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Article abstract

In few other areas of activity are the generation, gathering, processing, application and communication of information as important for business as they are in the travel and tourism industry. Ski area executives need to understand their markets in order to effectively interact with them. For this, managers have to be able to generate enough timely information about the market to support their decision making processes. This study develops a prototype ski executive information system for the Canadian ski industry. It is designed to provide ski industry executives with a readily accessible source of product and marketing intelligence to assist in strategic decision making. The icon and menu based grapical interfaces developed in this prototype combine to provide a user friendly information retrieval system whose efficiencies could eventually provide a botter use of various tourism data bases by decision makers.

A PROTOTYPE EXECUTIVE INFORMATION SYSTEM FOR THE SKI INDUSTRY

Karim B. Dossa and **Peter W. Williams**

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Abstract

In few other areas of activity are the generation, gathering, processing, application and communication of information as important for business as they are in the travel and tourism industry. Ski area executives need to understand their markets in order to effectively interact with them. For this, managers have to be able to generate enough timely information about the market to support their decision making processes. This study develops a prototype ski executive information system for the Canadian ski industry. It is designed to provide ski industry executives with a readily accessible source of product and marketing intelligence to assist in strategic decision making. The icon and menu based graphical interfaces developed in this prototype combine to provide a user friendly information retrieval system whose efficiencies could eventually provide a better use of various tourism data bases by decision makers.

Introduction

Businesses today have fewer layers of management, offer more diversified products and services, are increasingly international in focus and are heavily dependent on the accurate and timely flow of information. With organizational delayering, has come an increasing need for executives to directly use management information for strategic decision making purposes (Wainright, DeHayes, Haffer and Perkins, 1994). Executives and other senior administrators in organizations of all sizes and types are being forced by a wide range of market conditions to become more self-sufficient users of information technology. This situation relates to tourism as much as it does to almost any other economic sector.

Tourism is a very information intensive industry. In few other areas of economic activity is pertinent and current information concerning consumer preferences and behaviors, product performance, labor costs, and marketing effectiveness so critical to business success.

This is particularly the case for tourism executives and senior managers, who frequently must make strategic decisions concerning the products and markets to be developed for their organizations, with relatively little in-depth information at their disposal. It is not unusual for them to face decision making situations rich in data, but poor in information (Statistics Canada, 1989).

Often what top managers require to support their decision making processes is a customized information source or system which provides a current and consolidated picture of the key performance measures critical to their organization and industry. Frequently what they are able to retrieve is an array of uncoordinated, unfocussed and poorly presented documents, which may or may not relate to their decision making challenges.

This situation is particularly pronounced in Canada's ski industry, where decisions concerning product and market management issues must be made based on very sector spe-

cific market and travel related information. Aggravating the critical need for pertinent and timely information is the growing competitiveness of Canada's ski industry. Due in part to an aging population (e.g. baby boomers becoming more interested in softer, less strenuous activities), and a growing range of physically warmer and more accessible destination alternatives, the existing demand for alpine skiing in Canada has flattened (Williams and Dossa, 1994). This has created increased competition for current and latent skier markets. As discriminating skiers demand more efficient, hassle-free and value-laden products and services at slope side, the importance of having up to date and pertinent market and product performance measures available for decision making becomes paramount. This paper describes the development of a prototype ski area industry executive information system (EIS). It does so within a context of design criteria important to executive information systems in general and ski areas in particular.

Study Method

The research findings presented are based on several distinct stages of investigation. The first stage was a comprehensive review of the literature concerning the development, application and effectiveness of EIS technologies. This included not only determining the key criteria which senior managers might use to judge the appropriateness of an EIS, but also the various types of applications and usage constraints associated with such systems. Attention in this review was placed on identifying applications of this technology in the tourism industry in general and the ski area industry in particular.

Phase two of the research was designed to determine the specific types of information retrieval structures (e.g. computer operating systems, graphic and tabular display formats etc.) and content (e.g., product and market characteristics etc.) that senior ski area managers would ideally incorporate into an EIS. This involved the administration of a self-completion questionnaire. It was faxed to senior level ski area managers at fourteen (14) of British Columbia's largest ski areas.

The survey instrument explored issues related to computer usage patterns, market and product data requirements, and decision making issues of importance to ski area operations. In total, 13 of the 14 ski area executives contacted returned completed versions of the questionnaires. While this purposeful sample was not representative of all senior level ski area managers in either British Columbia, or Canada, the responses they provided offer guidelines which may be important to the development of EIS technologies in other jurisdictions.

The third phase of the research focused on the actual design elements that should be incorporated into the operating structure of an effective (EIS), as well as the integration of relevant content. This involved examining existing ski area related industry information and reconfiguring those portions of these data deemed to be appropriate to the needs of ski area executives. Particular attention was placed on ensuring that all data were presented in formats and retrieval systems suited to easy use by these decision makers.

Findings

Several valuable perspectives associated with the development of effective executive information systems for the ski area industry in particular and tourism businesses in general are presented in this discussion of the findings. These insights relate to the use of EIS technologies within organizational contexts broader than ski area businesses, the potential EIS behaviors of ski areas executives and senior decision makers, and the development of such systems in a British Columbia context.

Executive Information Systems In Context

The term Executive Information System was formally recognized in the early 1980's (Rockart and Treacy, 1982). In its broadest context, EIS refers to a set of computer based technologies that are able to provide managers and senior level administrators with important information in readily accessible and user friendly formats (Watson and Frolick, 1993). As compared to group support systems, expert systems, electronic document management systems (Sprague and McNurlin, 1993), EIS's focus on providing the specific information needed by executives and other associated senior level managers for their decision making processes. Fundamentally, EIS's help executives:

- implement decisions quickly within an organization;
- respond to information needs without directly involving middle management;
- improve communications within and beyond the organization;
- define and reinforce organization goals and objectives (Paller and Laska, 1990).

The early EIS's were used to a limited extent, largely due to a combination of human resource and technology development issues. From a human resource perspective, the vast majority of managers at that time were not computer literate, and felt that it was too late in their careers to either learn how to use or apply such technologies (Kanter, 1988; Nelson, 1990). From a technology development perspective, most of the early EIS approaches had not satisfactorily overcome many of the technical challenges associated with collecting, consolidating and displaying data in formats that were easily used by executive decision makers (Karten, 1987). As a consequence, EIS's were primarily employed in those situations where organizations were faced with particularly complex and specialized applications, and had the extensive financial and human resources required to build the customized systems needed to address their specific concerns (Paller and Laska, 1990).

From their earliest applications, EIS's have grown in terms of their ease of use and application. This growth has been attributed to a variety of factors including:

- *Improved computer technology*: applications that were technically impractical and too costly to implement only a few years ago have now become relatively routine (Rockart and DeLong, 1988), and have allowed executives to obtain critical information sooner for more timely and well-informed decision making (Giordanella, 1989);
- *the availability of information*: enhanced computer communication technologies have increased the flow and integration of information between and within various divi-

sions of most organizations. This has provided executives with greater access to more timely and focused information for quicker problem identification, analysis and decision making (Leidner and Elam, 1993).

- *organizational delayering*: as computer technologies have reduced the need for middle management personnel, there has been an accelerating need for executives to directly use labor, market and product information in organizational decision making.(Wainright et. al., 1994). This often creates situations where managers become inundated with data which is not central to their executive decision-making concerns. Executive information systems can reduce such conditions by focusing solely on performance measures and indicators critical to decision making.
- *more information sophisticated executives*: executives are being pushed by the growing computer culture of their organizations, to become more familiar with the application of information technologies routinely used by their subordinates in dealing with issues of strategic importance to the organization (Compton and Boone, 1992).

Today, examples of EIS initiatives exist in a variety of management contexts linked to different industry and government sectors. These include applications in government (Hoffman, 1994; Prendergast, 1993; Simard and Eenigenburg, 1990; Holland, 1990), hospital (Van Brussel, 1992), banking (Slofstra, 1994; Cummings, 1992), insurance (Nash, 1991; Kador, 1991); utility (Gates, 1993; Frolick and Jennings, 1993), hotel (Jesitus, 1993) and retail organizations (Robins, 1992; O'Leary 1991).

In the tourism field, information technologies have been employed in a growing range of situations including central reservation services (Kerr, 1994; Salomon, 1992); airline scheduling and sales (Poon, 1993); and guest services (Fryxell, 1993; Conhaim, 1988). While such systems represent valuable support systems for a wide variety of users ranging from front line staff to senior managers, they appear not to be designed specifically for senior level managers and executive decision makers (Poon, 1993). At strategic management levels, computer based information systems are used to facilitate corporate planning and strategic marketing. Organizations and their executives that have developed systems for accessing such information have a natural competitive advantage over those that do not (Witt and Moutinho, 1989).

Both internal and external pressures appear to stimulate the development of such systems. Increasingly competitive business environments tend to be the leading external pressure, while the major internal push is associated with the need for timely information (Watson and Frolick, 1993). In many of these situations, the relative success of organizations in developing and effectively using such systems has been largely a function of several distinct factors. Research clearly indicates that successful EIS initiatives are the result of:

- the computer hardware and software technologies employed matching the capabilities of the users;
- the data retrieval process and information structure reflecting the customized needs of the users;
- the data being accessible in easily retrieval formats;
- the data presenting both internal and comparative external industry information;
- the data being current and timely.

Ski Area Industry Requirements For An EIS

Specific information concerning the EIS needs of ski industry managers was derived from the survey of ski industry executives and senior managers. The design criteria they specified related to their current computer literacy, computer usage patterns, and the relative importance of specific types of information to be included in an EIS.

From a computer literacy perspective, it was apparent that the vast majority of the ski area executives interviewed were in at least an early "readiness" stage for applying a computer based EIS to their activities. The largest proportion (58%) of them claimed to have intermediate computer skills. Most of these executives (85%) used a computer at work, and over half of them (54%) also had access to a computer at home for their activities. They also used IBM or IBM compatibles almost exclusively for their computer related activities. About four fifths (85%) of these executives indicated they were most familiar with the Microsoft Windows operating system and a variety of software running in this environment (Table 1).

Conducting computer applications in the workplace appeared to be an integral part of the normal routine of most of these executives. Almost half (46%) of them spent three hours or more daily using their computers on work related issues. Most frequent uses of these technologies related to word-processing (100%), spreadsheet (73%) and graphic display (64%) applications. Less than half (46%) of them had used their machines for data base analysis purposes. This probably reflected a lack of available and pertinent data to examine in this context.

In terms of EIS content requirements, it was evident that executives were interested in gaining access to specific types of internal and external information. In particular, they indicated a strong interest in being able to easily retrieve current information on specific product and market trends in the ski industry. The majority of the respondents (70%) felt that ski area decision makers would be especially interested in an EIS to retrieve findings emanating from a biannual study of skiers visiting British Columbia (Williams and Dossa, 1992). Particularly important information from this ski industry report included segmentations of the province's skier markets as well as overall comparative information on the characteristics of these markets on a regional basis. The ski area managers also suggested other forms of information that would be important components of an effective EIS. In particular they noted the importance of data concerning the physical characteristics of other ski area facilities and services, as well as long term trends in skier market volumes and behaviors (Table 2).

EIS Prototype Development

Based on the preceding findings, a prototype EIS for ski area executives was developed. It was refereed to as SKIS forEX (Ski Knowledge Information System for EXecutives). The pro-

totype was designed to permit decision makers to suggest refinements to both the software and content dimensions of SKIS forEX, based on practical applications in the workplace. While not containing all of the information required by decision makers, specific hardware and software as well as content principles guided its development.

Hardware and software components of SKIS forEX were based on findings emanating from the previous two phases of the research. Guiding design principles were that the EIS would:

- operate effectively in an IBM computer hardware environment;
- function within the MS-Windows operating system environment;
- be acquired inexpensively and easily;
- have a readily understandable menu driven information retrieval system, complete with interactive graphics and figures compatible with Microsoft Excel;
- offer consistent and intuitive data search structures that would be transferable from one ski industry information module to the next;
- provide readily understandable and interactive data display systems.

Content design principles were that the EIS would incorporate information that:

- was interactive;
- was targeted at senior decision makers and required no intermediary interpretation by subordinates;
- accurately reflected distilled versions of what was contained in other industry reports;
- was up to date and could be readily revised as new information was generated;
- provided benchmark comparisons with previous and current industry performance standards.

Specific content incorporated into the EIS included information modules addressing specific product and market development subjects. In particular the EIS included executive summary highlights from existing ski market and product development reports; market performance patterns; service and facility development patterns; ski industry performance patterns; as well as highlights from popular and trade publications (Figure 1). The following figures provide insights into the formatting of typical information screens incorporated into the SKIS forEX information retrieval system (Figures 2 and 3).

Conclusions

SKIS forEX was developed as a prototype EIS designed to support the decision making processes of senior level ski area managers. As a starting point, it focused primarily on providing information central to decision making related to market and product development issues. Future versions of this EIS might expand to also include:

- A built-in clipboard to enable the user to make notes during an interactive session. For the statistically oriented user, the clipboard could potentially allow data to be extracted from SKIS forEX for "what-if" scenarios in a spreadsheet.
- A help menu utility in order not to alienate the non-user or the beginner by providing access to helpful information whenever the need arises.
- A link between SKIS forEX and the functionalities of other application software as improvements take place in the Dynamic Data Exchange capabilities. An example would be the ability to link into the rich graphic possibilities of a program like Microsoft Excel.
- Targeting other management areas within the ski industry (e.g., wholesalers, retailers, etc.) to provide relevant decision making information from SKIS forEX.
- Taking the prototype to the target users through focus groups, workshops and follow-up surveys to clarify the exact types of information needed and mechanisms for making the system more friendly.
- Expanding financial and/or human resource intelligence to decision makers.

Whatever the focus, the effectiveness of the system will be dependent upon the perceived and actual accessibility and relevance of the information provided. While a final verdict has not been reached on overall effectiveness of this particular version of SKIS forEX (testing of the prototype is now beginning), there is agreement that access to such information in an EIS format will become even more critical to the long term viability of many ski area operations. As layers of management between ski area executives and their customers continue to diminish, being able to rapidly respond to ever changing market conditions is becoming a growing responsibility for many of these managers. Undoubtedly a refined version of SKIS forEX will go a long way toward making these decisions easier. What is required at this point is more focused research which clarifies how to refine the prototype EIS so it can be effectively employed across the ski industry. The design principles for the development of a comprehensive EIS seem apparent. What is required is more detailed information concerning what must be done to encourage more decision makers to use them.

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TABLE 1

Summary of select ski area management computer use patterns.

Computer Literacy and Usage Patterns	Most Frequent Response
Computer Usage At Work	Yes (84.6%)
Type Of Computer Used At Work	IBM/IBM Compatible (100.0%)
Computer Usage At Home	Yes (53.8%)
Type Of Computer Used At Home	IBM/IBM Compatible (85.7%)
Computer Literacy	Intermediate (58.3%)
Familiarity With The Microsoft Windows Software	Yes (84.6%)
Time Spent On The Computer During Work	3 Or More Hours Per Day (45.4%)
Profile Of Computer Application Usage	Word Processing (100.0%)

TABLE 2

Summary of marketing and product development information preferences.

Information Source	Mean *
Profiles Of Key Market Segments From The B.C. Skier Survey	6.17
B.C. Skier Survey Final Report	6.00
Information On Other Ski Area Facilities And Services	5.92
Trends In B.C. Alpine Skiing 1985 To Present	5.83
B.C. Skier Survey Executive Summary	5.75
Ski Industry Market Trends Reports	5.46
B.C. Skier Survey Periodical Updates	5.36
Magazine Articles And Newspaper Clippings Related To Skiing	5.18
Ski Industry Newsletters	4.73
n	13

* Means are based upon values ranging from 1 = not important at all to 7 = very important.

Figure 1
SKIS forEX opening menu.

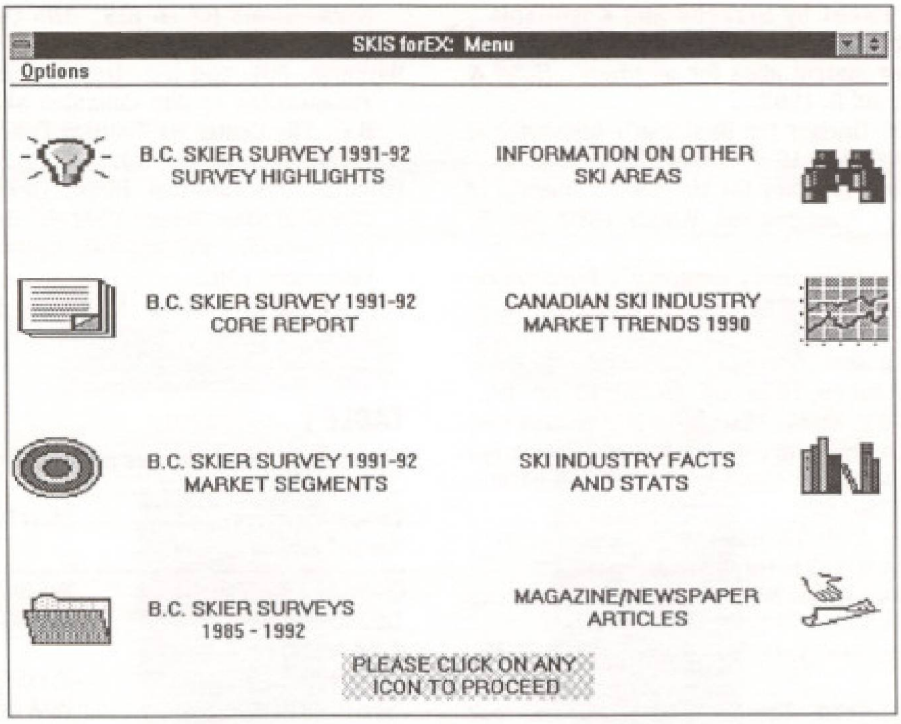
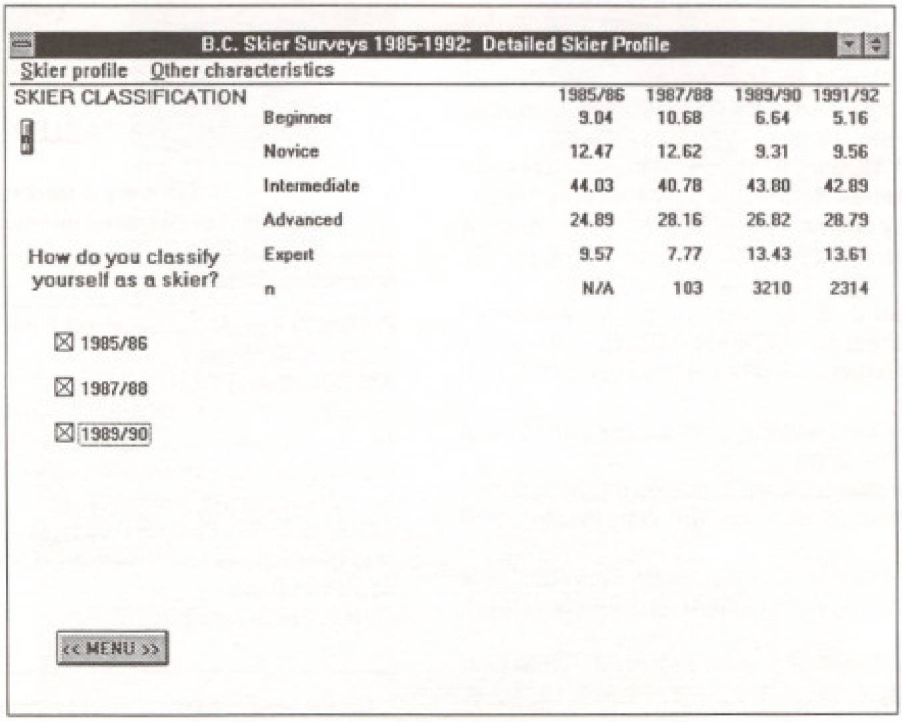
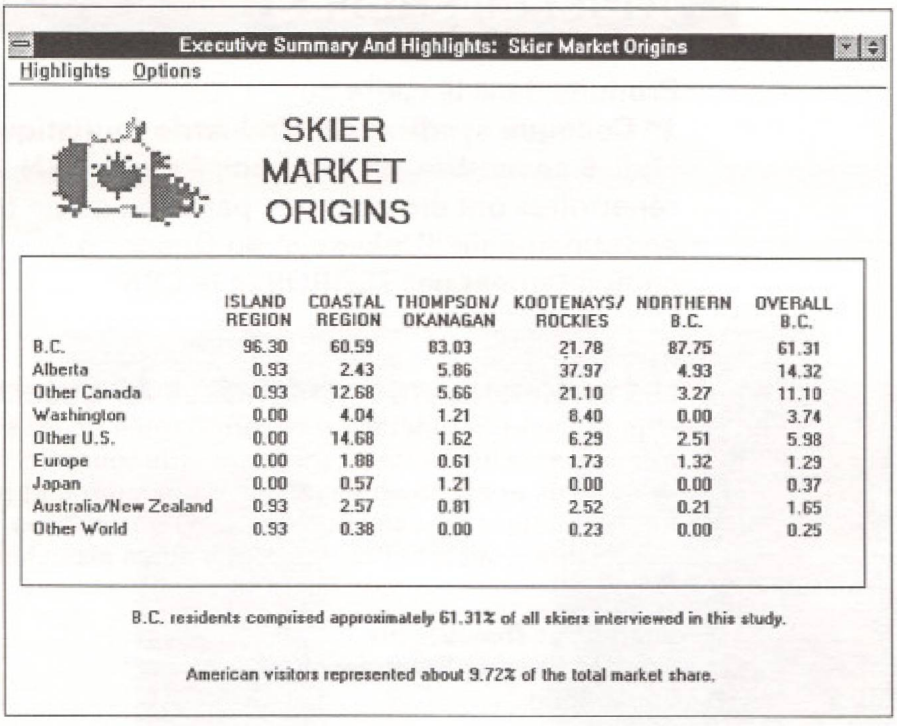


Figure 2
Sample interactive up-dating screen.



	1985/86	1987/88	1989/90	1991/92
Beginner	9.04	10.68	6.64	5.16
Novice	12.47	12.62	9.31	9.56
Intermediate	44.03	40.78	43.80	42.89
Advanced	24.89	28.16	26.82	28.79
Expert	9.57	7.77	13.43	13.61
n	N/A	103	3210	2314

Figure 3
Sample benchmark industry performance screen.



	ISLAND REGION	COASTAL REGION	THOMPSON/ OKANAGAN	KOOTENAYS/ ROCKIES	NORTHERN B.C.	OVERALL B.C.
B.C.	96.30	60.59	83.03	21.78	87.75	61.31
Alberta	0.93	2.43	5.86	37.97	4.93	14.32
Other Canada	0.93	12.68	5.66	21.10	3.27	11.10
Washington	0.00	4.04	1.21	8.40	0.00	3.74
Other U.S.	0.00	14.68	1.62	6.29	2.51	5.98
Europe	0.00	1.88	0.61	1.73	1.32	1.29
Japan	0.00	0.57	1.21	0.00	0.00	0.37
Australia/New Zealand	0.93	2.57	0.81	2.52	0.21	1.65
Other World	0.93	0.38	0.00	0.23	0.00	0.25

B.C. residents comprised approximately 61.31% of all skiers interviewed in this study.

American visitors represented about 9.72% of the total market share.