

PHAROS—The Single European Market Adviser

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The formation of the single European market (SEM) will create a new business environment in Europe. The competitiveness and, indeed, the survival of many United Kingdom businesses depends on how well they understand and react to the threats and opportunities presented by opening up Europe and associated industry restructuring. Expertise in single-market issues and legislation is scarce and expensive, making it difficult for many organizations to obtain. In addition, the recession has prompted many organizations, particularly the smaller ones, to concentrate their efforts on improving short-term profitability. Most of these organizations cannot afford the resources needed to assess the impact of SEM on their business. This chapter describes PHAROS, an expert system designed to assess the impact of SEM legislation on businesses in the United Kingdom. PHAROS was developed by National Westminster Bank (NatWest) and Ernst & Young Management Consultants. It will be used by 70,000 medium-sized businesses, resulting in millions of pounds of savings for the United Kingdom business community yet offering the bank a competitive advantage. This section discusses the importance of SEM. This importance is assessed in relation to business in the United Kingdom in general and NatWest in particular. How PHAROS was conceived is also discussed.

Why Is the Single European Market Important?

The creation of SEM is one of the greatest challenges that European industry has faced in nearly half a century. The changes it brings will shape the way business will be conducted across the Continent for decades to come. As trade barriers are removed, and business legislation across member states is harmonized, European companies will have access to a market of over 380 million consumers. Markets and industries are likely to undergo progressive restructuring similar to the American deregulatory experience of the last 10 years.

The formation of the single market presents tremendous opportunities, as well as significant threats, to businesses in the United Kingdom, and there will inevitably be major winners and losers. However, with less than 12 months to go, many United Kingdom companies do not appear to have developed robust business plans and operational strategies to effectively meet these changes. Indeed, a recent survey by the Department of Trade and Industry (DTI) showed that although 98 percent of British firms were aware of the creation of SEM, only 41 percent have taken any action, 10 percent are still thinking about it, and a further 28 percent remain convinced that they will not be affected.

Why Is the Single Market Important to National Westminster Bank?

As a major European bank, NatWest was concerned about the degree of indifference within its customer base and the United Kingdom business community in general. Its own strategies for Europe are well advanced, but pivotal to these is the recognition that the success of these strategies is inextricably linked to the business success of its client base. The facts of life for corporate banking in the 1990s mean that it is impossible to sustain a position as a successful financial services organization with a customer base deteriorating in quality and a loan book experiencing significant levels of default.

The difficulty facing NatWest was how to help its customers in a cost-effective manner. The provision of individual consultancy for each of its customers would be prohibitively expensive and time consuming. General exhortation by existing bank executives had not brought about the required level of change. A more unusual and radical method had to be identified that would capture the imagination of NatWest's customers.

How Was the Idea of PHAROS Conceived?

The process that eventually led to the development of PHAROS began with research done in mid-1990 by NatWest among its small- and medium-sized enterprise customers. This research found that the biggest

problem facing these organizations was a lack of appropriate information on SEM issues. Nearly one-third of the firms surveyed were prevented from taking any action for this reason alone.

At first, the result was puzzling. From NatWest's perspective, the problem appeared to be precisely the reverse because traditional awareness-raising activities had resulted in an excess of information from countless sources. However, further analysis revealed that the real problem centered on lack of time to identify and analyze this information. This time deficiency, combined with the state of the economy, had pushed SEM down on their list of priorities.

As a direct result, the idea of developing a disk-based means of delivering business-related information about SEM was conceived. This information could be structured to make it easily accessible and simple to use. It would also have an updating mechanism to ensure that the knowledge base remained up to date.

An off-the-shelf product was located in mainland Europe that could provide a solution. This product offered a database of SEM legislation on a disk that could be run on any IBM-compatible personal computer (PC). The user could access the database using either a hierarchical menu or a keyword search.

A limited field trial of the prototype was arranged to evaluate the concept by a representative number of NatWest customers. The results of this exercise, however, were mixed:

First, the database was recognized to be comprehensive, but the information was not business oriented, and key issues could not easily be identified and assessed.

Second, users found it difficult to navigate through the tree structure easily, and virtually all got lost in the hierarchy. Additionally, this structure was unnatural and did not fit in with their way of thinking about the problem.

Third, the keyword search facility relied on a prior knowledge of the terminology used by the developers of the product, causing difficulties.

Fourth, doubts were expressed about a bank's ability to support such a product in the field.

However, if NatWest could arrange for the information to be business oriented and accessed more quickly than a paper-based substitute, users would receive a value-added service of this sort enthusiastically.

Given this positive response to the concept, new objectives for the product were drawn up. These objectives were the following:

First, the product needed to be custom built for NatWest and targeted at decision makers who are typically not computer literate and, thus, demand complete ease of use.

Second, it should be capable of delivering advice specific not only to

the relevant industry sector but also to the business itself.

Third, the knowledge base contained within the system must extend across the spectrum of single-market issues for a business and not be limited to banking topics.

Fourth, the advice must be accessible and delivered shortly after starting to use the system.

Fifth, the system itself should not appear too glossy. It must be a practical, functional business tool and not contain overt marketing material.

It was becoming clear that these objectives could only be achieved by arranging a joint venture of some form with another organization. This organization must have wide-ranging business skills outside the traditional banking environment combined with leading-edge system capabilities. These skills were identified as those typically possessed by large firms of management consultants, particularly those with significant experience with both United Kingdom and European business issues. After an appropriate selection process, Ernst & Young Management Consultancy was engaged to undertake the project.

The initial brainstorming sessions identified expert system technology as a strong contender for delivering the required solution. The combination of Ernst & Young's skills and NatWest's market position, its knowledge of its customer base, and its direct distribution system to over one-third of the United Kingdom business community provided the foundation for an ambitious marketing program. In this way, NatWest could deliver a true value-added service to its customers and create significant competitive differentiation for itself in the United Kingdom banking sector by being in the lead toward this 1992 change.

A Description of PHAROS

This section introduces PHAROS. It describes what PHAROS does, what is innovative about PHAROS, why expert system technology was used, how PHAROS was implemented, and how users interact with it.

What Does PHAROS Do?

PHAROS was developed to help organizations in the United Kingdom compete in SEM. It identifies and assesses the issues arising from SEM legislation that directly affect a business and its markets. This information provides valuable input to the business planning process.

Through a series of consultation sessions, PHAROS builds a detailed profile of a business by capturing the key aspects of its current and planned activities. The following areas are covered:

Suppliers: This area elicits information about key suppliers and the

major purchases made by a business, including imported goods.

Own Operations: This area is concerned with the internal operation of an organization and covers such facets as logistics, finance, production, marketing, human resources, and information systems.

Products: This area captures information about the nature of the products or services offered by an organization.

Customers: This area covers the key markets for a business, including exports, and issues such as pricing policies as well as the specific needs of customers.

With this unique profile of a business, PHAROS does the following: (1) it identifies SEM legislation that affects a business and that could be important to its future operations; (2) it assesses and highlights the potential business implications of legislation in terms of threats and opportunities; (3) it suggests possible strategic and operational actions that a business can take to minimize the threats and maximize the opportunities; (4) it provides additional detail on particularly complex or technical SEM topics; and (5) it directs the business to sources of information, such as trade associations or government bodies, where further guidance can be obtained.

At any stage during the consultation, intermediate results can be viewed on the screen. At the end of a consultation, PHAROS produces a comprehensive report, which can be printed out, on its conclusions and recommendations.

What Is Innovative about PHAROS?

The expert system techniques used to develop PHAROS represent the best practice in the field, but they do not break any new ground as far as technology is concerned. What is innovative about PHAROS is that it demonstrates how knowledge-based systems can be used to deliver an area of expertise to a large number of users at a low cost.

From NatWest's perspective, PHAROS opens a new chapter in business-to-business marketing. The key to innovation has been to link an ambitious technology project with a marketing strategy to deliver a true value-added service to a major share of the United Kingdom business community. Other considerations that qualify PHAROS as an innovative AI application are as follows:

First, PHAROS will be the most widely distributed operational expert system at least in the United Kingdom, saving the business community millions of pounds of effort.

Second, it represents the first successful attempt at wide-scale retailing of expertise to external organizations using expert systems as a delivery mechanism.

Third, it demonstrates the feasibility of combining diverse sources of expertise to synthesize a new product.

Why Did We Use Expert System Technology?

The following requirements influenced the design and development of PHAROS:

Relevance: Identifying SEM legislation relevant to a particular business is a difficult and time-consuming task. PHAROS would succeed if it could quickly guide a business to information that is directly relevant to its operations.

Business focus: Information sources currently available on SEM legislation are mainly of a technical nature and require expert interpretation to relate them to the specific circumstances of a business. The advice given by PHAROS had to be focused on the business implications of legislation, with technical detail provided as supporting information.

Simplicity of use: The target user population of PHAROS is 70,000 and might eventually grow to be over 100,000 users. For this reason, it is difficult to make many assumptions about the user population and its knowledge of using decision support tools. PHAROS had to be easy to use and understand.

Ease of maintenance: SEM legislation is evolving rapidly, and there would be a need to keep users informed of any developments that affect their businesses. An update of PHAROS is planned every six months until legislation begins to stabilize. The architecture of PHAROS had to facilitate the updating of information without the need for system reconstruction.

These requirements seemed to render a conventional software solution unmanageable. Table 1 summarizes the justification for adopting an expert system approach.

Requirements	Issues	Expert System Solutions
Relevance	Large Search Space	Heuristic Search
	Complex Queries	Partial Pattern Matching
	Incomplete Search Criteria	
Business Focus	Heuristic Knowledge	Rule-Based Representation
Simplicity of Use	Large Number of Questions	Dependency Network
	Complex Dependencies	Truth Maintenance
Ease of Maintenance	Evolving Legislation New SEM Topics	Declarative Representation

Table 1. Justification for Using Expert System Techniques.

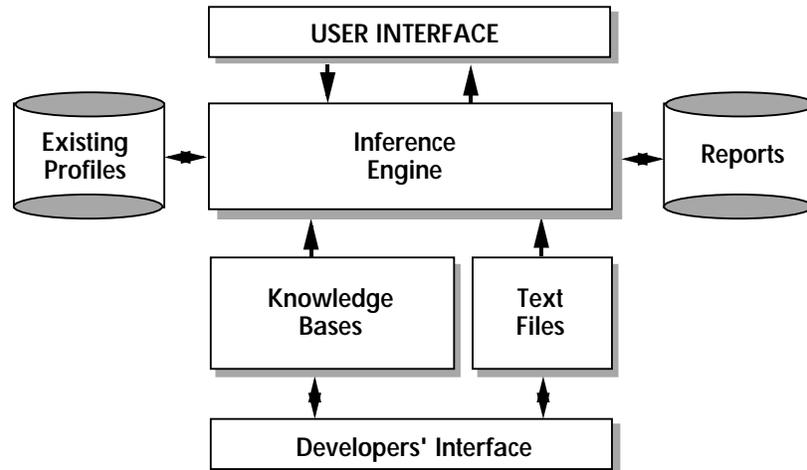


Figure 1. An Overview of the Architecture of PHAROS.

The remaining subsections outline how these requirements are satisfied by applying expert system techniques.

How is PHAROS structured?

The architecture of PHAROS is illustrated in figure 1. This architecture makes a clear separation between the user interface, inferencing mechanism, and knowledge bases. This separation offers the flexibility to modify the content of the knowledge bases without needing to make major software modifications. This feature is facilitated by the *developers' interface*, which enables knowledge coordinators to view and edit the content of the knowledge bases and textual information, such as context-sensitive help messages.

The inference engine supports backward and forward chaining. The structure of knowledge bases and other related information is shown in figure 2. The knowledge and data bases consist of three components: working memory, knowledge bases, and textual information.

Working memory: The working memory is populated as a user progresses through a consultation. This component includes information supplied by the user about the nature of his/her business, SEM legislation that has been identified as relevant, and the business implications that arise.

Knowledge bases: The core of PHAROS consists of three separate but related knowledge bases. First is the *profiling* knowledge base, which includes a dependency network that models the relationship between

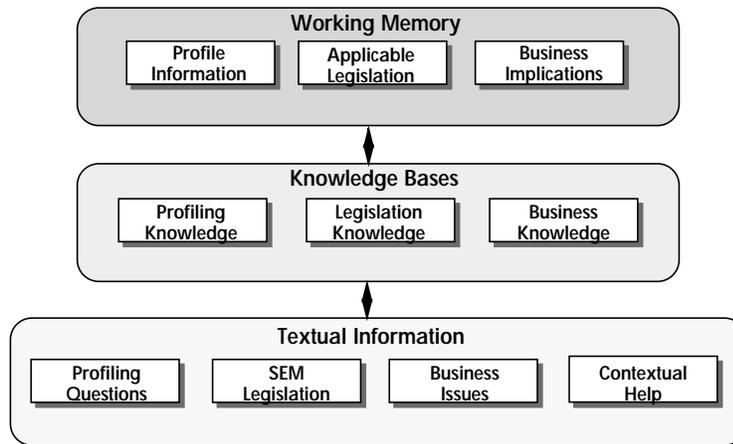


Figure 2. Overview of the Knowledge Base Structure.

all the questions in the system. This approach ensures that only questions that are relevant to a user's business are asked. Second is the *legislation* knowledge base, a set of rules that specify the circumstances under which a piece of legislation becomes relevant to an organization. SEM legislation is grouped under 20 topics, as shown in figure 3. Third is the *business knowledge* base, which consists of a set of production rules that determine the business impact of a piece of legislation in the context of the individual circumstances of a business. These rules represent the expertise of numerous individuals with both a knowledge of specific industries and a good understanding of changes that will result from the formation of the single market.

Textual information: PHAROS compiles its recommendations using a database of canned text paragraphs. Variables are embedded within text paragraphs that enable PHAROS to tailor its recommendations to the individual circumstances of a business. In addition, help information is stored as a set of text files. PHAROS consists of 720 rules, 120 questions, 551 text files, and 150 help files.

How Is PHAROS Implemented?

PHAROS is implemented using crystal, which is marketed by Intelligent Environments in the United Kingdom. Our choice of development tool was influenced by the following factors:

Technical requirements: Our requirements included support for rule-based representation, good user interface facilities, support for text manipulation, and interfaces to databases and external procedures.

	Suppliers	Operations	Products	Customers
1. Health & Safety				
2. Corporate Taxation				
3. Consumer Protection				
4. Financial Services				
5. EMU				
6. Competition Policy				
7. Company Law				

Figure 3. Summary Matrix Screen.

Hardware requirements: Because PHAROS is aimed at a large number of users, it was of paramount importance that it be able to run on IBM PCs or compatibles under DOS.

Productivity: The productivity of the developers was a key factor that influenced the selection of the development environment. The facilities that were required included screen painting, graphic display of knowledge bases, and good debugging and tracing facilities.

Robustness and performance: PHAROS will be installed on a range of PCs with different configurations and processing capabilities. It was therefore important for the development environment to run reliably on different platforms and perform adequately on a range of PCs.

Licensing and pricing: Initial discussions with tool vendors resulted in a wide range of prices and licensing conditions. Our requirements included an unlimited number of run-time licenses and further development of the application without incurring new license charges.

Other considerations that influenced our final choice included the ability of the vendor to provide training and technical support, the financial stability of the vendor, and the existing development skills of the project team.

How Do Users Interact with PHAROS?

PHAROS is intended for use by a wide range of individuals with varying levels of expertise and experience in using computer-based tools. The system will be used by the top managers within an organization whose time is scarce. Their first impressions are crucial to the success of

PHAROS. Any initial difficulties in understanding the tool and the way it works could deter users and affect their perception of the value of its advice. Hence, a great deal of emphasis was placed on structuring the dialogue and designing the user interface. The key requirements that were addressed are as follows:

Ease of navigation: At any stage during the interaction, information is provided that indicates where the user is and what he/she can do next. In addition, context-sensitive help is available throughout the system, and a tutorial provides example interactions with the system. Field trials proved that most users could learn to navigate through the system with ease.

User versus system control: Given the diversity of the user population, it was important to strike a balance between system-driven and user-driven dialogue. At one extreme, the system needs to guide novice users through all the steps, but experienced users should be offered more control. That balance was achieved by providing a menu-based dialogue with shortcuts for more experienced users. In addition, the consultation is structured to provide the user with maximum control over the sequencing of the dialogue.

Presentation of information: Depending on the nature of a business and the complexity of its operations, PHAROS could identify a large number of issues affecting it. In a complex case, the final report with the supporting technical details can be as large as 100 pages. The way this information is presented to the user was seen as a major determinant of its impact. PHAROS presents its findings on three levels: The first level is the *summary matrix*, a concise summary that highlights the key areas of a business that are affected by a particular SEM topic (figure 3). On this matrix, the rows represent the SEM topics and the columns the four key areas of a business. A tick in a cell indicates that a particular topic affects the corresponding area of the business. This matrix provides a useful summary that at a glance indicates how significantly a business is affected. The second level is *business implications*. Behind each tick in the matrix are detailed implications for the particular business with potential actions to be taken. The screen, as shown in figure 4, indicates the number of likely implications and the area of the business that will be affected. Third is *additional detail*. Where necessary, additional background information and technical details are provided on complex topics. This information can relate to the underlying legislation from which a particular business implication derives or provide further detail to clarify a specific issue. The availability of additional detail is indicated by a button marked "detail" that appears next to an implication. The detail can be viewed simply by highlighting the detail button and pressing return.

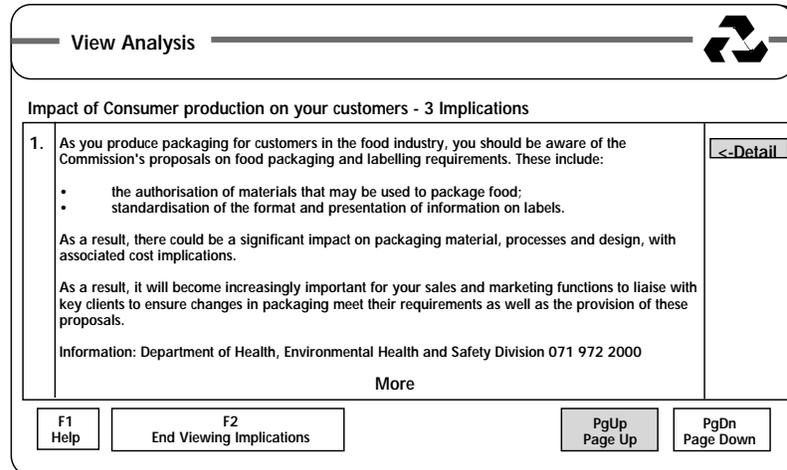


Figure 4. Business Implications Screen.

Feedback: At each stage during the interaction, PHAROS provides feedback in response to users' actions. The provision of feedback is important for maintaining users' confidence, particularly when there are possible delays while PHAROS is performing a complex analysis.

Finally, judicious use of color was made to improve the aesthetics of the product as well as to focus users' attention.

The Commercial Benefits of PHAROS

The benefits of the system were assessed from two perspectives: the benefits to the users and the benefits to NatWest.

What Are the Benefits to Users?

The field trials highlighted that PHAROS will be valuable for most organizations regardless of their level of awareness of single-market issues; for example:

First, for businesses that are already well aware of the single market and the way it will affect their operations, PHAROS provides a check that all the relevant issues, particularly those that are cross-sectoral, were identified.

Second, for businesses that are not significantly affected by the formation of the single market, PHAROS provides a comfort factor by confirming their own assessment of the situation.

Third, for businesses that are unaware of the implications of the single market for their operations, PHAROS provides a detailed analysis of how they will be affected.

For businesses that for whatever reason believe they will not be affected by the single market and are taking no action, PHAROS might indicate new issues not previously considered and, therefore, could prove to be crucial.

For any organization, even a cursory analysis of SEM issues has a considerable cost associated with it. Based on the field trials, such an analysis could cost a minimum of £1000 (\$1,767) in resources.

PHAROS provides a comprehensive analysis, and therefore, the market value of its advice could represent a savings of over £70 (\$123) million for the United Kingdom business community.

From the users' point of view, PHAROS represents a virtually zero-cost route for accessing major ongoing business research programs, yielding results that are specific to their business and can be achieved rapidly.

What Are the Benefits to NatWest?

Benefits to NatWest include the following:

The first benefit is promoting the image of NatWest as a forward-thinking organization. In the past, NatWest has been proactive in responding to customers' needs, and PHAROS provides it with a new tool to sustain this drive.

The second benefit is providing a competitive edge. Most banks in the United Kingdom have embarked on some program to create awareness of SEM within the business community through seminars and the distribution of brochures. PHAROS offers a marketing tool that enables NatWest to maintain its lead among the United Kingdom banks. We are not aware of any other financial organization in the United Kingdom that provides or plans to provide such a service to their corporate customers.

The third benefit is winning new customers. PHAROS is an integrated part of a marketing program that is aimed at penetrating competitors' customer bases. Linked with a planned sales campaign, this benefit will potentially lead to new business conversions in the corporate market.

Finally and most importantly, NatWest's philosophy is based on a recognition that the success of its customers is fundamental to its own profitability. The outlook over the medium to long term is bleak if customers do not compete successfully in Europe. PHAROS supports this philosophy by placing the single market firmly on the agenda of its corporate customers.

Most of these benefits, although not tangible, are extremely important from NatWest's viewpoint. Compared with other marketing strategies, such as an advertising campaign, PHAROS offers a more effective tool at a comparable cost. One objective of the field trials was to estab-

lish the reaction of clients to the provision of such a service by NatWest and the type of followup service they would welcome. The general response was extremely positive, and in every case, clients expressed an interest in such a service.

Two postlaunch activities have been planned to monitor the success of PHAROS. The first is the provision of an update service for a nominal fee. The number of businesses that subscribe to this service will be a further indication of success. In addition, a survey will be conducted to establish what actions were taken by organizations as a result of using PHAROS.

The Development Process

PHAROS was developed using the Ernst & Young methodology for structured techniques for analysis and generation of expert systems (STAGES). STAGES provides a framework for managing the development of expert systems with a strong focus on business requirements.

The components of STAGES support an entire project, from application selection through the investigation phase to delivery and maintenance of an operational system. The core of the methodology is project structure, which gives guidance on organization and staffing; project life-cycle management, and project activities.

How Was PHAROS Developed?

An overview of the project organization showing the key roles and their relationships is shown in figure 5. The project was managed and controlled using the STAGES life-cycle model. This model is based on a spiral model of development that ensures adequate attention is paid, in appropriate proportions, to quality management, project control and reviews, risk management, definition of objectives, and planning and estimating as well as development. The project was conducted in four phases, with formal reviews at the end of each phase and other check points at appropriate stages during each phase. Governed by this life-cycle model were the project activities. The diagram in figure 6 shows the configuration of STAGES activities for the project.

During the development, a number of prototypes were constructed to validate the key deliverables, decisions, and assumptions. The objectives for each prototype were clearly defined and were used to plan the field trials. These prototypes were as follows:

Sampler: The objectives of the sampler were to establish the technical, business, and organizational feasibility of the approach and estimate the level of funding needed for the full development project.

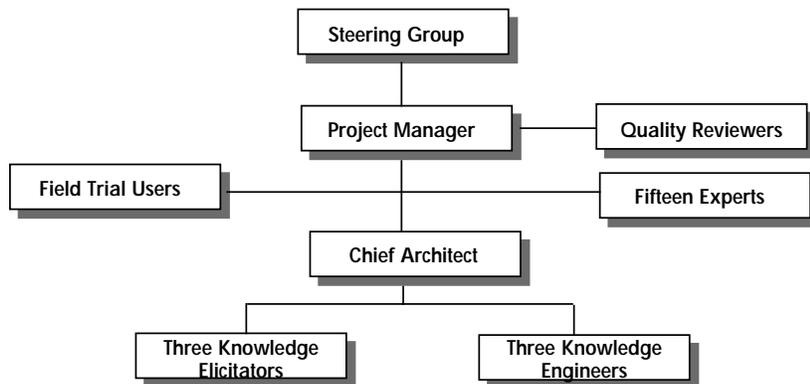


Figure 5. Project Organization.

Prototype 1: The objectives for the first prototype were to assess the efficacy of the user interface and the appropriateness of the advice given by PHAROS in terms of the level of detail and emphasis.

Prototype 2: The objectives for the final prototype were to establish how well PHAROS performed compared to professional management consultants and evaluate the total packaging of the system.

Each prototype was carefully evaluated through field trials with NatWest’s customers and internal validation. The outcome of each field trial was used to plan and focus subsequent phases. An important outcome of field trials was the identification of the need by users for an update service.

Work on PHAROS started in April 1991 and finished in January 1992. A summary of project costs is given in table 2.

Cost Category	Costs (£)
System Development	220,000
Knowledge Elicitation and Expert Resources	200,000
Production	175,000
Distribution, Marketing, and Support	270,000
Total	865,000

Table 2. Summary of Costs.

How Were Costs Justified?

The costs were justified based on maintaining a low unit cost and obtaining new customers.

Low unit cost: The unit cost of PHAROS is approximately £12 for each customer, and the cost of the project can be justified on this basis

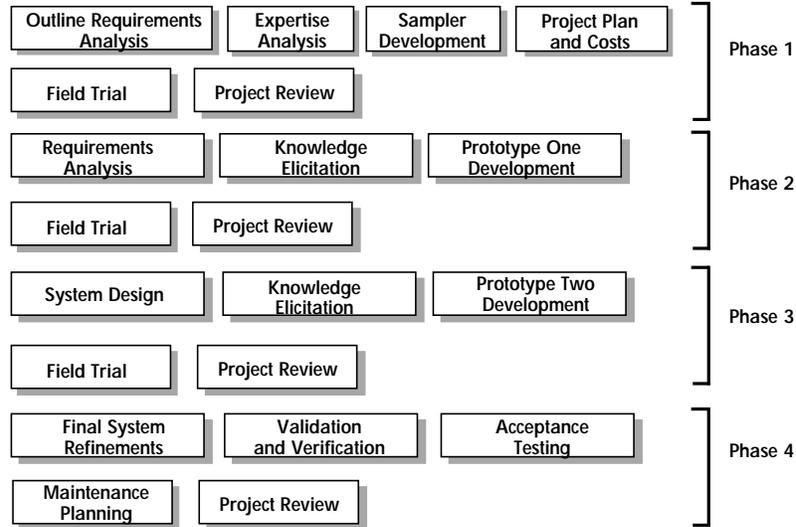


Figure 6. Project Phases and Activities.

alone. This amount is considerably lower than the cost of alternative services NatWest could provide as part of its normal corporate customer care program. In addition, other benefits might be realized.

New customers: Any new customer attracted as a result of PHAROS represents a profit-making opportunity.

Therefore, NatWest was convinced of the benefits of PHAROS, but it was concerned about the project's feasibility and whether it could deliver within acceptable time scales. For this reason, the project was structured to address the major risk issues early in the development process. The investigation phase was instrumental in demonstrating the feasibility of the project and creating confidence that the project could deliver.

How Was PHAROS Validated?

Because PHAROS will be distributed so widely, it is paramount that the advice it gives is valid and correct. In addition to internal system verification and destructive testing, a number of activities were undertaken to validate the advice provided by PHAROS:

Walkthrough by experts: The knowledge bases of PHAROS were documented using specially designed rule charts that ease validation. Experts on each SEM topic conducted a detailed walkthrough of each topic to ensure completeness and correctness.

External validation: The rule charts were further validated by Euro-

pean specialists who were not involved in knowledge elicitation. This validation not only provided an additional comfort factor but also ensured that recent changes in legislation were reflected in the rule charts.

Field trials: Three separate field trials were carried out to validate the assumptions underlying the system. In total, 15 representative NatWest's customers were visited. The final field trial included a comparison of the advice given by PHAROS and that of a SEM expert. In each case, PHAROS identified a larger number of issues that included those identified by the human expert. However, experts were able to prioritize the issues where PHAROS could not.

Dynamic validation: The system was worked through by over 50 people within NatWest and Ernst & Young. This work involved presenting PHAROS with case studies and reviewing the relevance of its recommendations.

Acceptance testing: The system was formally acceptance tested by NatWest staff members.

How Will PHAROS Be Maintained?

An update of PHAROS is planned on a biannual basis. In addition to updating the knowledge contained in PHAROS, each update will include a new module. The module that is currently being investigated for the first update is an in-depth analysis of environmental legislation that is a rapidly emerging area of importance for businesses.

The updates to the existing knowledge bases will be carried out by a team of knowledge coordinators who have some training in expert systems. Stringent change control procedures were put in place to ensure the integrity of the knowledge bases. The updates of PHAROS will highlight the recent SEM developments affecting users since they last consulted PHAROS.

Planning for Deployment

The deployment process for PHAROS commenced as soon as its feasibility was established. The deployment process was just as important as the development process in ensuring the success of the product. This process involved formulating tactical marketing and deployment strategies to support the launch of the new product.

The thrust of the marketing drive centered on the following key issues:

Identifying Competitors' Response Routes

The first stage was a forward study to identify likely competitor response routes to the proposed outline marketing plan. The main conclusion was that a straight "me too" response was unlikely. A successful

retaliation would be possible through a joint venture with other major players in the wider United Kingdom business arena, particularly if partners could bring enhanced credibility to the product. These partners included government bodies such as DTI or a major alternative distribution channel such as the Confederation of British Industry (CBI). A series of activities were undertaken to involve all potential joint venture partners in the distribution process: First, negotiations took place with CBI, which resulted in it becoming involved. Second, as a co-partner and with an agreement to promote and distribute PHAROS to its membership base, DTI was kept fully advised, and the involvement of users of government advisory units throughout the country was secured. Third, sponsorship deals with other major players secured additional distribution arrangements.

Deciding a Pricing Policy

It was recognized that the level of sustainable competitive advantage was directly linked to the level of distribution. A pricing policy was devised both to support this arrangement and yield an acceptable return on investment on the following basis: First, the initial package was to be provided free of charge to all businesses regardless of whether they were NatWest customers. Second, the price of the biannual update service was to reflect value and give preference to customers through a differentiated annual charge of £40 (\$70) for customers and £125 (\$220) for noncustomers.

Creating Internal and External Awareness

Internal and external awareness and promotional campaigns were developed in parallel with the system project. These campaigns included the development of a combined leaflet and application form that outlined the capabilities of the product and solicited the data required to drive NatWest's central database and provided the information needed to support a help-line service.

Detailed press, advertising, and distribution arrangements were also put in place to coincide with the target launch date. These arrangements included an internal briefing and demonstrations of the system to NatWest's regional sales managers and the preparation of a specially designed training and awareness guide for NatWest's managers and staff to provide information on SEM, its importance to NatWest, the rationale for PHAROS, and their role in making it a success.

Addressing the Logistics of Distribution and Technical Support

Concerns about NatWest's ability to support a software program of this

nature in the field were addressed by commissioning NatWest's computing subsidiary, CentreFile Ltd., to provide software support and manage disk reproduction.

Launching the Product

PHAROS was formally launched on 18 February 1992. At the time of writing this chapter, April 1992, requests for 15,000 copies of the system have been received.

The marketing objectives for this campaign are demanding, and targets have been set at ambitious levels. For the first stage of the project, it is intended to send out 70,000 copies of PHAROS. However, the true measure of success will hinge on how many subscribers sign up for the update service. The target is 35,000 users at a minimum.

Conclusions

In conclusion, PHAROS demonstrates how expert system technology can be used to gain competitive advantage. The main factors contributing to the success of the project were as follows:

- A strong focus on business objectives and users' requirements as opposed to technical issues
- An effective combination of a strong marketing program and advanced technology to develop a unique product reaching a significant proportion of the United Kingdom business community
- Management commitment and support throughout the project, reflecting its belief in the objectives of the project
- An appropriate project structure bringing together skills and roles necessary for a successful project
- A structured approach to development with strong emphasis on risk, project, and quality management
- A well-thought-out deployment plan paving the way for the introduction of the product

In summary, all the indications are that PHAROS will achieve its primary twin objectives—competitive advantage for NatWest and true added value for the customers.