

CHAPTER 13 - EVALUATING THE INDUSTRY-SPECIFIC MANAGEMENT INFORMATION SYSTEM FOR SOUTH AFRICAN CONSULTING ENGINEERS USING CRITERIA FOR A SUITABLE STRATEGIC MANAGEMENT INFORMATION SYSTEM

13.1 Introduction

South African consulting engineers required an information system to assist in improving their quantitative understanding of their broader industry, and in particular the impact of environmental changes on their industry, to enable them to respond appropriately to their business environment. Previous chapters detailed the processes whereby secondary and primary data was gathered and Chapter 12 showed how primary and secondary data was then combined for use as an industry-wide strategic management information system (SMIS) for the South African consulting engineering industry. This chapter contains the evaluation of the SMIS to determine the extent to which the study objectives were achieved.

The primary characteristic of a strategic management information system (SMIS) is that it should permit strategic decision-makers to focus more precisely on the information they need to make critical decisions that will affect the future of their enterprise [73]. The SMIS was evaluated against this characteristic, combined with several specific criteria for an industry-wide SMIS for the South African consulting engineering industry.

13.2 Compliance with criteria for a SMIS

The criteria referred to in this section were recorded and discussed in Chapter 6 and served as guideline for the planning and management of the SMIS development process that was followed.

13.2.1 Information relevant to strategic managers

A suitable strategic management information system (SMIS) should provide strategic management with information relating to decision situations on large strategic management issues [101, 168] such as:

- New business ventures
- Major additions to the core competencies of a firm
- Closure of mature or undesirable market interests
- Long-term market and service development
- Development of human resources in a firm
- Restructuring or re-engineering a firm including changes in corporate culture to adapt and prepare for the future
- Range of services offered, e.g. movement from mature services into new and developing or growth services
- Mergers and acquisitions
- Geographical office location

Table 13.1 illustrates the extent to which the consulting engineering SMIS has succeeded in providing the industry with such strategic information.

TABLE 13.1

Information provided by the consulting engineering SMIS with regard to generic strategic management issues

Strategic management issue	Information provided by SMIS
New business ventures	<p>Capital requirements (e.g. Statistics on slow payment, trends with regards to the product cycle, statistics on typical income and expenditure)</p> <p>Profitability (e.g. Profitability trends including 6 month forecast, statistics for different-sized firms)</p> <p>Level of competition and trends with regard to competition in the industry</p> <p>Growth potential (e.g. geographical, service and client type growth trends)</p> <p>Utilisation of capacity (utilisation of current capacity and expected future utilisation)</p> <p>Confidence index as indicator of health and future potential</p>
Core competencies	Detailed statistics on the size and growth trends with regards to 26 sub-disciplines or competencies including the regular identification of new competencies
Mature or undesirable market interests	<p>Detailed statistics on the market size and growth trends with regards to 26 sub-disciplines or competencies including the regular identification of new competencies and services</p> <p>Detailed statistics by client type on market size and growth trends</p> <p>Detailed statistics by geographical area on market size and growth trends</p>
Long-term market and service development	Statistical information limited to historical data and 6 month forecasts.
Development of human resources	<p>Detailed statistics on staff composition by functional category and race classification</p> <p>Statistics regarding expenditure on education and training</p> <p>Statistics on recruitment trends and problems</p>
Restructuring. Re-engineering, corporate culture	<p>Detailed statistics on staff composition by functional category and race classification</p> <p>Detailed statistics by client type on market size and growth trends</p> <p>Detailed statistics by geographical area on market size and growth trends</p>
Range of services	Detailed statistics on the market size and growth trends with regards to 26 sub-disciplines or competencies including the regular identification of new competencies and services
Mergers and acquisitions	<p>Detailed data on the trends with regard to firm size (profitability, client base, debtor performance etc.)</p> <p>Geographical market sizes and growth trends</p>
Geographical office location	Detailed statistics by geographical area on market size and growth trends

13.2.2 User-friendly reporting

The SMIS was developed with a focus on its primary users, i.e. the top or strategic management of South African consulting engineering firms. The system development did however also make provision for customised or tailored reporting to suit the individual and very different needs of other potential users of the SMIS. Table 13.2 identifies potential users and their respective management information needs and illustrates the nature of the management information provided by the SMIS to meet those needs.

TABLE 13.2
Meeting the management information needs of various stakeholders

Potential user: Management information needs	Relevant management information provided by SMIS
Strategic (top) management [127]: Condensed reports with an industry-wide and forward-looking focus to support planning and policy-making	Industry-wide survey reports included trend forecasting for key indicators as well as a discussion on the general state of the economy and economic prospects. A separate executive summary report was made available on the SAACE website.
Tactical and operational managers: Detailed and quantitative information, which may include industry-benchmarking features, to evaluate the feasibility and implications of strategic plans or to plan implementation of strategic plans [127, 73]	Survey reports contained a separate section with detailed statistical tables that can be used for detailed quantitative analysis. An optional service of customised reporting was provided to individual firms who were regular respondents to the surveys. A customised report can, for example, be produced to compare firm X with all other firms of the same size, and/ or the same geographic location, e.g. for benchmarking purposes.
Lobbyists: Industry-wide data, presented in an easily understandable and graphic format so as to be suitable for presentations to government officials, politicians and other industry stakeholders	Key industry data was presented in a summarised and interpreted form in the text of the reports. Colourful graphs were produced and included in PowerPoint™ presentations that were made available with each survey report. The presentations (in electronic format) and corresponding hard copies of the report text were made available to lobbyists and all industry representatives with client liaison obligations.

<p>Media liaison and public relations managers: Reports containing specific, issue-related information in a format that could easily be included in press releases or press kits</p>	<p>Media representatives were provided with relevant electronic extracts from survey reports including accompanying illustrative graphs relevant to specific issues. The fact that the material was used in several publications proved the usefulness of this approach.</p>
<p>Human resources managers: Information on employment, recruitment, training and education trends in the industry</p>	<p>Detailed statistical information on employment was provided in survey reports by functional category and race classification. Recruitment problems, recruitment trends and statistics on education (bursaries) and training were furthermore reported.</p>
<p>Financial managers: Information on operational financial issues such as debtor trends and operating capital requirements</p>	<p>Statistics on profitability and turnover trends as well as detailed information on debtor trends were reported in survey reports.</p>
<p>SAACE management: Information on industry trends to continue providing appropriate business support services</p>	<p>Survey reports included statistics on industry trends such as geographical expenditure changes, employment patterns, the nature of industry competition as well as shifts in services and disciplines offered by consulting engineering firms. This information was used in planning and managing the SAACE and its member services.</p>
<p>Other construction industry participants: Leading indicator-type information from the consulting engineering industry to forecast prospects for their own industries, (e.g. construction contractors, fabricators, material suppliers and others whose industries are "downstream" from the design activities of consulting engineers)</p>	<p>The reported trends on activity in the individual phases of the typical consulting engineering product cycle were made available to downstream industries in the construction industry and were found to provide useful indicators for use with their own economic analysis and forecasting systems.</p>

13.2.3 Current reporting

The methodology for data collection and processing was developed so as to minimise the period between the end date of each survey period and the publication of the corresponding SMIS report. Reporting frequency was important for the reports to be relevant and optimally useful to all the users identified in the previous section.

The initial survey forms were mailed to all the SAACE member firms, but electronic (e-mail) communication was subsequently used for the distribution of survey forms and facsimile transmissions for the return of completed questionnaires in order to speed up the survey process. In spite of this the best turnaround time that could be achieved was 3 months, from the end of a survey period to the publication of the report on the SAACE website. The following proved to be the main causes of this seemingly long survey cycle:

- The slow rate of survey returns by respondents, combined with the fact that an acceptable level of representivity of responses had to be achieved before capturing and processing of data could take place.
- A single person captured and processed the large volume of survey data in order to maintain the required confidentiality of data.
- The economist who processed the survey data did so on a freelance or contract basis and therefore also had other work commitments, which meant that she could not always give top priority to processing the consulting engineering survey data.
- Each draft survey report had to be approved by at least two designated persons before it could be published as a SAACE report.

The survey-reporting cycle could be shortened by using specialist direct electronic survey software which would allow all firms to be e-mailed survey notices and for respondents to then enter their data directly on a security-protected area of the SAACE website. This would remove the need for physical

data capturing and even for the initial data processing, which could be done automatically by the survey software without the threat of a breach of confidentiality of data. The direct electronic survey method could be introduced as a future improvement to the SMIS, but it will require additional expenditure for purchasing, customisation and maintenance of software and for web-site administration.

During the study period attractive prizes were occasionally offered as incentive for prompt return of completed questionnaires, without any noticeable reduction in the period required to achieve an acceptable level of representivity of responses. It is therefore questionable whether the direct electronic survey method will contribute significantly to an improvement in response times.



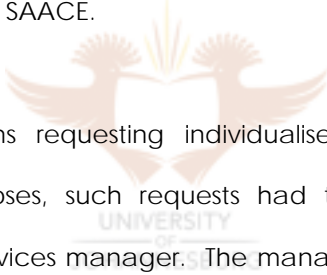
13.2.4 Confidentiality of data

The point of departure in this regard was that respondents must be given an absolute assurance that systems were in place to ensure confidentiality of individual firm data, i.e. their data must not be accessible to their competitors. Failure to convince the target population of the adequacy of these security systems would have resulted in low returns, non-representative data and a failure of the SMIS.

A system was introduced whereby individual firms could only be identified by a unique security code provided to the mandated principal of each firm by a single manager at the offices of the SAACE directorate. The implication was that nobody other than the individual firm's mandated principal and the

membership manager at the SAACE could identify individual firms from their survey data.

As a further security measure the data was captured and processed by an independent economist who was employed to do this work under a contract which included a confidentiality clause. Although the firm data was already anonymous when it arrived at the economist for capturing, a further security measure was introduced whereby data was captured processed and consolidated by the economist to a format in which individual firm data did not appear. This ensured that it was impossible, even for a person with a very good knowledge of the industry and its participants, to identify the data of any individual firm from the processed data which the economist made available to the author and the SAACE.



In the case of firms requesting individualised or customised reports for benchmarking purposes, such requests had to be submitted through the SAACE's member services manager. The manager identified such firms to the economist by security code only (i.e. no firm name) and provided the criteria for which the report had to be compiled (e.g. comparing a firm with all respondents of a similar size).

SAACE members had the first-hand experience that they could not access the secure members' area on the SAACE website without their firm identification code and that, in the case of a lost or forgotten code, SAACE staff other than the member services manager could not provide them with the access code. This measure, although occasionally a source of frustration to individual firm representatives, reinforced members' trust in the system that provided confidentiality of their firms' data.

13.2.5 Statistically representative data

Sample data from each survey had to be sufficiently representative to give a resemblance of data for the South African consulting engineering industry. It was therefore essential for the effectiveness of the SMIS to obtain regular survey returns from a sufficiently large number of firms. The sample furthermore had to be statistically representative in terms of:

- Firm size categories,
- geographic location categories and
- discipline or competency categories.

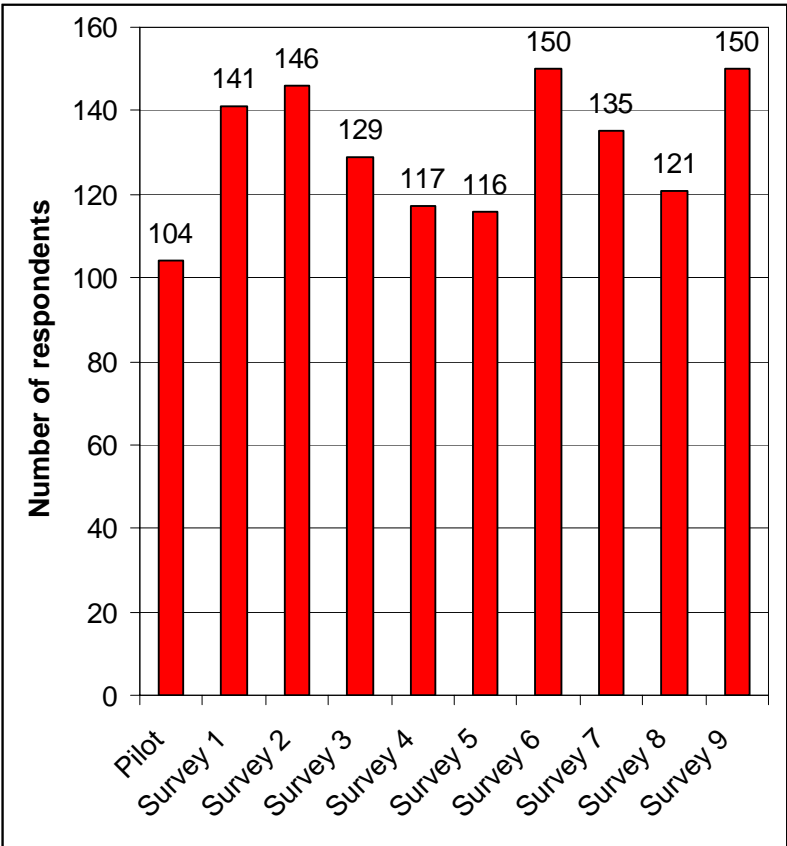


Surveys were therefore planned to be user-friendly in order to encourage participation by individual firms. Ongoing communication with firms was kept up throughout the study period. Communication reported initially on progress with the development of the SMIS and later on progress with individual surveys or survey reports. Periodic communication to all firms furthermore attempted to illustrate the potential value that regular participation in the surveys could have for the individual firm (e.g. access to customised reporting for benchmarking purposes) and reminded participants of the systems that assured confidentiality of their data.

The statistical representivity of survey returns was discussed in sections 9.2.2, 9.4 and 11.1.2. Figure 12.23 shows the number of returns received during each survey throughout the study period. The total number of firms surveyed varied between 370 and 400 over the study period, and the percentage returns can be considered exceptionally good for regular industry-wide surveys over a 6-year period.

FIGURE 12.23

Number of returns received per survey



13.2.6 Affordability

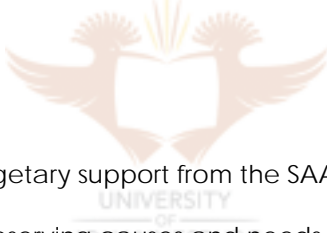
The SMIS reports and presentation materials were made available to both SAACE member firms and any other interested parties as a service to the industry. The SAACE, as a voluntary business support organisation, had a limited budget available for developing the SMIS. The SMIS furthermore had to be developed in such a way that its future continued operation could be managed on a modest annual budget.

The SMIS development cost was kept within the available SAACE budget by:

- Integrating the survey methodology and corresponding support and communication processes with the SAACE's electronic infrastructure, i.e. website, member database, e-mail system and facsimile transmission facility.
- Maximally utilising volunteer time of experienced and expensive professionals through this study.
- Employing two economists with a very good understanding of the construction industry, thereby reducing the time and cost implications of extensive discussions, briefings, planning meetings and misunderstandings.
- Negotiating an affordable fixed lump sum contract per survey with the construction economists responsible for capturing and processing survey data.

13.2.7 Sustainability

The SMIS design should enable it to continue operating in a sustainable manner. It should however be appreciated that this is not an automated system, but an extensive and complex system involving many stakeholders. The continued success, affordability and sustainability of the industry-wide SMIS will therefore depend heavily on the ongoing enthusiastic and informed commitment of a volunteer champion within the SAACE and continued financial support by the SAACE's council. The main function of this champion will be to manage (plan, organise, staff, lead and control) all aspects of the SMIS. As part of this management function he will have to, through his own enthusiasm for the SMIS, generate sufficient interest and illustrate substantial benefits in order to secure both:

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- Ongoing budgetary support from the SAACE council in competition with many other deserving causes and needs and
 - ongoing high response levels on surveys to ensure statistically representative data.

13.3 Conclusion and recommendations

The industry-wide strategic management information system (SMIS) for the consulting engineering industry was found to comply with the primary criterion for such systems in that it provides strategic decision-makers with the previously

unavailable industry information that they need to make critical decisions that will affect the future of their enterprises.

The SMIS furthermore provided strategic management information relating to decision situations on large strategic management issues such as new business ventures, core competencies, mature or undesirable market interests, long-term market and service development, development of human resources, restructuring, range of services, mergers and acquisitions and geographical office location.

The SMIS achieved all the pre-set goals in terms of meeting the different management information needs of diverse industry stakeholders such as the top (strategic), tactical and operational management of consulting engineering firms, industry lobbyists, the media, human resource managers, financial managers, SAACE management and other construction industry participants.



The SMIS will be more useful if the survey-reporting cycle could be shortened, but this would require intensive ongoing management effort and possibly also some investment in specialist direct electronic survey software that will allow all firms to be e-mailed survey notices and for respondents to then enter their data directly on a security-protected area of the SAACE website.

The measures that were introduced to secure confidentiality of data worked well and should be maintained as a core requirement for the continued successful operation of the SMIS.

An acceptable level of statistical representivity of survey data was achieved and the affordability requirement was met throughout the study period.

This chapter showed that a practical and relevant industry-wide SMIS was developed for the South African consulting engineering industry and the next chapter presents the author's concluding thoughts to this study as well as recommendations for further research and development.

