

## The Role of Microcomputers in Small and Medium Enterprises: Are They Used in Strategic Decisions and Planning?

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**Abstract:** Although strategic planning and information technology are key concepts in management research, they have been widely used in relation to only large firms. Only few studies attempted to examine the perceptions of small and medium enterprises (hereafter, SMEs) about the role of IT in strategy making. Moreover, these studies are of less significance for developing countries as the definition and environment of SMEs vary from developed to developing country. This article analyses the strategic use of microcomputers and software packages in corporate planning and decision-making in small and medium enterprises (hereafter, SMEs). Data were collected from 44 SMEs from 3 cities in the Republic of Botswana to study their perceptions about the use of computer-based technology to solve managerial problems, and analyzed using simple descriptive statistics. The findings indicate that SMEs in Botswana engaged in both strategic and operational planning activities. However, microcomputers and software packages were used primarily for operational and administrative tasks rather than for strategic planning. They perceive that strategic planning is costly, time-consuming, and hence appropriate for only large firms. The study also showed that firm size and strategic orientation have direct and positive relation to the use of computer technology for strategic decision making. The major implication of the findings for future research has been identified and presented.

**Key words:** Strategic Planning, Operational Planning, Decision Support System, Computer Technology, and Microcomputers, Small and Medium Enterprises

### Introduction

Today's business environment is characterized by an increasing intensity of competition, globalization of the world economy, rapid technological changes, and the growing expectations of customers, suppliers and the workforce. Surviving and growing in this turbulent and dynamic business environment requires strategic thinking and decision-making. Although research findings on the association between business planning and organizational performance remained controversial and inconclusive (Mintzberg, 1994; Pearce, Freeman and Robinson, 1987; Miller and Cardinal, 1994; Bracker and Pearson, 1986; Brews and Hunt, 1999; Hopkins and Hopkins, 1997) there is much consensus that strategic planning is a vital means of meeting these challenges. Strategic planning, among other things, deals with assessing the internal and external business environment for the purpose of identifying organizational strengths, weaknesses, opportunities and threats. It is based on this assessment that firms establish organizational goals, and determine the strategies to achieve them.

Strategic advantage and long-term competitiveness are therefore largely affected by the ability of firms to systematically gather and process relevant, timely and reliable information about customers, suppliers, competitors, changes in technology and market place, socio-economic, political and legal conditions. Recent advances in computer technology have made it simple for managers to gather and process information and develop decision models. Advancement in computer technology can also assist owners or managers of SMEs in making the transition from "doing" to "managing." (Herbert and Bradley, 1993).

The advent of powerful, low-cost microcomputers coupled with user-friendly software, has allowed greater number

of SMEs to use computerized Decision Support Systems (DSS) and Expert Systems (ES). As both hardware and software become more sophisticated, the use of microcomputers is moving from facilitating day-to-day routine business transaction to supporting managerial decision-making. However, though firms have greater access to computer technology than ever before, a plethora of studies (Boyd, 1991; Raymond, 1988; Muller-Boling and Susanne Kirchhoff, 1991; Dean, Brown and Bamford, 1998) indicated that only large, multi-national, and multi-divisional firms use microcomputers and computer software packages for strategy formulation and managerial decision-making. Most applications particularly in the small and medium sized firms are restricted to basic transaction and word processing, which are inexpensive to automate and maintain.

The objective of this paper is to investigate how a group of 44 selected small and medium firms were actually using microcomputer-based technology in Botswana, a developing middle-income African country.

### Materials and Methods

**Microcomputers, Decision Support Systems, and Business Planning:** It was in 1981, 20 years before, that IBM launched personal computers onto the market. This second anniversary, in 2001, seemed an appropriate time to investigate the extent of usage, the attitude and perception of SMEs toward computers, the reasons for adoption or rejection, the main purpose for which microcomputers are now being used in SMEs in developing countries.

Review of a number of small enterprise surveys (Oldfield, 1997: 8) concluded that "all the surveys lead to the same conclusion: SMEs have to keep pace with technological changes if they want to keep a competitive edge."

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Furthermore a survey of 414 medium sized firms (Smith, 1996) reported that the motivation for investing in new technology was to improve short-term operational efficiency as opposed to developing long-term competitive potential. In this context, previous research (Fuller, 1996) suggests that computer usage by SMEs is largely restricted to operational or administrative tasks (Fuller, 1996).

Decision Support Systems (DSS) have emerged as a promising new technology for structuring, guiding, and improving information processing and management decision-making. A DSS is an interactive computer-based system that provides the user with easy access to decision models in order to support semi-structured and unstructured decision making tasks. DSS typically possesses capabilities such as data management, graphic display, financial and statistical analysis, financial modeling, and optimization analysis (Chen, 1989). While large corporations have relied more and more upon DSS for effective decision-making, SMEs have virtually ignored this new technology. With the proliferation of personal computers, practical and inexpensive DSS are within the reach of SMEs to improve the quality of inferences and judgments. However, in order to stimulate diffusion of DSS technology to SMEs, the perception and attitude of SMEs toward the role of microcomputers and computer software packages must be challenged and changed.

One currently popular application of DSS is the expert system (ES), a method of applying human knowledge captured in a computer to solve problems that normally require human expertise (Herbert and Bradley, 1993). An expert system is a computer system that is designed specifically to emulate the reasoning of an expert. Expert systems handle a wide variety of management and planning problems regardless of problem sophistication and hence provide an opportunity for SMEs to use computer-technology to attain strategic advantages (Sullivan and Shivley, 1989). The impact of ES in SMEs may be greater than in large firms since SMEs may not have the luxury of alternative solutions.

In large firms, managers rely on DSS for effective decision-making. Chen (1989) and Sullivan and Shivley (1989) point out, however, that this technology has not been fully utilized by SMEs despite advantages cited by several authors. Chen and Williams (1993) have sufficient evidence to suggest that most of the impact of microcomputers on SMEs has been basic and operational than decisional and strategic. Other studies (Fuller T, 1996; Muller-Boling and Kirchhoff, 19991), however, indicated that there are some evidences that the main use of microcomputers in SMEs is shifting from record keeping (word processing and bookkeeping) to managerial decision-making (financial modeling, forecasting and data management). Moreover, as suggested by Gupta and Harris (1989) and Amer and Bain (1990) the use of computerized information systems in SMEs would lift the focus of business from operational matters to long-term business success.

Microcomputers and DSS can be effectively used in business planning and a wide variety of strategic applications such as sales forecasts, profit and cash flow forecasts, econometric models, stochastic and financial models, project planning and control, investment

appraisal and industry analysis, new product development, customer survey, networking suppliers and customers, materials requirement planning, facility layout and so on.

As confirmed by 93.2 percent of the sample firms in this study, SMEs in Botswana do not use DSS in their business planning and decision-making. The important question now is whether SMEs in developing countries use microcomputers and software packages (rather than DSS or ES) to support managerial decision-making.

**Research Design and Methodology:** 74 companies were randomly selected from a list of companies supplied by the Botswana Confederation of Commerce, Manpower and Industry (BOCCIM) to fill a 3-page questionnaire. The study was initially intended to include only manufacturing firms. However, the small number of manufacturing firms in Botswana forced the author to take samples from the merchandising and service sectors of the economy.

As part of a follow-up on the questionnaire, each respondent was reminded, on average, three times to complete and return the questionnaire. The respondents were also promised a copy of summary of the findings of the study. Although 56 questionnaires were filled and returned during the 82 days data collection period, only 44 were found usable for this study. Small firms are defined in Botswana as having 6 - 25 employees and medium firms having as many as 26 to 99 employees. Hence, micro and large firms are excluded from the study. The questionnaire was basically divided into three parts. Part one deal with the profile of the firms and part two covers questions addressed to evaluate the degree of emphasis placed on strategic and operational planning and whether the planning process was systematic and formal. As several previous studies (Armstrong: 1982, Boyd: 1991, Boyd and Reuning-Elliott 1998: Hopkins and Hopkins, 1997: Bracker and Pearson: 1986) indicate, the most commonly used technique to separate strategic planners from operational or short-term oriented planners is to evaluate the degree of emphasis they put on selected planning indicators. Based on the work of Boyd and Reuning-Elliott (1998) and Hopkins and Hopkins (1997), this study identified fourteen items (Table 1) to be used in measuring the planning construct. The last part covered the use of microcomputers and software packages to support strategic planning. This was designed to evaluate the relationship between types of planners and the use of microcomputers for decision-making purposes.

As the study deals with the perception of SMEs about business planning and computer application, the main data analysis techniques used were descriptive statistics like mean, standard deviation, and rankings.

## Results and Discussion

**Characteristics of Sample Firms:** The major problem of this study was the mixed nature of the sample firms. Out of the 44 SMEs included in the study 19 were manufacturing, 14 were service firms and the remaining 11 were merchandising (wholesale and retail business) firms. Only 9 (20 percent) of the CEOs were women. 26 (60 percent) were small companies with employees less than 26 while the remaining 18 (40 percent) were

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Table 1: Rankings and Mean Degree of Emphasis on 14 Selected Planning Indicators

Planning indicators	Small		Medium		All Firms	
	Mean	S.D	Mean	S.D	Mean	S.D.
Operational efficiency	23.5*	0.5	16.8*	0.3	20.8	0.5
Sales Forecasting	22.1	0.9	16.8	0.8	19.9	0.9
Functional budgets	21.3	0.5	16.5	0.9	19.3	0.6
Short – term goals	20.8+	0.4	17.2+	0.6	19.3	0.5
Annual action plans	19.5	0.3	17.1	1.2	18.5	0.8
Profit Forecasting	18.4	0.7	16.5	0.7	17.6	0.7
Environmental Scanning	11.5	1.9	12.8	1.9	12.0	1.9
Industry Analysis	10.9	1.8	13.9	2.1	12.1	1.9
Planning Manual usage	10.5	2.1	14.2	1.9	12.0	1.9
Building long term Potential	10.1**	0.9	15.2**	2.1	12.2	1.5
Long term goals	9.8++	1.7	13.9++	1.6	11.5	1.7
Technology Forecasting	9.5	0.5	13.5	2.2	11.1	1.4
Market Research Studies	9.1	1.1	11.1	1.1	9.9	1.1
Mission statement	8.4	1.8	9.8	1.5	9.0	1.6

Sample Size N=26 N=18 N=44\*, \*\* Indicate statistically significant difference at 1 and 5% level, respectively. +, ++ Indicate statistically insignificant difference at 1 and 5% level, respectively.

Table 2: Rankings and Mean Usage of Computer Software Packages by SMEs

Computer Software Packages	Small Firms		Medium Firms		ALL Firms	
	Mean	S.D.	Mean	S.D.	Mean	S.D.
Word Processing	4.9	0.6	4.7	0.3	4.6	1.3
Accounting Packages	3.8	1.1	4.8	1.8	4.4	1.2
Spreadsheet packages	3.6	0.8	4.4	0.8	4.2	1.6
Database Packages	2.7	1.2	4.1	1.1	3.8	1.8
Integrated MIS	1.8	1.8	3.6	1.1	3.1	1.4
Statistical Packages	1.4	2.1	2.8	1.1	2.2	1.9

Table 3: Rankings and Mean Frequency Use of Computer-Aided Business Applications By Type of Planners

Business Applications	Small Firms			Medium Firms			Small and Medium Firms		
	STR	OPR	ALL	STR	OPR	ALL	STR	OPR	ALL
Financial accounting	4.92	4.91	4.91	4.91	4.88	4.90	4.91	4.90	4.91
*Cost and mgt accounting	4.89	4.74	4.77	4.65	4.68	4.66	4.73	4.73	4.73
Payroll	4.68	4.78	4.76	4.76	4.85	4.80	4.74	4.80	4.77
Budgeting	4.42	4.52	4.50	4.88	4.90	4.89	4.74	4.62	4.66
Production planning	4.01	4.14	4.12	4.09	3.98	4.05	4.07	4.10	4.09
Sales planning	4.01	3.65	3.72***	4.48	4.13	4.34***	4.33	3.77	3.97
Stock control	3.98	3.49	3.58	4.56	4.16	4.40	4.38	3.66	3.92
Staff planning	3.96	3.02	3.20	4.03	2.75	3.53	4.01	2.95	3.34
Marketing mix	3.09	3.15	3.14	3.38	2.98	3.22	3.29	3.11	3.17
Profit Forecasting	3.11*	2.65*	2.74***	4.01**	2.89**	3.57***	3.73	2.71+	3.08
Cash flow forecasting	3.29*	2.22*	2.43^	3.9**	2.24**	3.25^	3.71+	2.23+	2.76
Market research	3.01*	2.11*	2.28^	3.65**	2.38**	3.16^	3.45+	2.18+	2.64
Investment appraisal	3.32*	2.01*	2.26^	3.88**	2.88**	3.49^	3.71+	2.23+	2.76
Strategic analysis	3.15*	1.96*	2.19^	3.68**	2.02**	3.03^	3.51+	1.98+	2.53
Risk analysis	3.02*	1.98*	2.18^	3.21**	2.23**	2.83^	3.15	2.04	2.45
Sample size	N=5	N=21	N=26	N=11	N=7	N=18	N=16	N=28	N=44

medium sized firms with number of employees ranging from 26 - to - 99. All the legal forms of business ownership-sole proprietorship, partnership, and corporations-were found in the sample firms. Out of the 44 sample firms, 6 (14 percent) were sole proprietorships, 9 (20 percent) were partnership and joint venture firms, and the remaining 29 (66 percent) were corporations. The average managerial experience of the CEOs was 4.6 years, and the number of years the companies have been

operating in Botswana was 5.3 years, on average.

**Microcomputers, Decision Support Systems, and Business Planning:** After DSS and ES were defined and explained, the respondents were asked to indicate the level of usage of these new technologies to support managerial decision-making. 93.6 percent of them indicated that they have never used these technologies with the exception of two medium sized firms who

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indicated that they sometimes use DSS.

To confirm that business planning is a precondition for the survival and growth of firms, firms were asked whether they engage in business planning or not. All the firms (100 percent) responded positively and confirmed that SMEs in Botswana engage in some form of business planning. Then, to evaluate whether their planning is systematic or unstructured, formal or informal, strategic or operational, the respondents were asked to indicate the degree of emphasis they place on each of the 14 selected planning indicators during their planning process using a 5-point Likert scale ranging from no emphasis (1) to very high emphasis (5).

As shown in table 1, more emphasis has been placed on operational planning related activities by both small and medium enterprises than strategic planning related issues. Small firms placed the highest emphasis on operational efficiency (Mean=23.5), followed by sales forecasting (Mean=22.1), functional budgets (Mean=21.3), short-term goals (Mean=20.8), annual action plans (Mean=19.5), profit forecasting (Mean=18.4) and so on. They put only very little emphasis on strategic planning related activities. The lowest emphasis, for example, was placed on the development of mission statement (Mean=8.4), followed by market research studies (Mean=9.1), technology forecasting (Mean=9.5), and establishment of long-term goals (Mean=9.8).

Medium sized firms have also put greater emphasis on operational planning than strategic planning. The development of short-term goals has received the highest emphasis (Mean=17.2) from medium firms, followed by annual action plans (Mean=17.1), sales forecasting (Mean=16.8), operational efficiency (Mean=16.8), all of which are operational planning indicators.

The other important findings are marked by "asterisk" and "plus signs". For small firms, the difference between the mean points for long-term goals (9.8) and short-term goals (20.8) is statistically significant at 1% level. The difference between the mean points for "building long term potential" (10.1) and "operational efficiency" (23.5) is also statistically significant at 5% level. From this, one can easily infer that small firms are excessively operational and short-term oriented. However, as shown by the "+" signs, for medium sized firms, the difference is not statistically significant. The mean point of "long-term goals" (13.9), for example, is close to the mean point of "short term goals" (17.2). This indicates that medium sized firms put more emphasis on strategic issues than do small firms. Hence, as firm size increases, firms tend to move from operational and short-term oriented planning toward strategic planning.

The above findings are also confirmed by the size of the standard deviations for each item in Table 1. The lower the standard deviation for a particular item the higher will be the common understanding of firms about that item. The standard deviation for operational efficiency (small=0.5; medium=0.3) for both small and medium sized firms is lower than the standard deviation for "mission statement" (small=1.8; medium=1.5) and "long term goals" (small=1.7; medium=1.6). This reveals that most SMEs in the sample have clearer understanding of operational planning related activities than strategic issues. In other words, SMEs have perceptual and

attitudinal problems with regard to strategic planning issues.

**Computer Software Packages used by SMEs:** Almost all SMEs use microcomputers and some computer software packages in their day-to-day business activities. Before investigating the use of microcomputers and software packages in business planning and decision-making, the respondents were asked (on a 5-point Likert scale ranging from 1 = not used at all, to 5 = used throughout the business) the extent to which they used the following six computer software packages in their business in general.

For all SMEs participating in the survey (N=44) and particularly for smaller firms (N=26), word processing was the most widely used computer software package (mean = 4.9 for small firms and 4.6 for all firms), followed by accounting packages, spreadsheets, databases, integrated management information systems, and statistical packages. No less than 97.7 percent (43 firms) of the sample firms used word processing software (with only one small company indicating that it never used such software) 90.9 percent (40 firms) used accounting packages. But only 31.8 percent (14 firms) used spreadsheets, 20.4 percent (9 firms) used database packages, 9 percent (4 firms) used integrated management information system, and only very few firms used statistical packages (6.8 percent).

The results also indicated that medium - sized companies tended to use the various software packages more extensively than small firms, with significant differences (for mean usage) being evident in respect of word processing, spreadsheets and MIS packages - and with 7 percent of small firms indicating that they used MIS software, compared with 18 percent of medium-sized companies. In sum, business support systems (word processing and accounting) are used extensively, but that specialized decision support software (databases, MIS and statistical packages) are employed less frequently even by medium sized enterprises.

**Microcomputers and Business Applications:** It has been stressed in the small business literature that the adoption of information technology and the utilization of Computerized Information systems (CIS) may result in firms focussing on long-term business success rather than on operational matters (Chen and Williams, 1993), and that information technology and CIS have the potential to provide SMEs with a competitive advantage (Fuller, 1996). To examine whether computer usage is related to the degree of strategic planning in SMEs the sample firms were divided into strategic planners (who indicated 4 or 5 on the ordinal planning scale reported in Table 1) and operational planners (who indicated 3, 2, or 1). 11 (60%) medium and 5 (20%) small firms were found to have strategic orientation (STR) while the remaining 7 (40%) medium and 21 (80%) small firms were largely focussing on operational and short-term issues (OPR).

To investigate in more detail the different business applications for which computers are utilized, respondents were requested to indicate (on a 5-point scale ranging from 1 = never, to 5 = always), the frequency with which computer - aided systems were used in a range of

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business activities.

STR and OPR =strategic planners and operational planners, respectively. \*, \*\*, and + indicate the existence of statistically significant difference between strategic and operational planning oriented SMEs at 1% confidence level. ^ Indicates the statistically significant difference between small and medium enterprises in mean usage of strategic issues.

Business applications and activities for which microcomputers are most frequently used include financial accounting, cost and management accounting, and payroll, followed by budgeting, production and sales planning, and stock control. Microcomputers were not extensively and effectively used for the purpose of strategic planning and decision-making. Managerial activities for which microcomputers were least used include risk analysis, strategic analysis, investment appraisal, market research, project planning, cash flow and profit forecasting. As shown in Table 3, in both the medium and small firm group, strategic oriented firms tended to use microcomputers for strategic decision making issues more extensively than operational planning oriented firms, with significant differences (for mean usage) being evident in respect of market research, project planning and strategic analysis-and with only 34 percent of operational planners indicating that they used microcomputers for managerial decision making, compared with 81 percent of strategic planning oriented firms. From this, one can derive that strategic orientation and computer usage are positively related. As the degree of strategic orientation (as measured by their involvement in strategic planning) increases, they tend to use microcomputers to achieve competitive advantage more extensively than before.

Table 3 also indicate that no operational planning oriented firm (small or medium) has scored a mean frequency of computer usage for strategic activities above the scale mid-point 3, and with the proportion of respondents indicating that they always used computers systems for these applications never rising above 20 percent. These applications comprised marketing mix; strategic analysis; staff (manpower) planning; risk analysis; investment appraisal; forecasting; and market research. But, all strategic planning oriented firms (small and medium) scored above the scale mid-point 3 for these applications. The frequency of use of computer aided systems for, for example, profit forecasts and sales planning differed significantly between respondents in the small and medium-sized firm sub-samples. The mean frequency score of medium-sized firms for profit forecasts (2.74) was significantly higher (at the 1 percent statistical level) than for small firms (3.52) - with only 22 percent of medium-seized firms indicating that they never used computer-aided systems for profit forecasting, compared with 36 percent of their smaller counterparts. A similar picture emerged with respect to investment appraisal, with 29 percent of small firms intimating they never used computer-aided systems for investment evaluation and selection (mean=2.26) compared with only 11 percent of medium-sized companies (mean=3.49).

As Table 3 reported, the mean frequency statistics for strategic and operational planners in respect of the various business applications utilized with computer-aided

systems is different. For operational planning firms, it shows that, on average, and for all business applications, strategic planners use computer-aided systems more extensively than operational planning oriented firms. Consistent with prior expectation, however, Table 3 shows that the largest mean differences relate to the last six applications-risk analysis, strategic analysis, investment appraisal, market research, and cash flow forecasting. For example, there is little difference between the average use of computer-aided systems by strategic and operational planners in the small company sub-sample in respect of financial accounting, cost and management accounting and payroll applications. This contrasts with the significantly high computer usage by strategic planners in such business activities as profit and cash flow forecasting, production and sales planning, investment appraisal, risk analysis and market research. The mean use of microcomputers by strategic planners in the small firms sub sample (mean=3.29) is, for example, significantly higher than operational planners (mean=2.22) for cash flow forecasting.

In general, although Table 2 reveals a similar picture for medium-sized firms, some differences are evident. Although the table shows that, on average, strategic planning oriented firms use microcomputers more frequently and extensively than operational planning oriented firms for staff planning, the deference is statistically significant for medium sized firms only. However, for all SMEs participating in the survey, Table 3 clearly demonstrates that, other than in respect of financial, cost and management accounting and payroll applications, the use of microcomputers by strategic planners is significantly higher than it is for operational planners.

**Implications For Research:** Although the use of microcomputers among SMEs varies depending on the type, size and the nature of firms and the industry in which they operate, the majority of SMEs in Botswana do not use microcomputers and software packages for supporting managerial decision-making and strategic planning. All SMEs, without any exception, use microcomputers mainly for basic, operational, administrative, and day-to-day business activities. SMEs put much emphasis to day-to-day, short-term business activities rather than building long-term competitive potential. They engaged in intuitive, informal, and unstructured form of business planning. Only few firms are found practicing strategic planning. Most SMEs perceive that business planning is costly and time-consuming task, and hence is appropriate only for large firms. As a result, computers are more widely used for administrative and operational tasks rather than for supporting managerial decision-making and strategic planning. This finding holds for both small and medium sized firms.

Firm size and strategic planning are positively related. Medium firms put more emphasis on strategic issues than do small firms. As the firm size increases (as measured by either number of employees or sales volume) from small to medium and large, they tend to shift from focussing entirely on operational issues to long-term strategic advantage. A further key finding was that

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computer usage was positively associated with strategic planning. SMEs with strategic planning tend to use microcomputers more extensively for supporting managerial decision-making than do SMEs with operational planning.

The adoption of IT and DSS may spur small businesses to focus on long-term planning and business success. Given the widespread use of microcomputers by SMEs participating in the current study, the findings in this paper suggest that the key to a wider use of information, its analysis and application, should not just rely on educating the SME sector on the benefits of IT adoption, but also in fostering a strategic planning orientation which will encourage management to utilize their existing capabilities more fully. The relationship between strategic planning and computer usage is not clear. Future research should focus on the promotion the culture of strategic planning and visioning rather than propagating the great benefits of IT adoption, because the development of strategic orientation leads to efficient use of microcomputers and software packages. However, there is no evidence in the literature indicating that efficient use of microcomputers will lead to the development of strategic orientation.

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