 | Grade 8 or less (%) | 38 |
| Proportion of females (%) | 13 | Grade 9-11 (%) | 20 |
| Proportion with other sources of income (%) | 77 | Grade 12 (%) | 20 |
| Proportion with other skills (%) | 50 | Tertiary (%) | 6 |
| Tons transported annually* | 4860 | | |

*Excluding those contractors transporting more than 10 000 tons.

Other sources of income included 31 different types, such as farming, taxi operations, and various public employments (teaching, health directorship, Department of Agriculture service). There are 30 skills listed, such as crop maintenance, land preparation, mechanical servicing, various management skills, and other entrepreneurial skills (trading, block laying, painting, boiler making, panel beating, welding).

Table 2 shows the total number of tractors, trucks, trailers and loaders owned by contractors in the sample. The ratio of tractors to trailers is expected to be less than one, but is in fact equal to one, which suggests that there are problems associated with tractor downtime, and there may be a large number of unreliable tractors which would necessitate employment of standby tractors.

Table 2. Machinery owned by sample contractors, 2002/03 (n=112).

| Machinery type | Tractors | Trucks | Trailers | Loaders |
|-----------------------------|----------|--------|----------|---------|
| Total number | 183 | 10 | 180 | 37 |
| Machine to contractor ratio | 1.63 | 0.09 | 1.61 | 0.33 |

Contractor attributes affecting service quality

It is postulated that a number of attributes affect a contractor's service quality as perceived by SSGs.

Owner's experience, education and gender

Studies have established a positive link between an owner's level of experience and the success of his/her business (Dyke *et al.*, 1992). They conclude that certain types of experience are important, such as previous experience in general management and management in the industry in which the individual is currently operating. It is thus expected that the longer a contractor has operated in the industry, the more experience he would have gained in terms of management practices and decision-making. Extensive experience in the sugar industry could have a positive impact on small firm success, and therefore on the contractor's service rating.

Robinson and Sexton (1994, cited in Lee and Heck, 2001) found that higher levels of education led to higher success rates in new business ventures. Furthermore, they show that education has a positive impact on business growth rates. Lee and Heck (2001) conclude that

education has a marked impact on business owners and that their businesses are more successful in terms of financial and size scale measurements. This relationship is due to the link between higher education and an increased use of information, collected data (i.e. financial records), computer technologies, and assistance (extension services, development officers and other organisations). It has also been found that education improves a businessman's decision-making ability by improving his/her understanding of the industry environment and business changes, enabling a more rapid and accurate adjustment to these changes (Huffman, 1974). Bates (1990) shows that higher educated entrepreneurs remain in operation for longer than those with a low level of education. A higher level of education is hypothesised as being important to the contractor's role as decision-maker and would, therefore, have a positive impact on his service quality.

Muntemba and Blackden (2001) show that females in sub-Saharan Africa have less access to, and control of, assets and other resources such as land, technology, financial services and labour, than their male counterparts. Some of these assets and resources (labour, financial services) are critical in the running of a cane transport contractor business. Lyne (1996) states that an individual with weak social status often faces greater legal uncertainty than the rural elite. Bruce (1989) indicates that widowed or single women have a substantially lower social status than men. It is therefore expected that women, facing higher transaction costs, would be perceived as contractors providing lower quality service.

Contractor business record keeping

Woodburn *et al.* (1994) reported that commercial farmers in KwaZulu-Natal regard their farm records as the most important source of information for production, marketing and financial decisions. However, they also found that keeping their own records and preparing their budgets were the two most time consuming information gathering activities on the farm. Penn *et al.* (1989) maintain that record management concerns the management of information and that businesses operating in both the public and private sectors need this information to make decisions. They argue that if this type of information is mismanaged or not available, organisations may cease to exist. The sample indicates that contractors keep only two or three types of records (mainly records of tons transported and labour costs). Apart from being inadequate, these records are sometimes merely receipts. Poorly organised documentation can negatively affect their quality of service.

External information sources

The link between information, decisions and business performance has been well established (Ford and Babb, 1989). The process of making production and management decisions in agriculture by evaluating and using information has been studied for more than 80 years (Boone *et al.*, 2000, cited in Tucker and Napier, 2002). Information has been identified as a significant business input that has a positive effect on production (Muller, 1974). Considering that only 59% of small-scale contractors had information on labour costs, and only 71% kept any form of records, external sources of information are important. The contractors were asked to rank their three most important sources of information (see Table 3).

It has been found that increased success with information provision is experienced by targeting the information at a specific need (Tucker and Napier, 2002). A similar situation may be evident in the small-scale contractor sector, which varies with respect to operation types (i.e. indirect versus direct haulage).

Table 3. Ranking of information sources in order of importance to sample contractors, 2002/03 (n=114).

| Source of information | Most important | Second most important | Third most important |
|-------------------------|-----------------|-----------------------|----------------------|
| Milling company | 78 | 6 | 3 |
| Local association | 6 | 27 | 6 |
| The Ingede ^a | 0 | 20 | 16 |
| SASEX ^b | 3 | 10 | 16 |
| Other contractors | 4 | 14 | 11 |
| Radio | 1 | 5 | 11 |
| Other (14 sources) | 5 | 12 | 28 |
| Total | 97 ^c | 94 | 91 |

^a A technical newsletter published by SASEX in the Zulu language

^b South African Sugar Association Experiment Station

^c 17 sample contractors did not respond

Contractor training

Hussain *et al.* (1994) found that more extension contact through a training and visiting extension programme in Pakistan increased a farmer's technical knowledge and induced earlier adoption of technology (chemical weed control). Brush *et al.* (1997) found that participation in training for agrichemical use is positively dependent on problem recognition, or recognition of a need or desire. Recognition of training needs, specifically linked to numeracy, bookkeeping and marketing, have in the past been highlighted by small-scale growers (Eweg, 2002). Most contractors are themselves growers and have therefore benefited from relevant grower training programmes such as those offered by Joint Venture Extension Officers. It is expected that increased training of contractors will improve their service quality. Training received by respondents is presented in Table 4.

Table 4. Training received by sample small-scale sugarcane contractors, 2002/03 (n=112).

| Type of training | Financial or bookkeeping | Mechanical servicing | Mechanical repairs | Planning | Implement setting | Any type |
|------------------|--------------------------|----------------------|--------------------|----------|-------------------|----------|
| % trained | 15.5 | 26.8 | 15.5 | 10.7 | 11.6 | 34.8* |

*Percentage contractors that had received at least one of the five types of training listed.

Machinery repair and maintenance

Morris (1988) defines repair and maintenance costs as, "... those expenditures necessary to restore or maintain the technical soundness and reliability of the machine following wear and tear, random failure and accidents." Small-scale sugarcane contractors generally own old machinery and are thus expected to have high downtime and high repair costs. The unreliability of small-scale sugarcane contractors is a problem (Sokhela, 1999), and is often the result of machinery breakdowns. Cut cane is left rotting in the fields, incurring high losses in Recoverable Value⁵ (RV) for SSGs. Contractors need to deliver cut cane within 48 hours to ensure no significant drop in RV (Stranack, 2002). Sokhela (1999) reported that 50% of

⁵ Recoverable Value (RV) is a measure of cane quality including sucrose, fibre and other non-sucrose content, used by the mills for cane payment to the farmer (information from Bamber, 2002).

grower respondents in his study viewed contractors as being unreliable. In the present study, 31 of the 114 contractor respondents (27%) expressed their concerns about breakdowns and repair problems. Another 12% had similar concerns, but had solved these by using savings to pay for repairs, giving the remaining work to other contractors or asking for their help, repairing their own machinery, receiving assistance from local garages, having standby tractors and trailers, or getting a mechanic to assist. However, some had found that assistance was often too slow or too expensive (6personal communication). It is hypothesised that better access to repair and service facilities, both internal (carrying own spares) and external (workshops, garages, dealers), would improve contractor service quality by reducing downtimes.

Specification of a contractor service quality model

An empirical regression model is formulated to include variables that may influence a contractor's service quality (rating) as perceived by SSGs. Service rating (SERV) is a score made up of six different service qualities and functions that contractors (not sample contractors) and growers interviewed considered important. Qualities and functions of contractors hypothesised as being important were listed through an interview with a local commercial contractor (7personal communication). The list of service qualities was then finalised in an interview with several contractors and growers from the Umbumbulu SSG area situated near the Eston Mill in KwaZulu-Natal.

Six service qualities regarded as important by respondents:

- The relative time taken to transport cut sugarcane, either to loading zones (for indirect haulage contractors) or mills (for direct haulage contractors).
- The overall capability of contractors to ensure that cane is cut, carted and delivered to the mill within three days.
- The ability of a contractor to meet his daily rated delivery, which is the agreed upon amount of sugarcane that a contractor is required to deliver per day to ensure a steady flow to the mill.
- The fourth service quality deals with the ownership of low downtime machinery, which would ensure that cut sugarcane is not left rotting in the fields.
- Staff management and the corresponding level of performance.
- A rating of client conflict or level of disagreement over service provision.

Growers were asked to rank the contractors currently serving them, by assigning a score for each of the above qualities, with scores ranging from 1 (poorly rated) to 4 (highly rated). The sum of these scores made up the SERV component of the model.

The hypothetical model postulated for a contractor's service rating as perceived by growers, is as follows:

$$\text{SERV} = f(\text{EXP}, \text{EDUC}, \text{GENDER}, \text{TRAIN}, \text{RECORDS}, \text{FCSINFO}, \text{GENINFO}, \text{EXMACMG}, \text{INMACMG}, \text{LNSIZE}) \quad (1)$$

Table 5 gives the definitions of these variables. A positive relationship with SERV is expected for all variables except for GENINFO, where a negative relationship is expected.

⁶ BJ Mkhize and SM Njapha, small-scale sugarcane contractors operating in the Umbumbulu district of Eston, KwaZulu-Natal, South Africa.

⁷ E Lusso, sugarcane farmer and commercial sugarcane contractor operating in Eston, KwaZulu-Natal, South Africa.

Table 5. Determinants of contractor service rating.

| Variable | Definition |
|----------|--|
| EXP | Contracting experience in the sugar industry (years). |
| EDUC | Level of contractor education (ordinal, 1=no education to 5=tertiary education). |
| GENDER | Gender of contractor (1=male; 0=female). |
| TRAIN | Level of training received by contractor (ordinal, 0=none; 5=high). |
| RECORDS | Level of records kept by contractor (ordinal, 0=none; 6=high). |
| FCSINFO | Focused information sources used by contractor (1=highly rated source; 0=otherwise). |
| GENINFO | General information sources used by contractor (1=highly rated source; 0=otherwise). |
| EXMACMG | External machinery management ability, e.g. existence of dealer/workshops in the area (a principal component). |
| INMACMG | Internal machinery management ability, e.g. keeping popular spares on hand (a principal component). |
| LNSIZE | Natural log of tons hauled by a contractor per annum. |

FCSINFO includes those information sources that are geared towards, or focused on, the sugar industry. A total of 16 focus information sources were available for inclusion in the model, such as SASEX (INFOSASE), milling companies (INFOMILL), the South African Sugar Association (SASA), the South African Cane Growers Association (SACGA), sugar industry extension services, other contractors (INFOCONT) or farmers, local associations (INFOLOA), and sugar industry literature (e.g. Ingede (INFOINGE) and The Link). A '1' is allocated to an information source that a contractor rated as one of his top three sources, and zero otherwise. GENINFO are other information sources not involved directly with information linked to the sugar industry. It includes information from the radio (INFORADI), television, newspapers and machinery agents. A '1' is allocated if a contractor rated the use of such an information source as one of his top three sources and a zero otherwise. It should be noted that the individual information sources were included in the regression, not FCSINFO and GENINFO. Of the 20 information sources considered, 14 were excluded from the regression as they scored less than 10 positives (scores of one), indicating lack of variability. The five information sources included as proxies for FCSINFO are INFOMILL, INFOCONT, INFOSASE, INFOLOA, and INFOINGE. One information source is included as a proxy for GENINFO, namely INFORADI.

Empirical analysis and results

This section presents the results and interpretations of the regression model. Table 6 presents the ordinary least squares (OLS) regression results for the estimated model. Six coefficients were significant at least at the 10% level of probability, including three information sources (INFORADI, INFOSASE, INFOINGE) and GENDER, TRAIN and LNSIZE. The non-significant coefficients include EXP, EDUC, RECORDS, EXMACMG, INMACMG and three information sources, namely INFOMILL, INFOCONT and INFOLOA. EDUC and RECORDS are not correlated.

Table 6. Contractor service quality model.

| Variable | Regression coefficient | Standardised coefficient | t-statistic | Significance level | Definition |
|-------------------------|------------------------|--------------------------|---------------|--------------------|------------------------------------|
| Constant | 9.960 | | 2.824 | *** | Constant |
| EXP | | 0.033 | | ns | Contracting experience |
| EDUC | | -0.142 | -1.413 | ns | Level of education |
| GENDER | 2.268 | 0.204 | 2.065 | ** | Gender of a contractor |
| TRAIN | 0.579 | 0.231 | 2.238 | ** | Training received |
| RECORDS | | -0.045 | | ns | Level of records kept |
| INFOMILL | | -0.045 | | ns | Information from milling companies |
| INFOCONT | | 0.076 | | ns | Information from contractors |
| INFORADI | -1.829 | -0.195 | -1.728 | * | Information from the radio |
| INFOSASE | 1.924 | 0.243 | 2.139 | ** | Information from SASEX |
| INFOLOA | | -0.040 | | ns | Information from local association |
| INFOINGE | 2.037 | 0.279 | 2.188 | ** | Information from the Ingede |
| LNSIZE | 0.714 | 0.214 | 1.915 | * | Log of tons transported annually |
| EXMACMG | | -0.061 | | ns | External machinery management |
| INMACMG | | 0.140 | 1.416 | ns | Internal machinery management |
| Number of observations | | | 86 | | |
| F statistic | | | 3.847 | *** | |
| R ² | | | 0.428 | | |
| Adjusted R ² | | | 0.317 | | |

*** significant at the 1% level ** significant at the 5% level * significant at the 10% level

GENDER has a positive coefficient, as expected, significant at the 5% level. This suggests that male contractors are perceived by SSGs to provide a higher quality service. On average, if a contractor is male he will have a 2.3-point higher perceived service rating than a female, *ceteris paribus*.

The TRAIN coefficient is significant at the five percent level, and indicates the positive impact of training on a contractor's service rating, i.e. the more training contractors receive, the more likely they are to improve their service quality as perceived by SSGs.

Three further significant coefficients relate to information sources. SASEX (INFOSASE) and the Ingede technical newsletter (INFOINGE) had positive estimated coefficients. The standardised coefficients show that INFOINGE and INFOSASE are the two most influential variables affecting SERV. Information from the radio (INFORADI) has a negative estimated coefficient that is significant at the 10% level. INFORADI is a more general source of information, and so might not be a source of incorrect information, but rather a source of lower quality information. A higher quality information source would provide more up-to-date and relevant information useful to contractors in the management of their business.

LNSIZE has, as expected, a positive coefficient that is statistically significant at the 10% level of probability. The positive effect of LNSIZE on service quality as perceived by SSGs may be due to the advantage that size economies would provide to larger contractors via lower costs per ton of sugarcane transported. This may enable them to acquire more modern and reliable machinery and thus provide a better quality service to growers.

Coefficients for both EDUC and INMACMG have absolute t statistics greater than one. The negative coefficient for EDUC indicates a negative influence of education on service quality. This negative relationship does not follow *a priori* expectations and may be due to EDUC not capturing the total effects of influences linked to, for example, 'out of contracting' income of higher educated contractors. For higher educated contractors involved in other 'out of contracting' activities, the contracting business may be a relatively less important source of income. There may therefore be less incentive for more educated contractors to deliver a higher quality service. Furthermore, the coefficient for keeping of popular spares on hand (INMACMG) was significant at the 16.1% level of probability. The result shows that internal machinery management practices may have a positive impact on a contractor's service quality rating as perceived by SSGs.

Conclusions and policy recommendations

The influence of contractor attributes on perceived contractor service quality was examined using information collected from a random sample of 114 contractors drawn from 10 mill group areas in KwaZulu-Natal. Results from a regression model indicate that the gender of a contractor, training received, use of information from SASEX and the Ingede, and a higher tonnage throughput have a positive impact on the quality of service as perceived by SSGs.

Although contracting is not gender specific, there is evidence to support views that the rural business environment in which contractors participate has some gender discrimination. Female contractor performance may be constrained by higher transaction costs, such as a limited control of and access to resources (labour, financial services) needed in contracting. These resources are seen as being unequally distributed in favour of males. Policy makers need to be aware of this situation and if necessary promote institutional reform that will help to reduce transaction costs faced by women (e.g. endorse women as contractors to financial institutions, informing them of the successful female contractor cases despite the extra constraints they face, and provide separate support to women dealing specifically with constraints faced by them through, for example, female gender rights workshops). Increased female participation in the contracting sector may also be promoted by giving female contractors more voice and influence in the sugar industry through their involvement in higher levels of management (e.g. regular participation in SSG sub-committees and local associations).

Training is an important contributor to perceived contractor service quality. The importance of training should be highlighted and organisations such as the South African Sugar Association and milling companies need to identify contractors' specific training needs. This could be done through consultation with contractors as well as SSGs. Furthermore, the benefits of training need to be clearly communicated to contractors if adoption of, for example, new management techniques and technologies, or improved management of current operations, is to take place. For example, training needs may be linked to forward planning or promoting the contractor's business foresight (machinery replacement cycles, cost lowering goals). A contractor needs to know where he is going (diversify, expand), what funds he will need in future, and where the funds will come from. Advice on what finances are available, how best to access these finances and how to service loan repayments, needs to be made available. Another important aspect would be 'following up' on training already given.

The results also suggest that the source of and access to information for contractors is important. SASEX appear to provide relevant information that affects the contractor's service quality as perceived by SSGs. Information on machinery costs, new industry developments, customer needs, and competitors, provided by Joint Venture or mill extension services, could

make contractors more competitive by enabling them to set their own prices and improve business methods relating to transport, staff management and cost cutting. High quality and relevant information may promote a contractor's ability to provide higher quality services to SSGs.

Contractor business size, in terms of tonnage hauled, may also be an important factor in promoting service quality. This is due to the nature of the contracting business and the dependence on machinery utilisation linked to economies of size. Contractors transporting higher tonnages can spread fixed costs and reduce overall costs per ton. This may enable them to acquire more modern and reliable machinery, leading to less downtime. The sub-committees who influence cane allocation to contractors need to be aware of the importance of economies of size and the likely influence it has on the service quality of contractors.

Although not included in the model, policy makers such as the government, and SASA staff should improve rural infrastructure (SSG area district roads, telecommunications) and the institutional environment (e.g. facilitate competition through information provision, help enforce contractual arrangements between growers and contractors, and promote women as contractors). Promoting competition may improve service quality and fair prices for clients. Contractors would need adequate information on, for example, competitor contractor charges and costs of machinery operations. Competition may also promote the reallocation of tonnage to better service providers, thereby improving their economies of size, overall cost per ton and the charge rates for growers. Contractors would also need to have the necessary skills if they are to compete, which may imply regular training.

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