
Kwangju Bank Strategic Information Systems Plan

Preface

This Strategic Information Systems Plan (SISP) documents a Strategic Data Model developed for the Kwangju Bank (KJB) in Kwangju, South Korea. Project Plans have been defined for early delivery of priority databases and application systems to support KJB management information needs.

This is a technical document intended for staff with implementation responsibility for KJB databases and systems. It describes the analysis of the Strategic Model to develop the SISP; in appendices it documents the Strategic Data Model in detail.

The Executive Summary of this SISP Report is written from a management and business perspective; it summarizes key results of the SISP for management.

The Structure of this Document

This Strategic Information Systems Plan (SISP) Technical Report is in three sections.

- Section 1 provides a brief overview of the SISP in an Executive Summary.
- Section 2 addresses development of the Strategic Model from KJB Strategic Plans.
 - It first discusses the Purpose and Benefits of a Strategic Data Model.
 - It examines the Mission, Goals, Objectives, Strategies and associated statements in the KJB Strategic Plan. It discusses Key Performance Indicators (KPIs) from the Plan.
 - Principles used to develop data models from planning statements are next discussed. The strategic data model includes data and information that support the KJB Strategic Plan, for later implementation of databases and application systems. These SISP concepts are based on Enterprise Architecture principles.
 - The Strategic Model, developed from the KJB Strategic Plan, was analyzed to identify major business activities and databases. This analysis identified subsets of databases that may be implemented early for delivery of priority information.
 - Recommendations for implementing the Strategic Data Model are then made.
- Section 3 provides additional detail in a number of Appendices. Each Appendix includes a cover page discussing its content, and describes how the information documented within the Appendix is to be utilized.

NOTE: This SISP Report can be read online by using hyperlinks in the Table of Contents, available from the [Project References](#) section of the IES web site.

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1 Executive Summary

- This report documents planning activity for the KIMIS project at Kwangju Bank in the city of Kwangju, South Korea. The report is a Strategic Information Systems Plan (SISP) for a Strategic Data Model, based on Enterprise Architecture principles. KJB and KEMI staff defined this model with Clive Finkelstein of Information Engineering Services Pty Ltd – IES – in AUstralia). Micro Banking Systems (MBS) Corporation in Seoul provided consultants for additional data modelling and project management support to the KIMIS project.
- KJB managers and business experts reviewed the Strategic Data Model in a Review Session. It identifies information that is needed by KJB managers to achieve the strategic goals and objectives in the KJB Strategic Plan.

1.1 What is a Strategic Model?

- A town plan is the plan for construction of a city. So also a Strategic Model is the “town plan” needed for construction of databases to support the Bank and its customers. As the layout of streets in a suburb is documented using a street map and a street directory, so also data definitions are documented using a data map and a data directory: called a data model.
- Operational data, summarized in an Information Warehouse, can be analyzed historically. For example, many factors that contribute to the profitability of a Branch over time can be analyzed in an Information Warehouse. An Information Warehouse can be developed from the KJB Strategic Model to analyze the Bank's operational databases so that any time-dependent and other trends can be determined.
- As a street directory enables people to find their way about the city, so a “*Repository*” is a directory of information in the Information Warehouse and in KJB databases and systems. The Strategic Model documented in this SISP report, with more detailed data models still to be developed at the tactical level, provide input to the KJB Repository. More details on Strategic Models are available from the [IES web site Projects](#) link.

1.2 What are the Benefits of a Strategic Model?

- The KJB Strategic Model, used to develop databases for an Information Warehouse (and for operational use where relevant), provides the following benefits to the Bank:

1.2.1 For Business Efficiency:

- A framework for provision of timely and accurate information: accessed, manipulated and presented in many different ways to support the changing requirements of business.
- A directory of information defining the meaning of data, its current and historical context, and the relationship of that data to other data.
- Data integration to remove data inconsistencies: reducing situations where regions and branches maintain different versions of the same data or depend on data distribution from head office. Data distribution can fail, or locations can update data at different times.
- An Information Warehouse that offers ease of use in obtaining information from operational data bases, where that is currently very difficult to obtain.

1.2.2 With an Information Warehouse:

- Reduction of inflexible, hardcopy reports that are not responsive to business needs.
- A saving in ad-hoc programming costs and time: desktop tools enable managers and their staff to obtain information without having to wait for IT resources to perform the work.
- Instant access to data to satisfy immediate information needs of management, so removing the delays caused by multiple interactions between managers and IT staff - with intrinsic possibilities for misunderstanding.
- Timeliness: delays in access to information incur considerable costs for the Bank - due to an inability to respond promptly, and wasted resources, both human and material.
- Sophisticated end user tools for user friendly access - with a capability to “drill down” through different levels of data summarization and aggregation in an Information Warehouse, from the big picture to fine detail. A manager can examine the result of an information request and request further information to be provided immediately.
- Trend analysis: the opportunity to examine trends over time and respond where needed to achieve outcomes.
- “What if” scenarios: the ability to “create hypothetical situations and assess their affect on the Bank. For example, *“if manpower in an area was to change in a defined way, how would this affect costs and product delivery?”*”

1.2.3 For Enterprise Architecture

- A Strategic Model enables priority business activities and processes to be identified for delivery into production in 3-month increments.
- The Strategic Model is used to derive project plans to manage the delivery of these business activities and processes into production. This derivation of project plans is automatic, based on modelling tools that support Entity Dependency analysis.
- The SISP developed for the Bank thus represents documentation that comprises an Enterprise Architecture Portfolio Plan (EAPP) Report, as discussed on the IES Web Site [Projects](#) section.

1.3 *How Was the SISP Developed?*

- The Strategic Plan identifies information needed by goals, objectives and key performance indicators (KPIs). The SISP reviewed the Mission, Vision, Direction, Strengths, Weaknesses, Opportunities and Threats (SWOTs), Goals and Objectives of the Bank.
- The KJB Strategic Plan was analyzed by *Visible Advantage*, an Integrated Computer Aided Software Engineering (I-CASE) modelling tool software package that automates support for business-driven Enterprise Engineering - the methodology for this SISP project. Diagrams, reports and matrices that were produced are documented in Appendices of the SISP Report.
- Business-planning methods help staff develop detailed plans at lower levels. Business-driven data modelling methods then help them to identify their information needs, based on those developed plans. Identified information is then provided from the Information Warehouse.
- The Strategic Model was analyzed to identify Business Activities and develop Project Plans for data modelling, as used with [Enterprise Architecture](#). Activities were identified which management should assess, to identify priorities. These activities typically become priority projects to be developed and delivered early to provide maximum benefit to the Bank.
- Some activities may already be carried out as functions in various business units of the Bank. Other activities exist in current functions but may not yet have been identified because of the high-level focus of the Strategic Model. Activities may also suggest functions that do not yet exist; they may address new directions to be taken by the Bank - such as Internet-related activities for Electronic Banking and Electronic Commerce to support the Bank's Global Banking goal using the Internet.

- Each activity was described in banking terms: what the activity represents; why it is needed; and how the Bank uses it. Examples that illustrate the operation of the activity were also included, drawn from current functions or described for new functions that are needed to support that activity.
- Each Activity was assigned to the relevant Function that is (or should be) responsible for that Activity. Some activities related to functions in particular business units. Other activities applied to different business units, but not as a function of that business unit. Activities were therefore also assigned to Business Units - as for assignment of activities to functions.

1.4 How Can an Information Warehouse Help Us?

- Definition of Goals, Objectives and KPIs in Strategic Plans indicates information that will be required by managers. Some of this can be summarized from operational databases on a periodic basis and printed in reports. Other analysis of information can be done in an Information Warehouse.
- Software packages that help managers analyze information and present results in graphical, tabular or report format on a desktop computer are readily available for an Information Warehouse. These packages are Executive Information Systems (EIS), Decision Support Systems (DSS) and OnLine Analytical Processing (OLAP) systems. Key criteria for the purchase of EIS, DSS or OLAP packages are ease of use and flexibility for specification by managers of any required analysis and presentation formats.
- An Information Warehouse delivers information from many perspectives or dimensions; this is called "multi-dimensional analysis". It enables managers to examine change trends over time. Demographic change trends (or other population changes) that affect needs for banking products and services - and help management assess the most effective ways of delivering those products and services to satisfy the needs - are all of great interest to KJB management.
- What cannot be purchased from outside, however, is the information that is to be analyzed and presented by these packages. The Strategic Model represents that information; it will be defined in greater detail later, by tactical and operational modelling in priority areas.
- Much information is performance-related: Goals, Objectives and KPIs should be measurable and can be calculated and presented by an Information Warehouse using EIS, DSS and OLAP packages. But a problem exists: one of monitoring progress towards achievement of the results (or "targets") over time. This monitoring can be carried out automatically within manager-defined boundaries by Decision Early Warning (DEW) systems.

- An Information Warehouse can deliver this information to a manager's desktop in Head Office or in bank branches throughout the country and overseas. It enables bank managers to interrogate data at the branch level, to analyze data themselves, and to create ad-hoc reports - without time-consuming and expensive programming to develop inflexible hardcopy reports.

1.5 What Does the SISP Tell Us?

- Three main project areas emerged that are all important to the Bank: *Marketing; Risk and Finance; Planning and Resource*. In each project area there are several focus areas, which comprise a number of projects for activities identified in the Strategic Model. These are summarized below. They are described in more detail in the SISP Report.

| Project Area | Project Focus Area |
|-----------------------|--|
| Marketing | Market Customer Product Branch |
| Risk and Finance | Risk Portfolio and Treasury Finance Cost |
| Planning and Resource | Planning Performance External Factor Resource |

- There is much work yet to be done to identify the information that is of most interest to management, so that the Information Warehouse can deliver it. Priorities were identified so that resources can be allocated first to those project focus areas that offer greatest benefit to the Bank and to management. Other areas can then be left till later.

1.6 Project Priorities

- ◆ A number of candidate model views were considered to determine priority projects for the Tactical Modelling phase. These were discussed in terms of the basic and advanced systems that apply to each area. Detailed Project Maps were developed for the highest priority model views. Advantages and disadvantages of each view were identified. The model views follow:

1. **Customer Management:** For Marketing purposes

2. **Financial Management:** For enhancement of the quality of profit & loss control
3. **Portfolio And Treasury:** For the improvement of funds management & asset control

- ◆ The Strategic Model and SISP enable KJB to align its information systems directly with its strategic plans, and build an Information Warehouse. However these benefits will only be achieved if the strategic model is expanded to tactical and operational model detail, and priority systems and databases are implemented. The following recommendations therefore address the initial steps that should be taken to achieve this.
- ◆ The assessment of project priorities indicated that an emphasis on Customer Management and on Portfolio and Treasury for initial tactical modelling offer considerable potential to KJB. These also need to include some of the prerequisite activities from Financial Management and Market Management.

1.7 Recommendations

- ◆ The first model view for tactical modelling should be Customer Management.

Customer Management is a priority area in the strategic model. The focus on Customer Management is fundamental also to the other priority areas.
- ◆ Tactical business plans should provide input for Customer Management

The Mission, Goals, SWOTs (Strengths, Weaknesses, Opportunities and Threats), Strategies and KPIs for Customer Management should be defined in sufficient detail to be used for tactical modelling of Customer Management.
- ◆ Financial Management should be the second model view for tactical modelling

As Financial Management activities are prerequisites for Portfolio Management, some tactical modelling of Financial Management will need to be completed before starting to do tactical modelling in the Portfolio Management model view..
- ◆ Tactical business plans provide input to Financial Management

Documented tactical business plans for Financial Management Plans are needed for tactical modelling in the Financial Management area.
- ◆ Portfolio Management should be the third model view for tactical modelling

When tactical modelling for part of Financial Management has been completed, tactical modelling in the Portfolio Management model view can commence.
- ◆ Tactical business plans provide input for Portfolio Management

Tactical business plans for Portfolio Management should be documented for use as input to tactical modelling.

◆ Schedule Concurrent Tactical Modelling Projects

Tactical business planning and tactical modelling for these model views should be conducted with three project teams working initially together, and then progressively moving to concurrent tactical modelling..

This completes the Executive Summary of the SISP Report. The next section comprises the body of the report, while the Appendices contain the detailed documentation of the strategic model.

1.8 References

Additional Information about *Visible Advantage* (previously called IE: Advantage) is available from <http://www.visible.com/>.

Details on Enterprise Engineering, which is based on business-driven Information Engineering, is available by clicking the "[Projects](#)" link at <http://www.ies.aust.com/>.

2 Development of KJB Strategic Model

2.1 Introduction

This report documents planning activity for the KEMI Integrated Management Information Systems (KIMIS) project at Kwangju Bank (KJB) in the city of Kwangju, South Korea. The report documents the Strategic Information Systems Plan (SISP) for the KJB Strategic Data Model.

Participating in the development of the SISP were staff from KEMI (Kwangjubank Economics & Management Institute - a subsidiary of KJB). Facilitating the development was Clive Finkelstein (Chief Scientist of Visible Systems Corporation in USA and also Managing Director of Information Engineering Services Pty Ltd – IES – in Australia). Consultants from MBS Corporation in Seoul provided data modelling and project management support to the project. MBS Corporation (Micro Banking Systems Corporation) is a Korean Distributor of Visible.

KEMI staff defined the strategic data model in a facilitated session with Clive Finkelstein, at Kwangju Bank on August 19, 1997. The Strategic Model was reviewed and refined where necessary by KJB managers and business experts in a Review Session on August 21 - 22, 1997. The Strategic Model identifies information needed by KJB managers to achieve the strategic goals and objectives in the KJB Strategic Plan as well as strategies and key performance indicators (KPIs).

Like many large organizations, KJB has massive amounts of operational data. While this data provides detail at specific points in time, much of the information that managers need for decision-making must be summarized from this operational data as aggregates: analyzed from many dimensions; and also as change trends examined over time. KJB databases and systems are designed to deliver this information to management.

A town plan is the plan for construction of a city. So also a Strategic Model is the “town plan” needed for construction of KJB databases and systems. For suburbs that are needed first, the major roads in the town plan are designed in detail and are constructed first so that initial buildings and houses can be built. Similarly for information that managers need, first, the data from which that information is derived must be defined in detail at the tactical or middle management levels. As the layout of streets in a suburb is documented using a street map and a street directory, so also data definitions are documented using a data map and a data directory, called a data model.

When streets are in place, construction can begin (using available raw materials) of buildings that will be occupied first. So also, once detail data has been documented in data models for priority tactical areas, the source of that data must be determined. This data is raw material for derivation of the information needed by management.

Some data is presently stored in the existing KJB operational databases. Other data may only exist in databases outside KJB. Once located, that data must be processed: so transforming the raw data into the information needed by management - analogous to constructing a building. As data changes over time, this processing is carried out at regular intervals. The information that is derived from this regular processing can be stored on a historical basis in a KJB Information Warehouse. This is discussed briefly below and in more detail later in this SISP.

An Information Warehouse enables operational data to be examined and analyzed historically from many different perspectives. This is called "multi-dimensional analysis". For example, an Information Warehouse enables factors contributing to the profitability of a Branch to be analyzed using software packages that carry out OnLine Analytical Processing (OLAP). Operational data, summarized in an Information Warehouse, can also be analyzed historically using Executive Information Systems (EIS), Decision Support Systems (DSS) and Decision Early Warning Systems (DEWS). An Information Warehouse can be developed from the KJB Strategic Model. This warehouse can be used to analyze KJB operational databases so that time-dependent trends can be determined from different perspectives such as region, product and type of customer.

As a street directory enables people to find their way about the city, so a "Repository" is a directory of information in the KJB databases and systems. It contains "meta-data" (data about data) that helps managers find information they need. The Strategic Model documented in this SISP report, together with more detailed data models still to be developed at the tactical level, provide the meta-data for the KJB Repository.

2.2 Purpose and Benefits of KJB Databases and Systems

Databases and systems developed from the KJB Strategic Model have the following purpose and benefits for Kwangju Bank:

2.2.1 For Business Efficiency

- A framework for provision of timely and accurate information: accessed, manipulated and presented in many different ways to support the changing requirements of business.
- A directory of information defining the meaning of data, its current and historical context, and the relationship of that data to other data.
- Data integration to remove data inconsistencies: reducing situations where regions and branches maintain different versions of the same data or depend on data distribution from head office. Data distribution can fail, or locations can update data at different times.
- An Information Warehouse that offers ease of use in obtaining information from operational data bases, where that is currently very difficult to obtain.

2.2.2 With an Information Warehouse

- Reduction of inflexible, hardcopy reports that are not responsive to business needs.
- A saving in ad-hoc programming costs and time: desktop tools enable managers and their staff to obtain information without having to wait for IT resources to perform the work.
- Instant access to data to satisfy immediate information needs of management, so removing the delays caused by multiple interactions between managers and IT staff - with intrinsic possibilities for misunderstanding.
- Timeliness: delays in access to information incur considerable costs for the Bank - due to an inability to respond promptly, and wasted resources, both human and material.
- EIS, DSS, OLAP and DEWS Capabilities: sophisticated end user tools for user friendly access - with a capability to “drill down” through different levels of data summarization and aggregation in an Information Warehouse, from the big picture to fine detail. A manager can examine the result of an information request and decide to seek additional information, which can then be provided immediately.
- Trend analysis: the opportunity to examine trends over time and respond where needed to achieve outcomes.
- “What if” scenarios: the ability to create hypothetical situations and assess their affect on the Bank. For example, *“if manpower in an area was to change in a defined way, how would this affect costs and product delivery?”*

2.2.3 For Enterprise Architecture

- A Strategic Model enables priority business activities and processes to be identified for delivery into production in 3-month increments. The Strategic Model is used to derive project plans to manage the delivery of these business activities and processes into production. This derivation of project plans is automatic, based on modelling tools that support Entity Dependency analysis.
- The SISP developed for the Bank thus represents an Enterprise Architecture Portfolio Plan (EAPP), as discussed on the IES Web Site [Projects](#) section.

2.3 KJB Strategic Plan

The KJB Strategic Plan was used as a catalyst to identify information needed by management to achieve goals, objectives and key performance indicators detailed in those plans. KEMI staff initially examined this plan in the facilitated session on August 19, 1997. The session focused first on the Strategic Plan Mission, Vision, Direction,

Strengths, Weaknesses, Opportunities, Threats (SWOTs) and Goals and Objectives. These are listed in Figure 1 and are discussed in the following pages.

| | |
|---|---|
| Kwangju Bank Strategic Plan All Statements in The Entire Model Tue Aug 26 12:43:23 1997 | Planning Statement Report Page 1 |
| <p>Statement: A - MISSION : HARMONY OF LIFE AND FINANCE</p> | |
| <p>Category: Text: Contribute to the development of regional economy and to the affluent life of customers and employees with progressive banking activities.</p> | Mission |
| <p>Statement: B - VISION</p> | |
| <p>Category: Vision Text: KJB group - Integrated finance group leading the information culture KJB - A regional financial nucleus expanding worldwide An integrated financial institution leading the banking culture of daily life A human-first bank realizing the dreams of all Kwang Eun group</p> | |
| <p>Statement: C - KJB STRENGTH</p> | |
| <p>Category: Strength Text: Relatively young people and quick decisions Excellent information Infrastructure and technologies Good community customers with the loyalty to KJB and strong branch networks in the community Many experiences pursuing various innovations Employees with the same identity Relatively flexible organization</p> | |
| <p>Statement: D - KJB WEAKNESS</p> | |
| <p>Category: Weakness Text: Weak Economy in the main business regions => not good debt structure and not good asset structure Relatively small size bank Short of business experts with knowledge and skills => In every business area which demands special knowledge such as funds management, international banking, marketing, product development, risk management, etc Short of managers with good leaderships and knowledge Not enough endeavours to utilize IT strategically Not good image in service quality Difficulties in hiring talented persons Weak capability of consolidating various innovations</p> | |

Figure 1: KJB Major Strategic Planning Statements

Statement: E - OPPORTUNITIES

Category: Opportunity

Text: Deregulation enables KJB to advance into new market, introducing new products and new business
Speeding up information around the world allows KJB to do business with no boundary limit
Internationalization and openness bring new overseas business opportunities
Potential possibility of the development of the regional economy
=> Opportunities of SOC construction.
Competitors aggressively advancing into KJB's main business regions

Statement: F - THREATS

Category: Threat

Text: Rate liberalisation causes KJB to endure pain if the spread margin between loan rate and deposit rate falls precipitously
Deregulation makes new competitors equipped with new products and high technologies emerge in the market
New competitors through Internet

Statement: G - BROAD PRESENCE

Category: Goal

Text: (Phase I): Build up strong business basis and sound health
=> Building up strong business networks in the South West region and infrastructure for electronic banking(internet)
(Phase II): Do business with no boundary limit through EB

Statement: H - INFORMATION BUSINESS

Category: Goal

Text: (Phase I): Place KJB's information structure on a firm base to share Enterprise wide knowledge
(Phase II): Lead information industry specially in banking areas

Statement: I - GLOBAL BANKING

Category: Goal

Text: (Phase I): Establish a basis for Global banking
=> Strengthen the capability of international banking business
(Expand overseas branches and increase foreign currency deposits and funds)
(Phase II): Expand international banking services inside and outside the bank

Figure 1 (Cont'd): KJB Major Strategic Planning Statements

Statement: J - SCOPE DIVERSIFICATION

Category: Goal

Text: (Phase I): Build up sound and healthy management for diversification
=> Select conservatively approaching way to diversification responding to the change of customers needs as considering KJB's weak capability
(Phase II): Realise Retail Universal Banking

Statement: K - STRATEGIC MANAGEMENT

Category: Goal

Text: (Phase I): Build up systems for strategic management
=> Acquire excellent quality human power, Proper Organization, Risk Management System
(Phase II): Realise effective Strategic Management

Figure 1 (Cont'd): KJB Major Strategic Planning Statements

The major planning statements in Figure 1, and others from the KJB Strategic Plan, were all entered into *Visible Advantage*, an Integrated Computer Aided Software Engineering (I-CASE) modelling tool software package that provides automated support for business-driven Information Engineering (IE) - the methodology used to develop the Strategic Model and this SISP. The resulting planning report is documented in *Appendix 3 - Planning Statement Report*. The *Goals and Objectives Matrices* later in this document include matrices showing areas of the Bank responsible for each planning statement (see Figure 4 and Figure 5).

2.4 Understanding Business-Driven Enterprise Engineering**2.4.1 The Need for Feedback to Management**

Strategic Plans, to be effective, must be implemented at all management levels throughout an organization. Some clarification may be needed so that staff responsible for implementing plans at a lower level clearly understands what management requires of them. Alternatives, which arise during this implementation, may also be of interest to management at a higher level. Figure 2 shows that feedback should be provided for management review and refinement where appropriate.

Figure 2 also shows that business-planning methods help staff develop detailed plans at lower levels. Business-driven data modelling methods then help them to identify their information needs, based on those developed plans. This provides immediate feedback that can suggest refinements to developed plans that management feel are needed. Identified information will later be included in the Information Warehouse and data from which it is derived will be included in the KJB databases and systems.

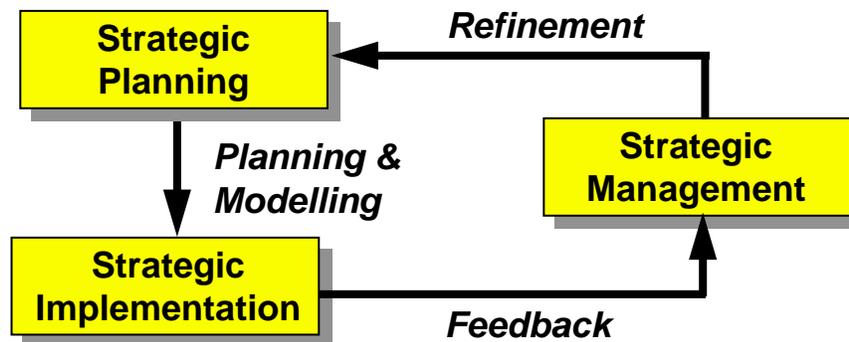


Figure 2: Strategic Planning Feedback from Implementation

This feedback, the refinement of plans and identification of information needs is carried out in tactical-level projects discussed later. This approach will:

- Result in databases and systems that will deliver management information at all levels of KJB, to help managers carry out their responsibilities and achieve their defined plans.
- Identify information that managers will need from the KJB databases and systems, and the data to be stored in the Information Warehouse where it will be used to derive that information.
- Provide invaluable feedback to management to clarify the wording of planning statements where needed, so those statements are correctly interpreted and implemented.

The Mission in Figure 1 is a foundation for all KJB activities. Its focus is: *“Contribute to the development of regional economy and to the affluent life of our customers and employees with progressive banking activities”*. We will use statements in Figure 1 to illustrate a high-level representation of the Strategic Model, as shown in Figure 3.

2.4.2 Data and Information for Decision-Making

The modelling tool Visible Advantage was used to capture details of the information needed by managers for decision-making and the data from which it is derived, as shown in Figure 3. This information and data are represented in data models that will later be used to build KJB databases and systems and the Information Warehouse that will provide the required information to management. For example, Figure 3 is a graphical Strategic Data Map for Marketing within the Strategic Model. It shows marketing data needed based on the KJB Strategic Plans. It also contains additional data defined from other strategic statements in Figure 1. This will be discussed later, in *Representing Strategic Plans in a Strategic Data Model*.

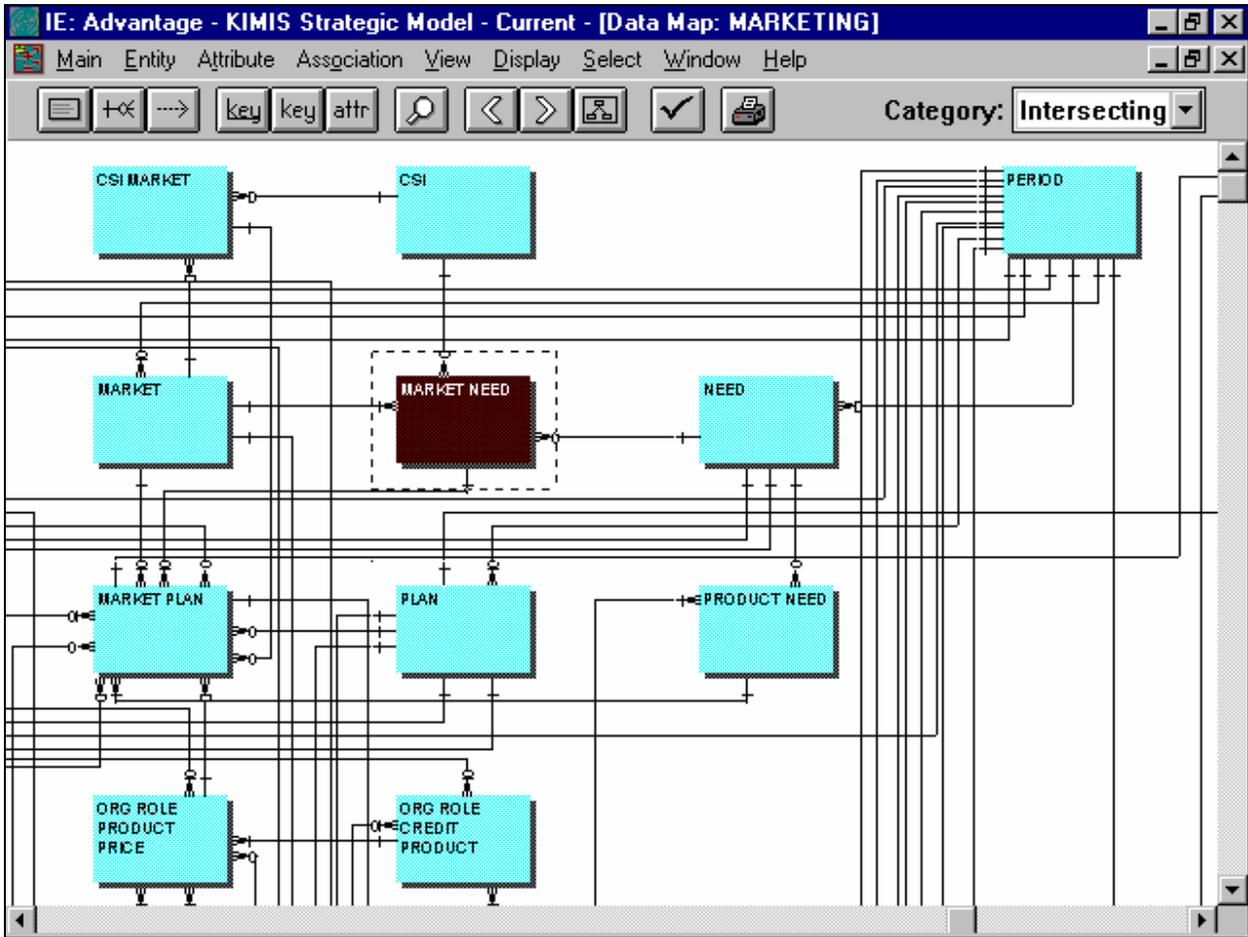


Figure 3: Strategic Data Map for Marketing within the KJB Strategic Model

2.4.3 Goals and Objectives Matrices

The Strategic Plan documents the KJB Mission, Goals and Objectives for Kwangju Bank. The assignment of Goals to Functions in the modelling tool is displayed in a Statement - Model View Matrix, partly illustrated in Figure 4.

The Statement - Model View Matrix in Figure 4 lists each statement on a separate row, showing functions responsible for those statements by ticks in the relevant Model View columns. Figure 4 shows that the Goal: *G - Broad Presence* applies to many functions, as illustrated by ticks in relevant Function columns.

Objectives for functions are shown in Figure 5. This Statement - Model View Matrix lists each objective on separate rows with ticks in the relevant Function columns. Figure 5 shows that the goal: *G- Broad Presence* has four objectives, numbered G1 - G4. Objective: *G3 - Build up Total Marketing System* applies to *Marketing* and *Planning & Resource*. Additional ticks show statements that require coordination with other functions in each relevant Function column.

| Statements | BRANCH | COST | CUSTOMER | EXTERNAL FACTOR | FINANCE | KJB Strategic Model | KJB STRATEGY | MARKET | MARKETING | PERFORMANCE | PLANNING | PLANNING & RESOURCE |
|---|--------|------|----------|-----------------|---------|---------------------|--------------|--------|-----------|-------------|----------|---------------------|
| A - MISSION : HARMONY OF LIFE AND FINANCE | ✓ | | | | ✓ | ✓ | ✓ | | ✓ | | | ✓ |
| B - VISION | ✓ | | | | ✓ | ✓ | ✓ | | ✓ | | | ✓ |
| C - KJB STRENGTH | ✓ | | | | ✓ | ✓ | ✓ | | ✓ | | | ✓ |
| D - KJB WEAKNESS | ✓ | | | | ✓ | ✓ | ✓ | | ✓ | | | ✓ |
| E - OPPORTUNITIES | ✓ | | | | ✓ | ✓ | ✓ | | ✓ | | | ✓ |
| F - THREATS | ✓ | | | | ✓ | ✓ | ✓ | | ✓ | | | ✓ |
| G - BROAD PRESENCE | ✓ | | | | ✓ | ✓ | ✓ | | ✓ | | | ✓ |
| G1 - EXPAND NETWORKS IN JONBUK | ✓ | | | | | ✓ | ✓ | | ✓ | | | ✓ |

Figure 4: Achievement of Goals Involves Many Areas of the Bank

This linking of objectives to functions clearly shows, for each row, all of the functions involved in achieving that objective. And by reading down each Function column all of the goals and objectives that each function supports are apparent. The full Statement - Model View Matrix of Goals and Objectives is included in *Appendix 4 - Goals and Objectives by Function*.

2.4.4 Representing Strategic Plans in a Strategic Data Model

Figure 3 showed that strategic planning statements are represented by a high-level strategic data map of the data and information needed by management in support of those plans. This has been repeated as Figure 6 for easy reference in the following discussion; it is part of the Strategic Data Model developed in the facilitated session.

| Model Views \ Statements | BRANCH | COST | CUSTOMER | EXTERNAL FACTOR | FINANCE | KJB Strategic Model | KJB STRATEGY | MARKET | MARKETING | PERFORMANCE | PLANNING | PLANNING & RESOURCE |
|--------------------------------------|--------|------|----------|-----------------|---------|---------------------|--------------|--------|-----------|-------------|----------|---------------------|
| G - BROAD PRESENCE | ✓ | | | | ✓ | ✓ | ✓ | | ✓ | | | ✓ |
| G1 - EXPAND NETWORKS IN JONBUK | ✓ | | | | | ✓ | ✓ | | ✓ | | | ✓ |
| G2 - BRANCH REARRANGEMENT | ✓ | | | | | ✓ | ✓ | | ✓ | | | ✓ |
| G3 - BUILD UP TOTAL MARKETING SYSTEM | ✓ | | | | | ✓ | ✓ | | ✓ | | | ✓ |
| G4 - STRENGTHEN ELECTRONIC BANKING | ✓ | | | | | ✓ | ✓ | | ✓ | | | ✓ |
| H - INFORMATION BUSINESS | ✓ | | | | ✓ | ✓ | ✓ | | ✓ | | | ✓ |
| H1 - BUILD UP INTEGRATED INFORMATION | ✓ | | | | ✓ | ✓ | ✓ | | ✓ | | | ✓ |
| H2 - CREATE EB ENVIRONMENT | | | | | | ✓ | ✓ | | ✓ | | | ✓ |

Figure 5: Achievement of Objectives Requires Much Coordination

2.4.5 Data Map Notation

Figure 6 shows a highlighted box: MARKET NEED. This represents Market Needs data and is called a “*data entity*” that may later be implemented as a database table in the KJB databases and systems. The lines joining this data entity to other entities show a relationship exists between each pair of joined entities. This relationship line is called an “*association*”.

Business rules that have been defined for the effective and efficient operation of KJB are shown schematically as symbols on association lines in the data map. The meanings of these symbols are discussed next. Narrative statements that clarify the correct application of each rule should also be used to define business rules. These rules will later be incorporated into KJB databases and systems so managers can readily identify the information they need to assess achievement of goals and objectives.

The symbols on each end of an association line in Figure 6 provide information about the association. An association with a “crows foot” (---<) indicates *many*, while the

absence of a crow's foot indicates *one*. These are called the association *degree* or *cardinality*. A zero on the line (--0-) indicates *optional* and is interpreted as "may"; a vertical bar on the line (--|) indicates *mandatory* and is interpreted as "must". These are called the association *nature*. A third association nature uses a zero and a vertical bar (-0|) together to represent *optional becoming mandatory*. This indicates time-dependency and is interpreted as "will".

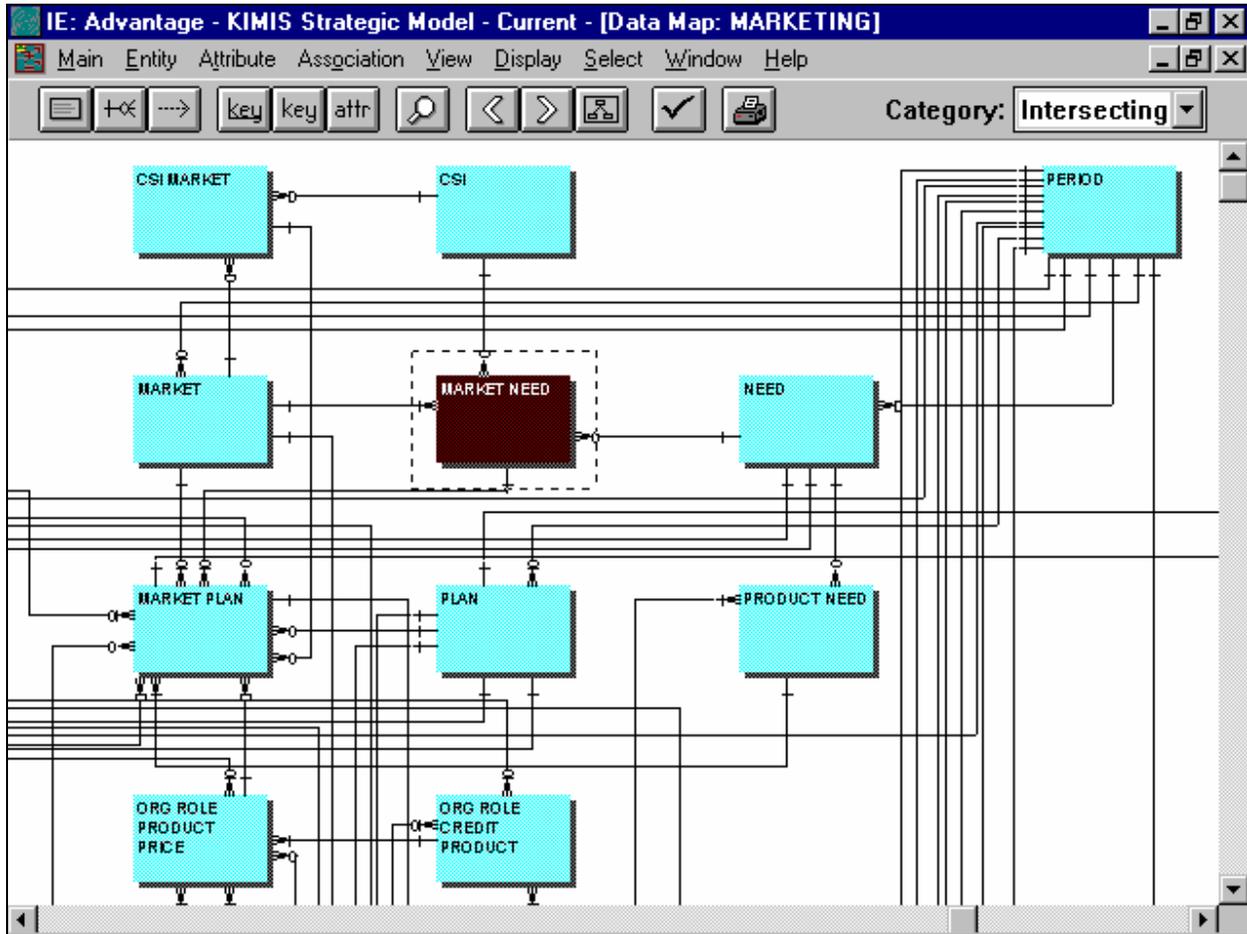


Figure 6: Strategic Data Map for Marketing in the Strategic Model

When the KJB Mission was discussed in the facilitated session, it was agreed that a market *must* have at least one (or many) needs for products from KJB, while many markets may have a need. This is shown diagrammatically in a data map as follows:



This is called a *many to many* association between MARKET and NEED. It is difficult from this to determine *which* markets have *what* needs. An intermediate entity (called an "intersecting" entity) identifies specific needs for each market. The line between MARKET and MARKET NEED shows an association of *mandatory one to mandatory many*. This represents the business rule that a market *must* have a need for *at least one*

(or many) of the products that are provided by KJB, to be a market of interest to KJB. However the association between NEED and MARKET NEED is *mandatory one to optional many*. This indicates that zero, one or many markets *may* have a need, as shown next.



Furthermore, an intersecting entity (derived by decomposing a *many to many* association) is a high-level representation of a business activity or business process. MARKET NEED thus represents the business activity: *Market Needs Analysis*. A strategic map developed in this way therefore can be used to identify not only fundamental data used by KJB, but also indicates major KJB business activities.

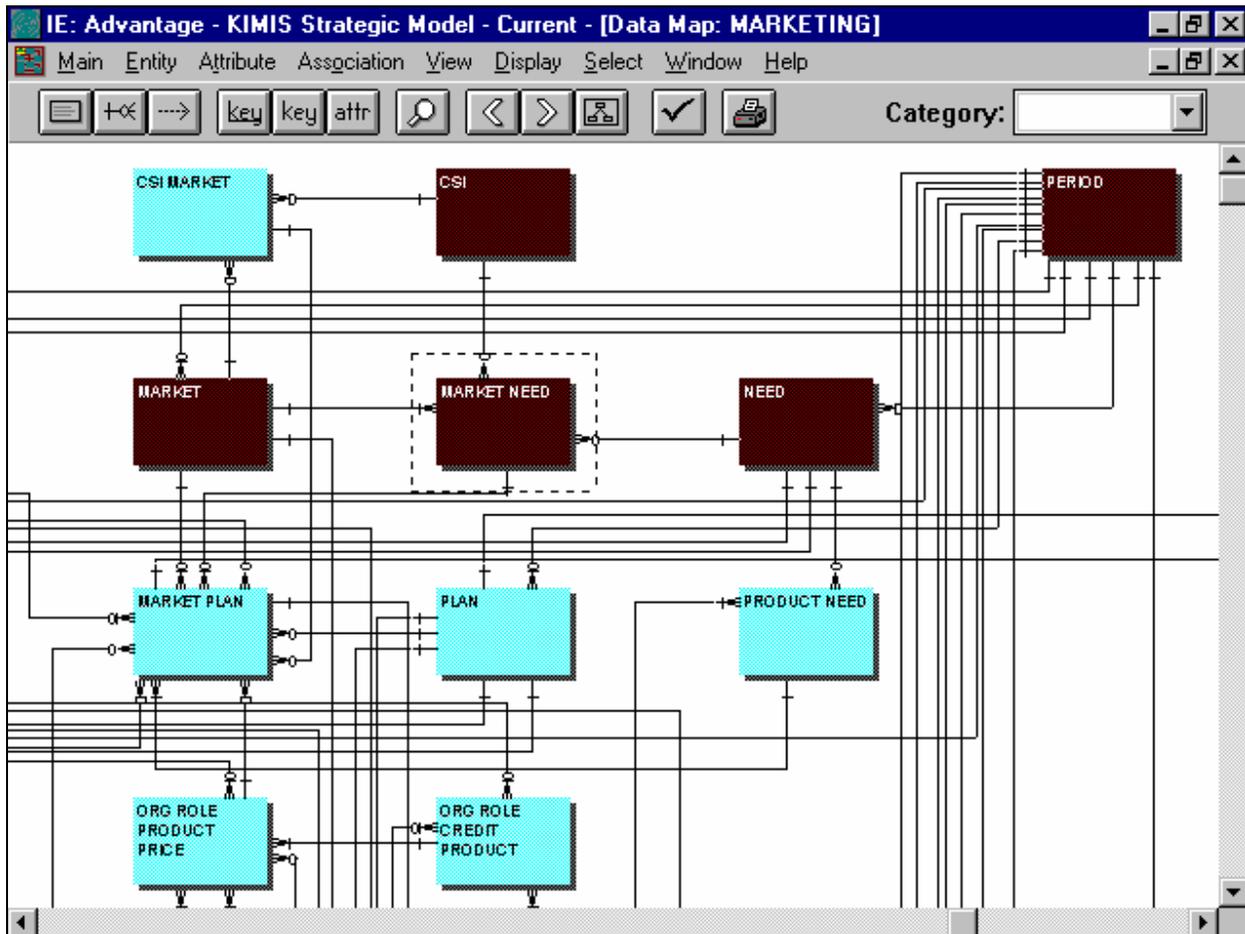


Figure 7: Market Needs are related to the Customer Satisfaction Index (CSI)

For example, to understand Market Needs, KJB must have information about its markets and their needs - shown as lines joining MARKET NEED to MARKET and also to NEED in the data map. These related entities are shown highlighted in Figure 7. Market Needs are also related to time and customer satisfaction - shown by association

lines to PERIOD and to CSI (Customer Satisfaction Index) - which are also highlighted in Figure 7. At a strategic level an association represents: reporting paths, communication paths, management controls, audit controls or coordination required to manage the operation of areas of the business that refer to data in the entities joined by the association.

2.4.6 Data Supporting Planning Statements

The planning statements in the KJB Strategic Plan were used to identify major data entities and associations in the strategic data map as discussed above. *Appendix 3: Planning Statement Report* shows the data entities relevant to each planning statement listed under the statements as “Data Links”. This clearly indicates to management the data relevant to each planning statement from which information is derived; it provides design input to develop the KJB databases and systems. These Data Links are shown (in part) in Figure 8, for the KJB Mission.

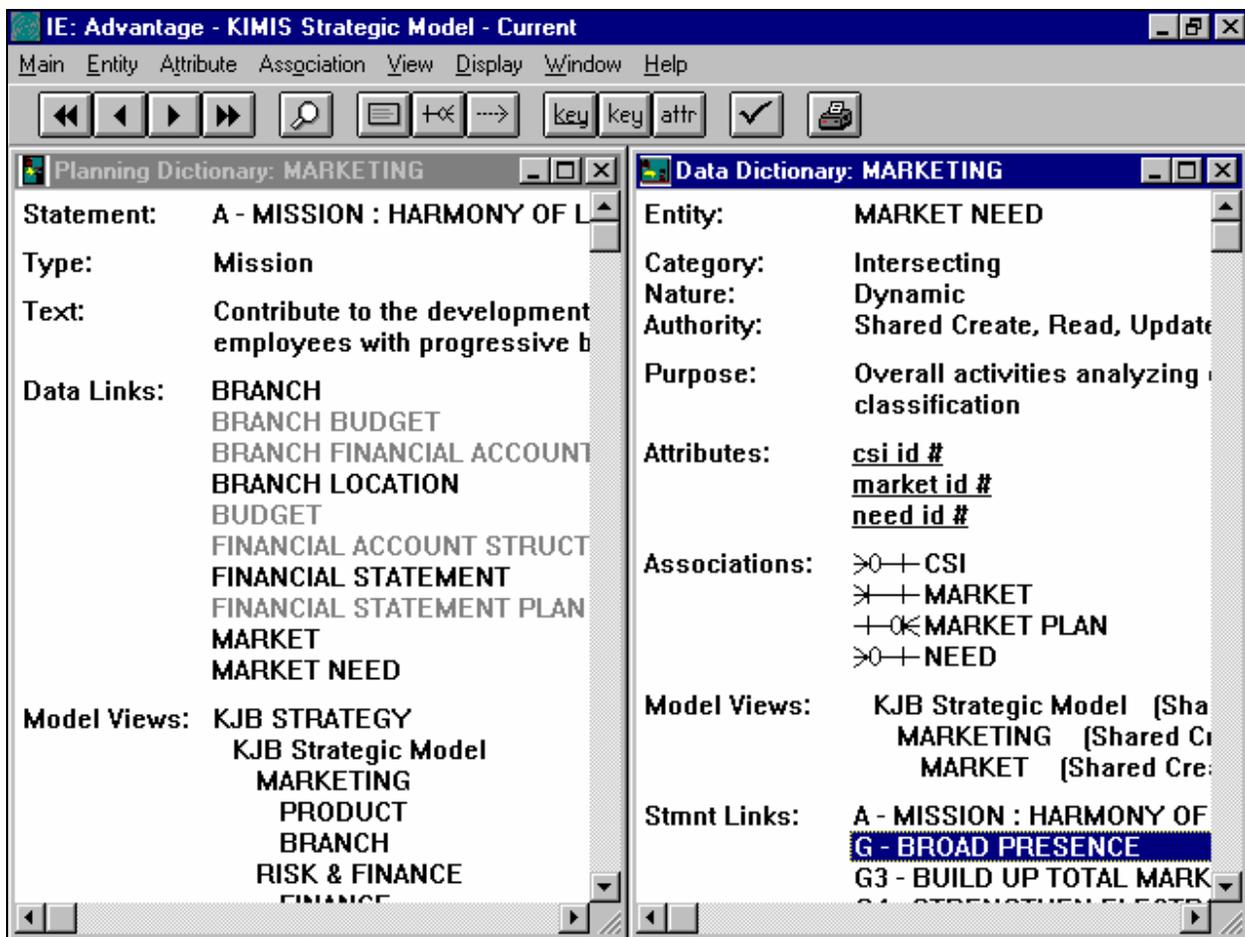


Figure 8: Planning Dictionary shows Data Links supporting Mission. MARKET NEED in Data Dictionary has Statement Links to Mission and other Statements

Data links in capitals in Figure 8 (such as MARKET and MARKET NEED) represent the data entities that provide information to support the KJB Mission. These entities will later be implemented either as KJB databases and systems or a KJB Information Warehouse to provide required information.

Figure 8 also shows the data entity MARKET NEED with corresponding Statement Links including that for *A - KJB Mission*. It shows those planning statements that can be examined to determine performance or other data that may be held in the data entity to provide required management information.

2.4.7 Measurement of Objectives and Performance Indicators

The *Objectives* in the Strategic Plan (see G1-G4 in Figure 5) enable high-level assessment by KJB (and others) of its effectiveness in achieving the Mission. However these Objectives are expressed qualitatively at present: they are not yet directly measurable in this form. Any such measurement would be indirect, by aggregating achievement of quantitative key performance indicators (KPIs) at lower business levels. This Objective assessment should be clearly stated in the Strategic Plan and also at lower business levels. Clear statements in the Strategic Plan that indicate how Objective achievements and KPIs are measured were not apparent.

Objective statements in the Strategic Plan should ideally be expressed in terms that can be quantified. Further refinement of the Strategic Plans would allow direct assessment of Objectives from key performance indicators in different Functions of the Bank.

Any data links listed in Figure 8 in lower case are data attributes; later to be implemented as columns in the data tables that implement those data entities. Attributes provide the detailed information that is required by management from the KJB databases and systems. Objectives or KPIs are expressed quantitatively (rather than qualitatively). They must be measurable and so are represented as attributes - used to measure the achievement of the Objectives or KPIs.

To give an example, an attribute *"percent market profit this period"* can be included in MARKET NEED to measure the achievement of a *"Market Profitability"* KPI.

Using Objectives and KPIs, attributes that measure performance or provide additional information to management can be defined in the Strategic Model. They require refinement through data modelling at the Tactical level by business managers and staff that have expert knowledge of the Bank and its different functions. This tactical data modelling will identify data attributes that provide specific performance information that managers require.

2.5 Current Functions, Databases and Systems

2.5.1 Current KJB Functions

The KJB Strategic Plan sets directions for the future of the Bank. Data and information needed to support achievement of the Strategic Plan were identified in the Strategic

Data Model, as discussed above. We will shortly see that the Strategic Model can be used to identify business activities that are also needed to support the Strategic Plan. But first, existing Business Functions in the Bank were identified as documented in Appendix 7. The activities in the Strategic Model will later be related to these functions in a Business Activity - Business Function Matrix.

2.5.2 Current KJB Databases and Systems

The Strategic Model, documented in detail in Appendix 1 - 6, will later be used to define more detailed data at the tactical and operational levels of the Bank. These tactical and operational data models will indicate the data and information needed for implementation of databases and systems that support the Strategic Plan at those levels. These data models will need to be compared with the data and information provided by current databases and systems that are used by the Bank. Much of the data required for the future would also be the same as data used today. However additional data and information may be needed to support Global Banking and other goals of the Bank, which are not required by current databases and systems.

Additionally, information that managers need to support achievement of the Strategic Plan is proposed to be provided by an Information Warehouse (IW), which would be implemented by the Bank as discussed later in this SISP Report. This Information Warehouse would be populated periodically by data from normal operations of the Bank, extracted from current databases and summarized for analysis by management.

To assist comparison against the tactical and operational data models as described above - and to identify source data that would need to be extracted and loaded into a KJB Information Warehouse - the current databases and systems will need to be documented in detail, and will later be described in Appendix 8.

Data models of the current databases will need to be developed by the Bank, using the technique of Reverse Engineering in conjunction with the Visible Advantage modelling tool. This is discussed further in the section documenting the *KJB Information Warehouse*.

2.6 KJB Model Views

2.6.1 Structure of Model View Hierarchy

An organization as large as the Bank is very complex. The data models representing the Bank are also complex. To assist in managing these data models, the Strategic Model has been structured into a number of model views with a hierarchy structure which represents subsets of data and information of interest to the Bank. These model views are described as follows:

- **Marketing:** Marketing-related information and an aggregate of its marketing-related business activities. Marketing comprises the following more detailed model views.

- ◆ **Market Management:** Market segmentation, analysis of the needs of customers by each market, analysis of competitors by regions, marketing campaigns and promotion activities, customer credit analysis, investigation and analysis of CSI.
- ◆ **Customer Management:** Customer Management should be able to provide KJB with aggregate information needed for segmentation of customers and management of target customers (to help build marketing strategies). In addition and more importantly it should provide basic customer information needed for business activities such as sales, advisory service and promotion in the field.
- ◆ **Product Management:** Information related to products, such as product development and management, and an aggregate of product-related business activities.
- ◆ **Branch Management:** Information related to branch operation, such as branch planning and marketing and an aggregate of branch-related business activities.
- **Risk and Finance:** Information related to risks, funds management, treasury, finance and cost and an aggregate of activities in these areas. Risk and Finance comprises the following more detailed model views.
 - ◆ **Risk Management:** Information required for risk analysis and management, and an aggregate of risk-related business activities.
 - ◆ **Portfolio and Treasury Management:** Activities managing funds, assessing performance of funds management and decision-making in funds and assets management.
 - ◆ **Financial Management:** Finance-related information such as budget, finance and accounts and an aggregate of financial activities.
 - ◆ **Cost Management:** Cost-related information such as product-cost, customer-cost, direct cost, indirect cost, standard cost, cost drivers and an aggregate of cost-related activities.
- **Planning and Resource:** Information related to planning and performance, external factors and resources, and an aggregate of activities related to these areas.
 - ◆ **Planning and Performance Management:** Mid- and long-term management planning on a business sector basis according to performance measures, including information related to business planning such as strategic planning, market planning and performance measures, and an aggregate of business activities related to them.
 - ◆ **External Factors Management:** Activities analyzing external factor information that affect KJB strategies such as the economic index, money trends, interest rate, exchange rates, and providing external factor information.

- ◆ **Resource Management:** Resource-related information addressing human, material and other resources and an aggregate of resource-related business activities.

This model view structure is shown in a *Model View Hierarchy* diagram, in Appendix 1.

2.6.2 What Model Views Imply

Each model view represents a subset of data of interest to the Bank. At this strategic level of definition, only major databases and activities have been identified. For example, the model view for Marketing Management includes data for Markets and Needs: represented by the data entities MARKET and NEED. It also includes data representing the *Market Need Activity*: as MARKET NEED. These are discussed further in *Business Activities Identified from the Strategic Data Model*.

Data and information representing markets, and needs of those markets, would also be included in a Marketing Data Mart in the Information Warehouse. A Marketing Data Mart is a focused subset of data, for analysis by Marketing Managers and staff within KJB. Executive Information Systems (EIS), Decision Support Systems (DSS) or Decision Early Warning Systems (DEWS) are used to carry out this analysis. Further analysis based on the techniques of Data Mining also use OnLine Analytical Processing (OLAP) systems.

At the tactical and operational levels, the MARKET and NEED entities will expand into more detail; they will eventually represent detailed *Marketing* and *Needs Assessment* databases. The MARKET NEED entity (for the *Market Needs Activity*) will also expand into more tactical and operational detail; it will represent tactical *Market Needs Analysis Processes* and operational *Market Needs Analysis Systems*.

2.6.3 Entity Contents of Each Model View

An entity may appear in one more than one model view, where the data in that view is of interest to many parts of the Bank. Each model view with an interest in an entity is listed under that entity in the *Entity Report*, included as Appendix 6. The Entity Report can be printed for The Entire Model (as shown in Appendix 6), or may be printed for one or a group of model views. For example, the Marketing Management model view can print an Entity Report that specifically includes only those entities within that model view. This enables managers and staff interested in the Marketing Management model view to focus only on data relevant to them, without needing to be aware of data used in other model views but of no interest to Marketing.

Over 200 entities were identified in the Strategic Model and documented in the Appendices. Each entity typically would later be implemented as a database table. The number of entities at this strategic level will expand to around 1,000 entities when the tactical and operational data models are fully defined. Managing this number of entities is very complex. Model views help to manage this complexity; they enable priority subsets of the Strategic Model to be extracted for more detailed tactical and operational

data modelling, as priority projects. This is discussed next, in *Projects Identified from the KJB Strategic Model*.

2.7 Projects Identified from KJB Strategic Model

The Strategic Model can be analyzed to identify Business Activities and develop Project Plans to manage detailed tactical and operational data modelling. Many Activities can be identified in this way from the Strategic Model, for assessment by management to identify priority activities. These become priority projects for databases and systems that should be developed and delivered early to provide maximum benefit to the Bank. The following pages describe how business activities and projects can be identified from a Strategic Model.

2.7.1 How to Identify Business Activities from a Strategic Model

The modelling tool Visible Advantage was used to analyze the Strategic Model to identify business activities and processes that will be used to provide information to management from the KJB databases and systems. This analysis results in derivation of “clusters” of related data entities needed by each activity or process. For example, Figure 9 shows one cluster derived from the Strategic Model. It is the *Market Need Activity* - represented by the entity MARKET NEED.

Cluster analysis objectively and precisely identifies subsets of the data model based on the dependency and the commonality of data shown in it. This indicates data frequently shared by the same activities. Cluster analysis thus provides feedback to management so that an assessment can be made whether all required business rules have been defined; the Strategic Model can then be refined where necessary. The modelling tool suggests activities or processes for implementation of the KJB databases and systems. We will look at this in more detail.

Figure 9 shows that *Market Need Activity* is based on the last line, showing the data entity MARKET NEED in bold. The entity on the last line is called the “*Cluster Endpoint*”: the focus of the business activity. The cluster shows that MARKET NEED is directly dependent on each entity listed above it that is also bold. These are (reading from the bottom, up): CSI, MARKET, NEED and PERIOD. This indicates that data from all of these data entities is required so that KJB can determine a market's needs over time. (Of course other details about the market are also required to determine those needs, but that detail has not yet been included in the data model; it will be added during more detailed tactical data modelling.)

The right-bracketed number preceding each entity indicates the project phase to implement that entity; we will discuss this later in *Detailed Project Plans derived from a Data Model*. Data entities supporting this activity were shown highlighted in Figure 7, which is a data map that graphically shows the dependent entities from the cluster in Figure 9.

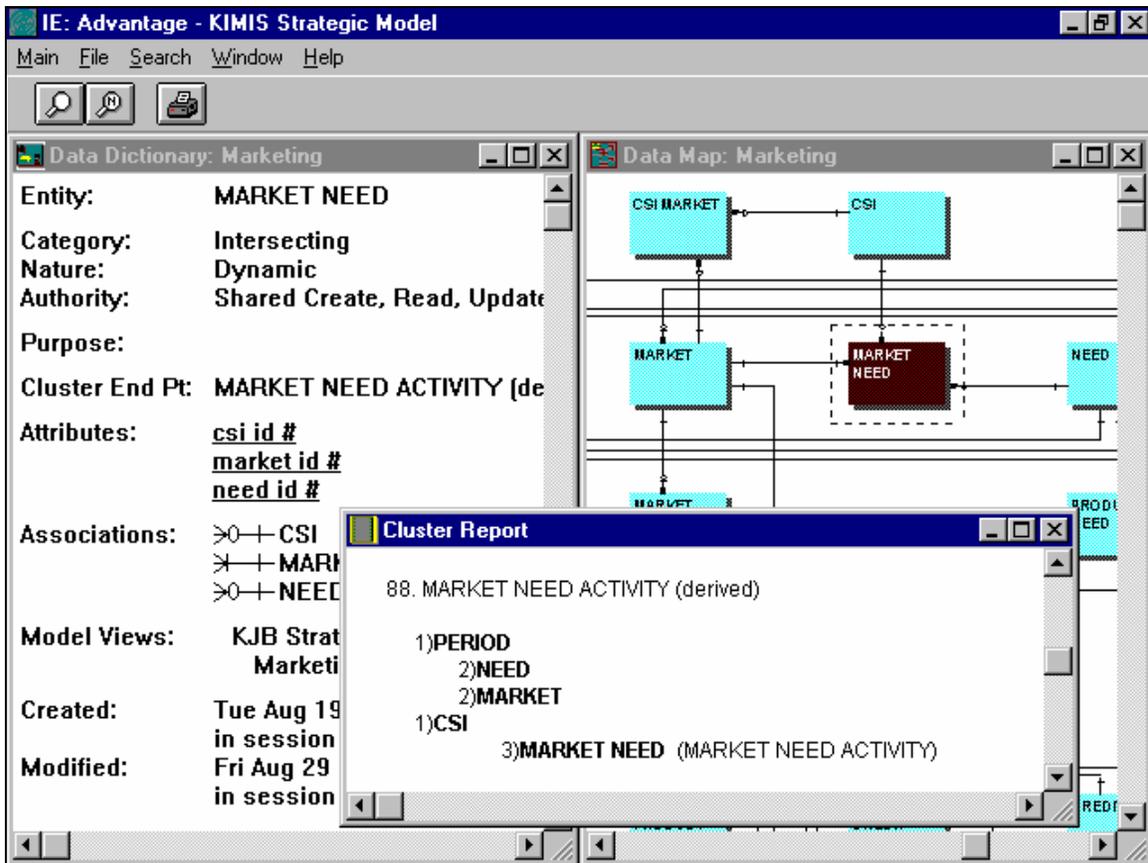


Figure 9: Analysis identified the *Market Need Activity* from MARKET NEED

Activities shown as clusters derived from the Strategic Model can help managers identify relevant information needs. A narrative statement that describes the *Market Need Activity* is illustrated by the following typical example.

2.7.1.1 Business Activity Description: *Market Need Activity*

“Market needs are determined by regular surveys of our customers' and prospective customers' requirements for banking and other financial products and services that we can provide now or in the future. Our main focus is to support the needs of our domestic markets (i.e. the needs of our loan market for small firms in the Kwangju area). But our goal for global expansion requires that we also address the needs of overseas markets; these may be different to those of our domestic markets.”

Only Management and Marketing staff can decide whether this description of the activity is correct; an agreed definition of the activity is established. Marketing management can then decide whether tactical and operational business processes for market needs analysis, as required for domestic and overseas markets, are adequate.

Figure 10 shows another part of the strategic model, with MARKET PLAN in the data map and *Market Plan Activity* in the Cluster Report. The cluster indicates that MARKET

PLAN is dependent on PLAN, PLAN TYPE and MARKET (as these are shown in bold). However it also shows another activity that is not bold, but instead is in plain text: *Market Need Activity*. The modelling tool has identified in the Strategic Model that the *Market Need Activity* (discussed earlier) is a prerequisite activity to the *Market Plan Activity*. This is very true; an effective Market Plan cannot be defined without an understanding of the relevant needs of each market to which the plan refers, whether domestic or overseas. The MARKET PLAN entity may be defined in the Strategic Model as follows:

MARKET PLAN: A Marketing Plan is defined for each market where we operate or plan to operate. This plan addresses the needs of each market, whether domestic or overseas, for banking and financial products and services. It defines the current plan and sets Key Performance Indicators (KPIs) to monitor market penetration and growth over time.

This leads to a description of the *Market Plan Activity*, which also incorporates the earlier defined *Market Need Activity* – for review and refinement by management as appropriate.

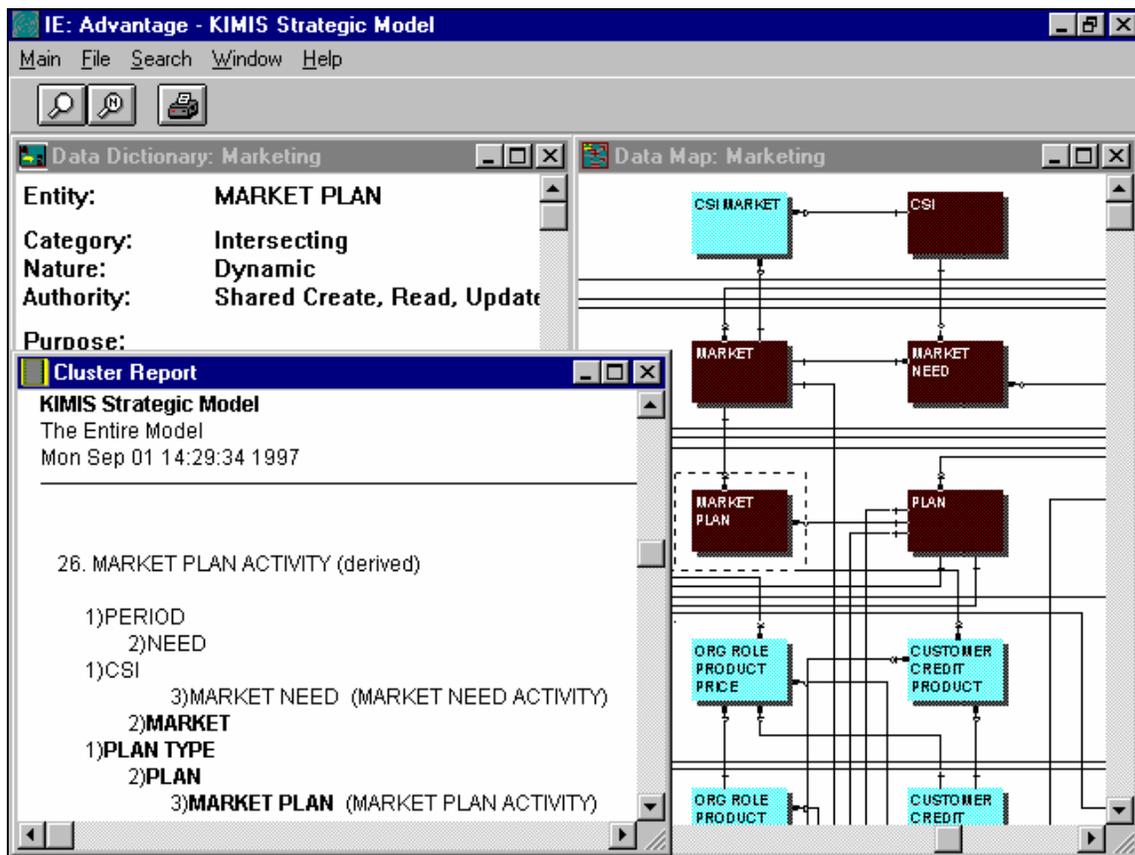


Figure 10: Entities for the *Market Plan Activity* cluster are shown highlighted

2.7.1.2 Business Activity Description: Expanded *Market Plan Activity*

"A Marketing Plan is defined for each market where we operate or plan to operate. This plan addresses the needs of each market, whether domestic or overseas, for banking and financial products and services. It defines the current plan and sets Key Performance Indicators to monitor market penetration and growth over time.

Market needs are determined by regular surveys of our customers' and prospective customers' requirements for banking and other financial products and services that we can provide now or in the future. Our main focus is to support the needs of our domestic markets (ie. the needs of our loan market for small firms in the Kwangju area). But our goal for global expansion requires that we also address the needs of overseas markets; these may be different to those of our domestic markets."

We combined the *MARKET PLAN* and *Market Need Activity* definitions above. The *Market Plan Activity* could then be expanded to address the *Global Banking* goal (from Figure 1):

"Our Marketing Plans take these different market needs into account. They establish firm objectives and strategies in each market where we plan to operate for market entry, market growth and market penetration - to achieve the defined KPIs.

To gain competitive advantage from opportunities offered by Internet technologies, each Marketing Plan will define objectives and strategies for Electronic Banking and Electronic Commerce. This will help Kwangju Bank achieve its global banking goal. The Internet particularly will enable KJB to enter overseas markets at low cost, for rapid market growth and penetration."

This activity description is more extensive than is suggested only by the entities in Figure 10. It was developed from one Goal in the Strategic Plan, focusing on Internet Technology that the Bank will be able to deploy for expansion into overseas markets.

Referring to *Appendix 2: Cluster Report*, it can be seen that the *Market Need Activity* exists in many different clusters in the Strategic Model as derived by the modelling tool. This indicates it is a common business activity (or process) that should only be implemented once, but which can be reused as a standard activity so that management and staff are aware (at all times) of the needs of each market. This information is very important; it is essential knowledge that managers and staff must have access to, if they are to correctly deal with the needs of customers in those markets.

2.7.2 How to Derive Project Plans from a Strategic Model

Each cluster discussed above is a separately implementable subset of the KJB Strategic Model for construction of databases and systems. In *Appendix 2: Cluster Report* we see that the modelling tool identified over 160 activities and data bases

based on data entities defined in the Strategic Model in the facilitated session. Which of these should be implemented first?

From the discussion above, we determined that the *Market Need Activity* is a prerequisite activity for the *Market Plan Activity*. The *Market Need Activity* should be implemented first. Appendix 2 shows that it is a prerequisite for many other marketing activities. It thus becomes a prerequisite project before projects defined to implement those other activities in Appendix 2. It is used to develop a Project Map to build relevant KJB databases and systems.

2.7.2.1 Project Map for Market Need Analysis

The relationship between *Market Need Activity* and *Market Plan Activity* is represented in Figure 11. This diagram is a Project Map of these two clusters, used to manage implementation of some of the KJB databases and systems: it shows an implementation sequence for these clusters. This diagram and associated principles will be used later in this document for project planning.

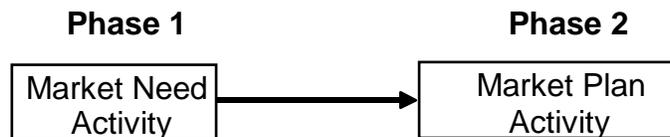


Figure 11: Project Map showing a Prerequisite Activity to be Implemented First

Figure 11 shows that the right-most activity (*Market Plan Activity*) is in Phase 2, as it depends on the *Market Need Activity* which precedes it in Phase 1. Because many other clusters also depend on this activity as a prerequisite (see *Appendix 2: Cluster Report*), it should be one of the first clusters implemented. It is thus given an implementation status of *Mandatory*.

Other activities may follow, depending on management priorities for specific information. These activities are therefore each given an implementation status of *Optional*.

2.7.2.2 Detailed Project Plans derived from a Data Model

The *Market Plan Activity* is documented as a project cluster in *Appendix 2: Cluster Report*. It has been extracted and is shown in Figure 12.

| |
|--|
| 10. MARKET NEED ACTIVITY (derived) 1)PERIOD 2)NEED 1)CSI 3)MARKET NEED (MARKET NEED ACTIVITY) 2)MARKET 1)PLAN TYPE 2)PLAN 4)MARKET PLAN (MARKET PLAN ACTIVITY) |
|--|

Figure 12: Market Plan Activity, used for Project Planning

Figure 12 shows, in the right-bracketed number preceding each entity, the relevant project phase for detailed definition and implementation of that entity. This represents a project plan that can be illustrated in a Gantt Chart for Project Management purposes - as shown in Figure 13 for the *Market Plan Activity*.

| Cluster Content | Project Phase: | 1 | 2 | 3 | 4 | 5 | 6 |
|--------------------------------------|----------------|---|---|---|---|---|---|
| 1)PERIOD | | ■ | | | | | |
| 2)NEED | | | ■ | | | | |
| 1)CSI | | ■ | | | | | |
| 3)MARKET NEED (MARKET NEED ACTIVITY) | | | | ■ | | | |
| 2)MARKET | | | ■ | | | | |
| 1)PLAN TYPE | | ■ | | | | | |
| 2)PLAN | | | ■ | | | | |
| 4)MARKET PLAN (MARKET PLAN ACTIVITY) | | | | | ■ | | |

Figure 13: Gantt Chart for the *Market Need Activity*

Project phase dependencies in the cluster are clearly shown in the Gantt Chart of Figure 13. The specific duration for each entity in its phase has not been defined yet, as it depends on the complexity of definition and implementation of the relevant entity. This is determined during detailed modelling at tactical and operational levels.

We will examine activities related to financial statements in different currencies for Kwangju Bank. This will enable us to identify interdependent and independent activities.

2.7.2.3 Interdependent and Independent Activities

Activities that address financial statements and accounts in different currencies are documented in *Appendix 2: Cluster Report*. The Currency Financial Account Activity and Currency Financial Statement Activity from that Appendix are both shown in Figure 14.

29. CURRENCY FINANCIAL ACCOUNT ACTIVITY (derived)
- 1) LOCATION TYPE
 - 1) PERIOD
 - 2) LOCATION
 - 1) EXTERNAL FACTOR TYPE
 - 4) EXTERNAL FACTOR
 - 3) CURRENCY
 - 1) FINANCIAL ACCOUNT TYPE
 - 1) BUDGET TYPE
 - 2) BUDGET
 - 1) F S TYPE
 - 4) CURRENCY FINANCIAL STATEMENT (CURRENCY FINANCIAL STATEMENT ACTIVITY)
 - 1) FINANCIAL STATEMENT FOCUS
 - 3) FINANCIAL STATEMENT
 - 4) FINANCIAL ACCOUNT
 - 5) CURRENCY FINANCIAL ACCOUNT (CURRENCY FINANCIAL ACCOUNT ACTIVITY)
30. CURRENCY FINANCIAL STATEMENT ACTIVITY (derived)
- 1) BUDGET TYPE
 - 1) PERIOD
 - 2) BUDGET
 - 1) F S TYPE
 - 1) FINANCIAL ACCOUNT TYPE
 - 1) LOCATION TYPE
 - 2) LOCATION
 - 1) EXTERNAL FACTOR TYPE
 - 4) EXTERNAL FACTOR
 - 3) CURRENCY
 - 5) CURRENCY FINANCIAL ACCOUNT (CURRENCY FINANCIAL ACCOUNT ACTIVITY)
 - 4) FINANCIAL ACCOUNT
 - 1) FINANCIAL STATEMENT FOCUS
 - 3) FINANCIAL STATEMENT
 - 4) CURRENCY FINANCIAL STATEMENT (CURRENCY FINANCIAL STATEMENT ACTIVITY)

Figure 14: Inter-Dependent Currency Financial Activities in the Strategic Model

Figure 14 clearly shows that these activities are both interrelated: they are called “*Interdependent Activities*”. A financial statement that is expressed in a particular currency clearly uses financial accounts also expressed in the same currency, and vice versa. The interdependency of these activities is shown schematically in Figure 15.

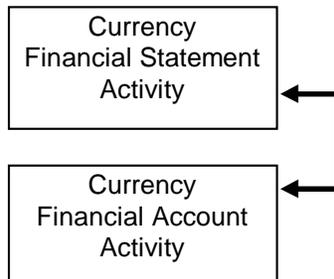


Figure 15: Interdependency of Currency Financial Activities

Double-headed arrows joining the two activities show that they are interdependent: both activities must be fully defined then both must be implemented together. This suggests that the two activities should be implemented in one project, perhaps called the “Currency Financial Statement” project.

The Cluster Report in Appendix 2 includes a cluster for the COST STRUCTURE entity in the Strategic Model. This is used to maintain expert knowledge of interrelationships between costs that are of interest to the Bank. This cluster is called the Cost Relationships Knowledgebase in Figure 16. All entities are bold; there are no entities in plain text. This cluster is not dependent on any activity: it is therefore independent and can be implemented as a project at any time.

24. COST RELATIONSHIPS KNOWLEDGEBASE (derived)
- 1) **PERIOD**
 - 1) **COST TYPE**
 - 2) **COST**
 - 3) **COST STRUCTURE** (COST RELATIONSHIPS KNOWLEDGEBASE)

Figure 16: The Cost Relationships Knowledgebase is Independent

In Figure 17 we see the Cost Financial Account Activity. This requires the two interdependent activities above: the Currency Financial Statement Activity and the Currency Financial Account Activity. It also requires the Cost Relationships Knowledgebase as a prerequisite.

22. COST FINANCIAL ACCOUNT ACTIVITY (derived)
- 1) **PERIOD**
 - 1) **COST TYPE**
 - 3) **COST STRUCTURE** (COST RELATIONSHIPS KNOWLEDGEBASE)
 - 2) **COST**
 - 1) **FINANCIAL ACCOUNT TYPE**
 - 1) **BUDGET TYPE**
 - 2) **BUDGET**
 - 1) **F S TYPE**
 - 1) **LOCATION TYPE**
 - 2) **LOCATION**
 - 1) **EXTERNAL FACTOR TYPE**
 - 4) **EXTERNAL FACTOR**
 - 3) **CURRENCY**
 - 4) **CURRENCY FINANCIAL STATEMENT** (CURRENCY FINANCIAL STATEMENT ACTIVITY)
 - 1) **FINANCIAL STATEMENT FOCUS**
 - 3) **FINANCIAL STATEMENT**
 - 5) **CURRENCY FINANCIAL ACCOUNT** (CURRENCY FINANCIAL ACCOUNT ACTIVITY)
 - 4) **FINANCIAL ACCOUNT**
 - 5) **COST FINANCIAL ACCOUNT** (COST FINANCIAL ACCOUNT ACTIVITY)

Figure 17: The Cost Financial Account Activity has Several Prerequisites

We can summarize these dependencies in a cluster representing all of the related activities in a project. This is shown in Figure 18.

22. COST FINANCIAL ACCOUNT PROJECT (derived)
- 1) COST STRUCTURE (COST RELATIONSHIPS KNOWLEDGEBASE)
 - 1) CURRENCY FINANCIAL STATEMENT (CURRENCY FINANCIAL STATEMENT ACTIVITY)
 - 1) CURRENCY FINANCIAL ACCOUNT (CURRENCY FINANCIAL ACCOUNT ACTIVITY)
 - 2) **COST FINANCIAL ACCOUNT** (COST FINANCIAL ACCOUNT ACTIVITY)

Figure 18: Cluster of Prerequisite Activities in Cost Financial Account Project

The prerequisite activities detailed for the Cost Financial Account Activity in Figure 18 are shown schematically in Figure 19. The Currency Finance activities are at the left of Figure 19 to show that they must be implemented in Phase 1 of a Cost Financial Account project. As we discussed above, a double-headed arrow joins them, to show that they are interdependent.

The Cost Relationships Knowledgebase box is drawn at the left as it also is in Phase 1. It is an independent activity as we discussed above. It can be implemented as an independent project at any time as it is not dependent on any prerequisite activities.

The Cost Financial Account Activity box is drawn to the right of these boxes, to show that it is implemented in Phase 2. It is dependent on the prerequisite activities at the left in Phase 1. This is indicated by arrows from the Phase 1 activities to this Phase 2 activity.

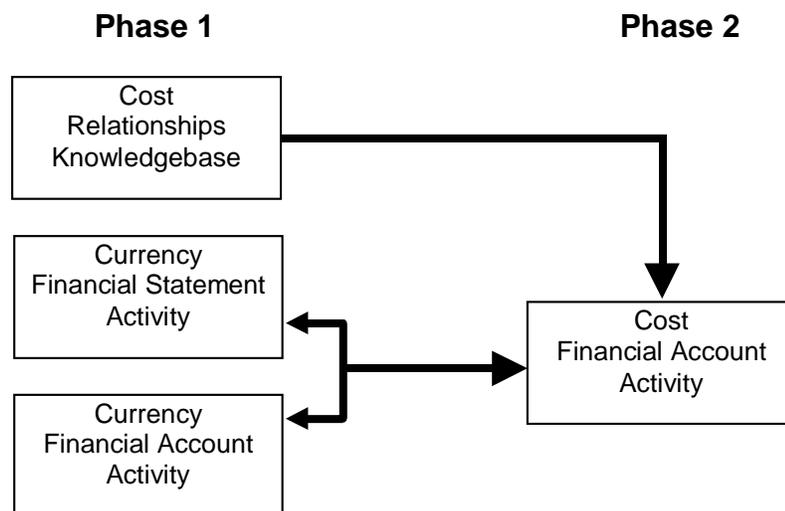


Figure 19: Project Map for implementation of Service-related activities

2.7.3 Relating Activities to Functions and Business Units

We can now relate Business Activities identified in the Strategic Model to the current Functions and Business Units of the Bank. To achieve this, other Model Views were defined using Visible Advantage to represent the Bank's major Business Functions and Business Units. We will shortly see how these model views will be used to assign

Business Activities to Functions or Business Units. These are (or will be) responsible for the implementation, operation and management of those activities and the tactical business processes and operational systems that are within them.

Some activities may already be carried out as current functions in various business units of the Bank. Other activities will exist in current functions that have not yet been identified because of the high-level focus of the Strategic Model. However the Strategic Model may also include activities suggesting functions that do not yet exist; they may address new directions to be taken by the Bank - such as Internet-related activities for Electronic Banking or Electronic Commerce to support the Bank's Global Banking goal using the Internet.

2.7.3.1 Business Activities and Functions

Each Business Activity identified by Visible Advantage as a cluster in the Strategic Model was described in detail, as discussed earlier in *How to Identify Business Activities from a Strategic Model*. These Activities were entered as Planning Statements into the Planning Dictionary of Visible Advantage. The description that was developed for each activity was entered as planning statement text to describe the purpose of that activity. This purpose describes in banking terms what the activity represents, why it is needed and how the Bank uses it. Examples that illustrate the operation of the activity are also included, drawn from current functions or described for new functions that are needed to support that activity. These Business Activity Planning Statements are documented in *Appendix 3 - Planning Statement Report*.

Each Activity was then assigned to the relevant Function that is (or should be) responsible for that Activity. This was achieved using the Statement - Model View Matrix of Visible Advantage as described earlier in relation to Figure 5. The assignment of Activities to Functions is included with other matrices in *Appendix 6 - Activities by Business Function and Business Unit*.

2.7.3.2 Business Units and Functions

Some activities may relate to specific functions in particular business units. Other activities may apply to different business units, but not as part of a function of that business unit. Therefore it is useful to assign Activities also to Business Units, using the same approach as described above for assignment of activities to functions. These are documented with other matrices in *Appendix 6 - Activities by Business Function and Business Unit*.

2.8 KJB Information Warehouse

Definition of Goals, Objectives and KPIs in Strategic Plans indicates information that may be required by managers. Some of this can be summarized from operational databases on a periodic basis and printed in reports. Other information might first need to be converted ("transformed") into a different format that is suitable for analysis. This

conversion ("transformation") and analysis of information is done in an Information Warehouse - to avoid any performance impact from analysis processing carried out directly against operational KJB databases and systems.

2.8.1 Information Warehouse Systems (EIS, DSS, OLAP, DEW)

Software packages that enable managers to request information – to analyze it and present results in graphical, tabular or report format on a desktop computer – are readily available for use with an Information Warehouse. These packages are Executive Information Systems (EIS), Decision Support Systems (DSS) and OnLine Analytical Processing (OLAP) systems. Key criteria for the purchase of EIS, DSS or OLAP packages are ease of use and flexibility for specification by managers of any required analysis and presentation formats.

What cannot be purchased from outside, however, is information to be analyzed and presented by these packages. The Strategic Model represents this information; it will be defined in greater detail later, through tactical and operational data modelling.

Much information is performance-related: the specific information needs of managers depend on KPIs that have been set in Tactical and Operational Business Plans for achievement by Business Units of the Bank. Goals, Objectives and KPIs should all be measurable and can be calculated and presented by an Information Warehouse using EIS, DSS and OLAP packages. But a problem exists: one of monitoring progress towards achievement of the results (or "targets") over time. This monitoring is carried out automatically within manager-defined boundaries by Decision Early Warning (DEW) systems.

However packages to provide this decision early warning function cannot be purchased. If such a capability is required, a DEW system must be developed for the Information Warehouse. The KJB Strategic Model has included the data entities needed to develop a Decision Early Warning System. Its development and use are discussed in *Decision Early Warning using an Information Warehouse*.

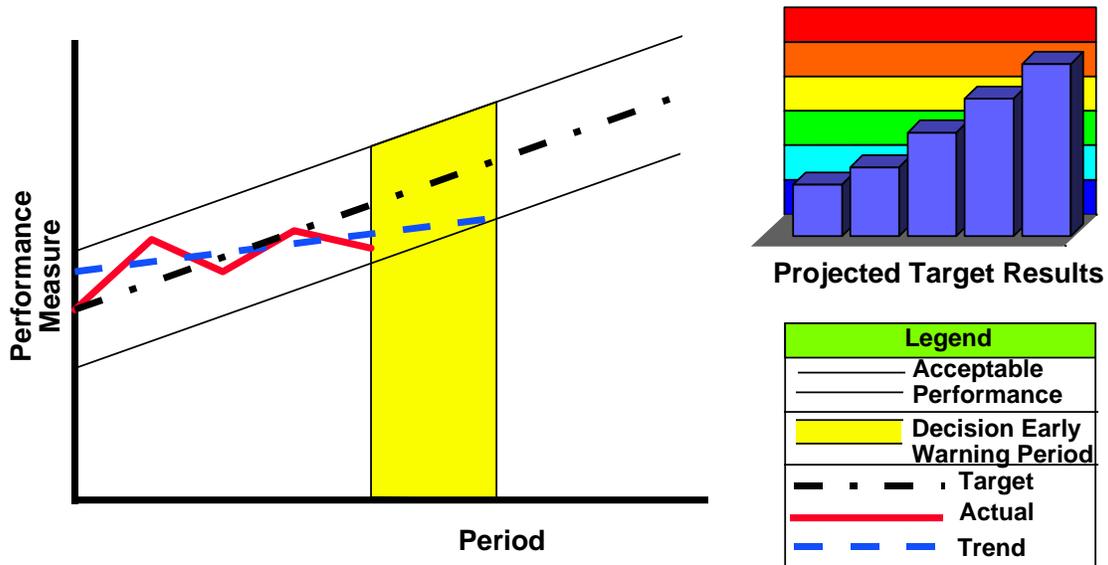
2.8.2 Management Use of an Information Warehouse

An Information Warehouse delivers information from many perspectives or dimensions; this is called "multi-dimensional analysis". This enables managers to examine change trends over time. Demographic change trends (or other population changes) that affect needs for banking products and services - and help management assess the most effective ways of delivering those products and services to satisfy the needs - are all of great interest to KJB management.

An Information Warehouse can deliver this information to a manager's desktop in Head Office or in bank branches throughout the country and overseas. It enables bank managers to interrogate data at the branch level, to analyze data themselves, and to create ad-hoc reports - without time-consuming and expensive programming to develop inflexible hardcopy reports.

2.8.3 Decision Early Warning using an Information Warehouse

Goals, Objectives and KPIs are all performance measures that are documented in Strategic, Tactical and Operational Business Plans. They should all be measurable, and the results of these performance measures are plotted over time. They are monitored by a Decision Early Warning System as shown in Figure 20. The Performance Measure is plotted on the Y-axis, with time plotted as Periods on the X-axis. The *target* performance measure at each time period can then be plotted, shown by a dashed and dotted line in Figure 20.



Adapted from: C. Finkelstein, "Information Engineering: Strategic Systems Development," Addison-Wesley, Reading: MA (1992)

Figure 20: A Decision Early Warning System

The target may not be achieved exactly, but a manager will want to know if the performance result is within acceptable boundaries: shown by the lines above and below the target line. If performance falls outside these boundaries, the manager responsible for the performance measure can be notified immediately by an automatic e-mail message from the Information Warehouse. This e-mail message will include the appropriate Decision Early Warning graph in Figure 20, and may also automatically include statements from the relevant Business Plan that is relevant to the performance measure, such as KPIs or objectives that it addresses. A decision can then be taken by the manager to allocate resources to resolve the unacceptable performance.

If the performance result falls within the boundaries of acceptable performance, the manager need take no action. The actual result at the end of each time period is plotted: the actual performance result over time is the solid heavy line in Figure 20. This shows a trend developing that will result in unacceptable performance in the future: shown by a dashed line. A decision may need to be taken by the responsible manager: perhaps by changing resources previously allocated to achieve the desired change in performance, or by allocating other or additional resources.

The vertical band from the X-axis indicates an “*Early Warning Period*” representing an expected delay before allocated resources can work to change the trend. For example, once a decision has been made it may take time for relevant resources to become available (called the “*resource lead time*”). When available, it may take further time for the resources to take effect (the “*resource lag time*”). A safety factor may also need to be included (the “*decision safety factor*”). The total of resource lead time, resource lag time and decision safety factor then indicates the early warning period for the performance measure.

The responsible manager is also notified by automatic e-mail if a trend has been detected that will cross into unacceptable performance within the early warning period, as shown in Figure 20. The manager can then make an early decision before the unacceptable performance boundary is crossed: such as allocating resources to change the trend and avoid that unacceptable result.

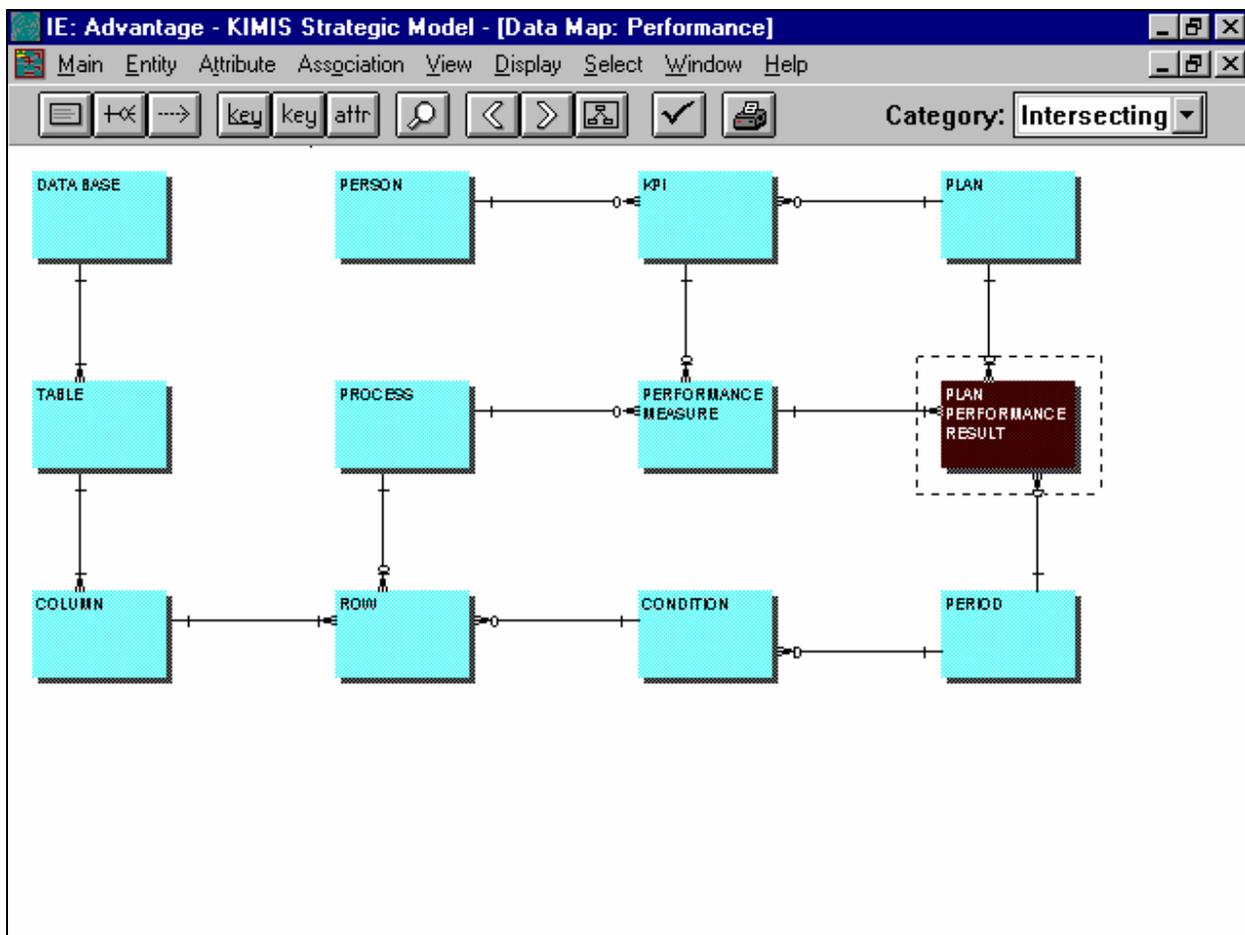


Figure 21: Data Map of the Decision Early Warning System

A Decision Early Warning System as described above can be incorporated in an Information Warehouse. This will enable managers at every level within the Bank to track the achievement of their performance measures or performance agreements

automatically. The data map for the Decision Early Warning system is shown in Figure 21 and is discussed next.

2.8.3.1 Development of a Decision Early Warning System

The data map in Figure 21 shows the data entities needed to develop a Decision Early Warning System. A KPI has one or many PERFORMANCE MEASURE. A PLAN has one or many KPI and also one or many PLAN PERFORMANCE RESULT over time (PERIOD). A manager is a PERSON who may be responsible for many KPI.

A PROCESS calculates each plan performance result. A process is documented as a narrative activity description in a process statement or it can be documented in a computer programming language, such as an SQL query statement.

The process operates against source data for the performance measure. Each source data value is a ROW for a data COLUMN of a TABLE in a DATA BASE, whose values are filtered by a CONDITION (such as in an SQL Where clause).

2.8.3.2 Using the Decision Early Warning System

This data map includes all of the data entities needed for performance monitoring to deliver decision early warning information automatically to management. A Decision Early Warning System can be implemented as part of the Information Warehouse - or it may be installed on any computer attached to the Bank's Intranet.

We have assumed Intranet access of the DEW computer in the discussion below. This offers flexibility to connect to the Internet if external source data is required by a process and performance measure to calculate a plan performance result. The DEW computer does not have to be powerful; a server or a desktop computer will do. It avoids the need for a firewall, or compromising the security of the Bank's Information Warehouse by a direct Internet connection.

Performance results are monitored over time periods using the Decision Early Warning System as described step-by-step next:

- A time period is defined by the responsible manager with a start date and duration, which may be expressed in any time unit - such as hours, days, weeks, months or years.
- When the period duration ends, an automatic request is sent from the DEW computer via the Intranet to the Information Warehouse. This request specifies the process (or includes an SQL query), the data source and the relevant source data filtering condition. It also specifies the performance measure and the plan for which performance is to be monitored.
- Once initiated, the process operates on the source data - filtered by the condition defined for the process. The source data may be in operational databases and systems, or may reside in the Information Warehouse computer attached to the

Bank's Intranet. It may involve a large quantity of data and take considerable time to produce a result.

- The result of this processing is transmitted from the Warehouse back to the DEW computer, as a performance result for that period. The DEW computer compares this result value to the target value and to the upper and lower bounds of acceptable performance for that period.
- If these bounds are exceeded, or a trend is detected that will cross those bounds within the early warning period (ie. a trend towards unacceptable performance), the person responsible for the relevant plan is notified by email with the DEW graph as an email-attached file.
- The next performance period begins. Another performance result is then calculated on its completion, as described above.

Once initiated by the start date and period duration, performance monitoring is automatic. The person responsible for the performance measure and KPI is only notified if a performance result value falls outside the acceptable boundaries (as earlier defined by that manager), or if a performance trend has developed that requires an early warning notification.

The performance result is calculated by a process executed by the Information Warehouse computer, or by any other computer within the Bank. Alternatively, if appropriate arrangements are made with other organizations to use the data sources on their computers, those machines may carry out the processing when contacted by the DEWS computer. This approach can be used to contact any computer worldwide that has a data source of interest to the Bank - by using the Internet and World Wide Web.

2.8.3.3 Performance Measures in the Decision Early Warning System

A Decision Early Warning System developed in this way is dynamic: any performance measure and its relevant SQL query and Where clause (or other programs for processing) can be added to tables used by the DEW computer as follows:

- The performance measure is entered as a new row in the *Performance Measure* table.
- The SQL query is added to the *Process* table, and the Where clause is added to the *Condition* table.
- The names of the relevant column, table and data base that provide the data source for the performance indicator are added to the *Column*, *Table* and *Data Base* tables.
- The location of the data base is added to the *Data Base* table (as a LAN or WAN address for a KJB data base, a dial-up phone number for an external data base, or instead as a URL ["Universal Resource Locator"] for a data base accessed via the Internet).

Thus new performance measures can be dynamically and easily added to the Decision Early Warning system: by adding appropriate SQL query and Where clauses specifying relevant processing to derive performance results for that measure; and by identifying the data source. The responsible manager can then set targets and upper and lower performance boundaries and specify the period frequency for automatic performance monitoring.

2.8.3.4 Project Plan for the Decision Early Warning System

The Decision Early Warning System in Figure 21 can be built for the Information Warehouse based on the two clusters shown in the Cluster Report in Figure 22. This specifically derived only those clusters for the DEW system: the three asterisks following some entity names indicate that those entities are defined elsewhere in the KJB Strategic Model.

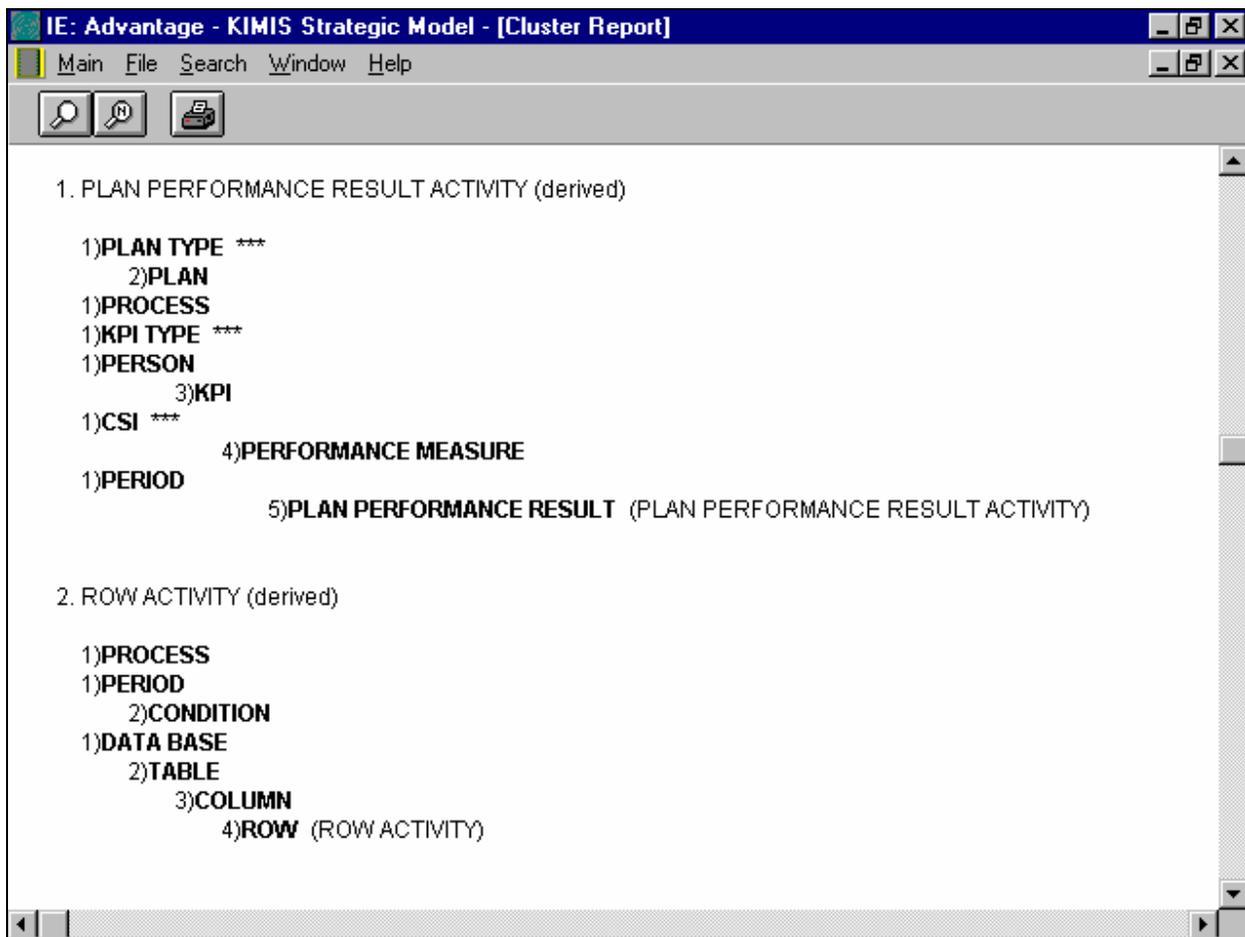


Figure 22: Project Plan for Decision Early Warning System

The next section documents the results of the SISP and the Recommendations.

2.9 Project Plan Model for Kwangju Bank

All activities and databases that were identified by Visible Advantage in the Strategic Model are documented in *Appendix 2: Cluster Report*. This report was used to develop an overall Project Plan data model, utilizing the modelling tool also to derive a project plan for project management.

2.9.1 Development of the Project Plan Model

Each cluster that represents an activity in the Cluster Report is a project task in the Project Plan; independent or interdependent activities that are identified in the report each become a prerequisite task of relevant projects in the plan.

Visible Advantage was used to group related activities into a series of projects. The cluster report for this Project Plan model was produced, showing a number of separately implementable projects for the Bank. This Project Plan Cluster Report is also included in Appendix 2.

Three main project areas emerged that are all important to the Bank: *Marketing; Risk and Finance; and Planning and Resource*. In each project area there are several focus areas, which comprise a number of projects for activities identified in the Strategic Model. These are summarized. They are provided in detail in Appendix 2.

| Project Area | Project Focus Area |
|-----------------------|--|
| Marketing | Market Customer Product Branch |
| Risk and Finance | Risk Portfolio and Treasury Finance Cost |
| Planning and Resource | Planning and Performance External Factors Resource |

2.9.2 Preparation for Tactical and Operational Modelling

A Model View was defined for each of these project areas and their focus areas in the Strategic Model. A description of each area was entered into the Visible Advantage Planning Dictionary as a Project Planning Statement for each model view. This enables reports to be produced during tactical and operational modelling for these projects, for use by project teams in these areas. These reports provide input from the Strategic

Model for more detailed tactical and operational data modelling. The following reports provide required strategic input for each project:

Reports from each Project Model View as input for Tactical Modelling:

- Planning Statement Report of all planning statements in the relevant Model View
- Data Map of all entities in the relevant Model View
- Cluster Report of all entities in the relevant Model View
- Entity Report of all entities in the relevant Model View

2.9.3 Project Phase Sequence in KJB Summary Project Map

The model views listed above are now rearranged according to model view dependencies based on the Project Plan Model. This was derived from the Cluster Report in Appendix 2, using the method discussed earlier in relation to Figure 18 and Figure 19. The Project Plan is shown in summary form in Figure 23. This clearly shows the model view project sequence, by phase, for building the Information Warehouse and KJB databases and systems.

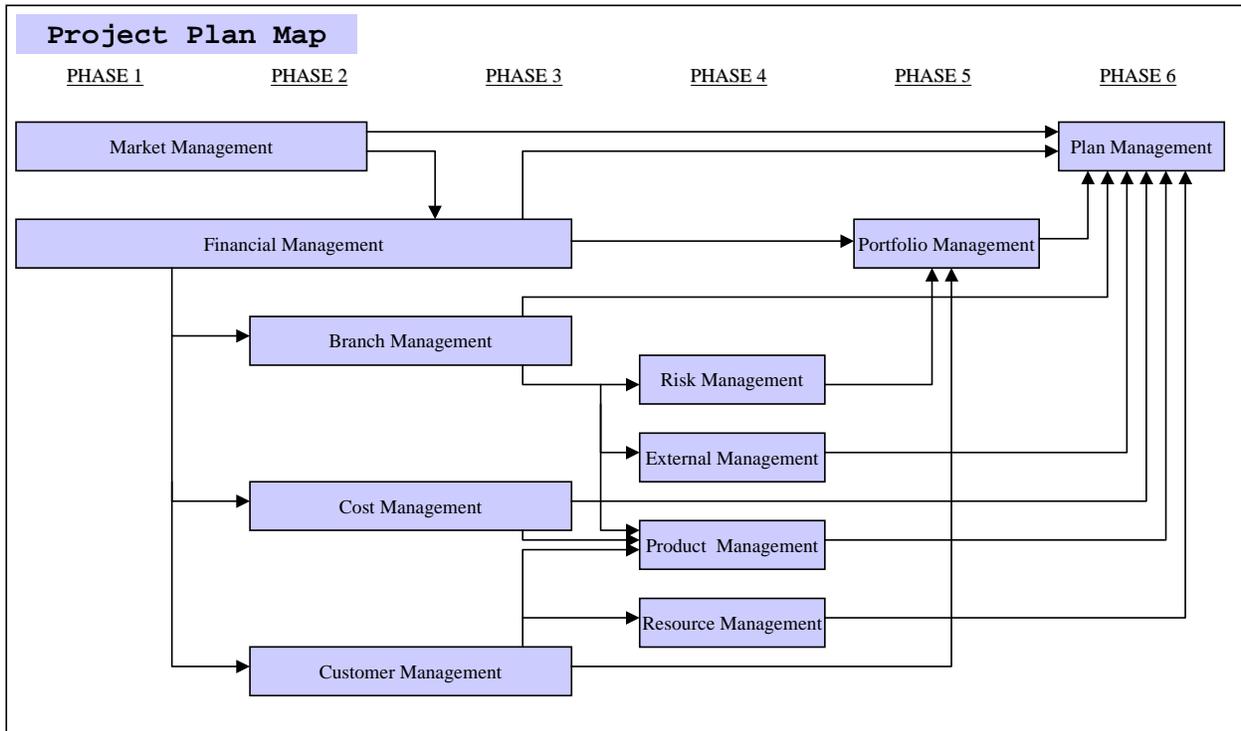


Figure 23: Summary Project Map showing Phase Sequence for Model Views

Figure 23 indicates that the Market Management and Financial Management model views have activities within them that are prerequisite activities for many of the other model views. This is not surprising for a market-driven Bank as market needs drive many banking activities and good Financial Management is paramount for a Bank. In the absence of any other priorities, the initial tactical modelling projects would focus on

Market Management and on Financial Management. However there are other factors which also have to be examined to decide the most important priority projects. Some of these factors may relate to problems associated with current systems and others may address opportunities that are emerging. An assessment of business priorities will also contribute to a decision of which project areas to select for initial tactical and operational modelling.

2.9.4 Priority Projects

A number of candidate model views were considered to determine the priority projects for the Tactical Modelling phase. These are first summarized and then discussed in more detail in terms of the basic and advanced systems that apply to each area. Detailed Project Maps have been included and are discussed for the highest priority model views. The benefits or advantages (i.e. merits) and the disadvantages (i.e. demerits) of each view are identified.

2.9.4.1 Candidate Views for Priority Projects

- **Financial Management:** For enhancement of the quality of profit & loss control
- **Customer Management:** For Marketing purposes
- **Product Management:** For Marketing purposes
- **Portfolio And Treasury:** For the improvement of funds management & asset control
- **Risk Management**

2.9.4.2 Selection and Benefits of Priority Projects

The Tactical Modelling phase will define the content of entities within a cluster in greater detail. This involves identification of tactical data attributes for entities in the cluster. Some attributes will represent aggregates or may exist as derived attributes calculated from detailed operational data. New entities will also be identified through Business Normalization. The focus for tactical data modelling therefore addresses the entities within priority clusters.

In KJB, the importance of *Customer Management* and *Product Management* appears to be very strong, but prioritization for systems development of individual databases and activities at this stage is very difficult. We will consider the strategic importance of each cluster in order to choose priority projects. Once the views in which those priority projects reside are selected, we can then define the number and range of priority projects belonging to those views. We will also need to check the current systems and databases related to chosen priority projects, as well as prerequisite projects that should be developed before the priority projects.

From the candidate views above, we have determined that *Financial Management*, *Customer Management* and *Portfolio & Treasury Management* are very important to KJB. However the final choice will depend on the range and the difficulty of projects to be developed and the status of current systems and databases related to those projects. We will now examine each of these views in more detail.

2.9.4.2.1 Financial Management

JUMP1 and JUMP2 are current Financial Management Systems developed and used by KJB. Many of the existing KJB MIS systems also use financial management data for decision-making and business operations at present. Considering prior experience and the existing data in the financial management area, the development of new financial management systems will deliver clear benefits.

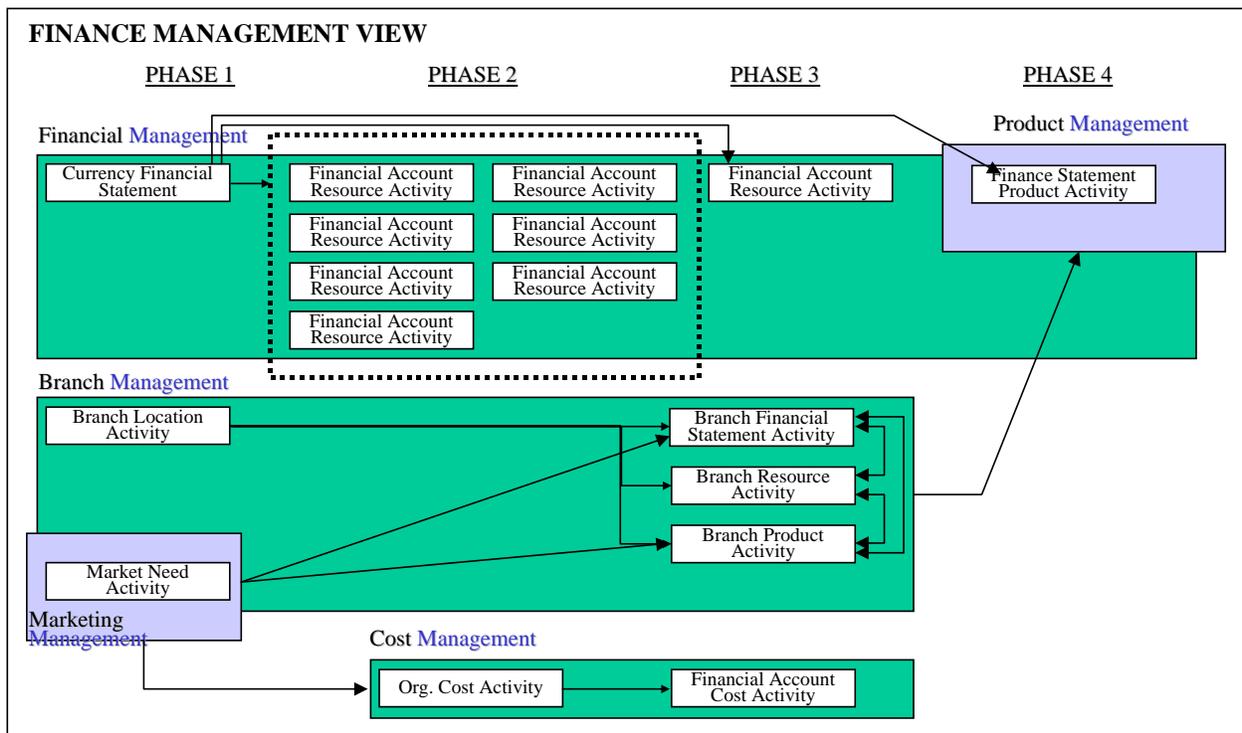


Figure 24: Project Map Showing Financial Management Activities

Figure 24 indicates that the *Currency Financial Statement Activity* is a prerequisite for many other activities. In addition, the *Branch Location Activity* in Branch Management and the *Market Need Activity* in Market & Management are prerequisites for activities to which they point.

These activities most likely all presently exist: some may be processed by current systems; others may be manual systems. They may not need to be redeveloped if they currently satisfy the Bank's requirements. It is important to determine which of the activities in Figure 24 offer the greatest potential benefit to KJB. These may be considered as potential projects for tactical modelling.

From the Cluster Report in Appendix 2 and an assessment of current systems, the KIMIS project team has identified a number of basic and advanced Financial Management Systems. Some have been identified in the Strategic Model, while others exist in the current systems and would only be identified from more detailed tactical and operational modelling. These systems are:

Basic Systems for Financial Management

- ⇒ Financial Accounting Systems
- ⇒ Balance Sheet, Profit & Loss
- ⇒ Tax Management
- ⇒ Region and Branch Accounts, Balance Sheet, Profit & Loss

Advanced Systems for Financial Analysis

- ⇒ Budget and Position Control (Plan and Actual)
- ⇒ Portfolio and Account Analysis Systems
- ⇒ Cost Management Systems
- ⇒ Cost and Profit Analysis Systems
- ⇒ Risk Analysis in Financial Systems and Accounts

Projects for Financial Management identified from the Cluster Report in Appendix 2:

- | | |
|--------------------------------|--------------------------------|
| ⇒ RESOURCE FINANCIAL ACCOUNT | ⇒ REGION FINANCIAL ACCOUNT |
| ⇒ POSITION PLAN | ⇒ REFION FINANCIAL STATEMENT |
| ⇒ COST FINANCIAL ACCOUNT | ⇒ RESOURCE FINANCIAL STATEMENT |
| ⇒ CURRENCY FINANCIAL ACCOUNT | ⇒ ORG FINANCIAL STATEMENT |
| ⇒ CURRENCY RISK | ⇒ BRANCH FINANCIAL STATEMENT |
| ⇒ FINANCIAL STATEMENT RISK | ⇒ CURRENCY FINANCIAL STATEMENT |
| ⇒ LOCATION FINANCIAL STATEMENT | ⇒ FINANCIAL ACCOUNT PRICE |
| ⇒ FINANCIAL STATEMENT PLAN | ⇒ RISK FINANCIAL ACCOUNT |
| ⇒ PRODUCT FINANCIAL STATEMENT | |

Financial Management Merits (i.e. Benefits)

- ⇒ A number of current systems and data
- ⇒ Bank wide interests
- ⇒ Tend to be project areas that are logical prerequisites for other projects

Financial Management Demerits

- ⇒ Do not belong to direct profit generation areas such as Marketing and Funds Management

2.9.4.2.2 Customer Management

To expand the customer base and differentiate customers according to KJB marketing focus, Customer Management is most necessary. Additionally it will be a principal system for Electronic Banking marketing.

Figure 25 also shows that the *Currency Financial Statement Activity* in Financial Management is a prerequisite for many other activities in Customer Management. *Branch Location Activity* in Branch Management and the *Market Need Activity* in Market

Management are prerequisites also for activities to which they point in Customer Management.

Again it is important to determine which of the Customer Management activities in Figure 25 offer the greatest potential benefit to KJB. These may be considered as potential projects for tactical modelling. From the Cluster Report in Appendix 2 and an assessment of current systems, the KIMIS project team has identified a number of basic and advanced Customer Management Systems. Some have been identified in the Strategic Model, while others exist in the current systems and would only be identified from more detailed tactical and operational modelling.

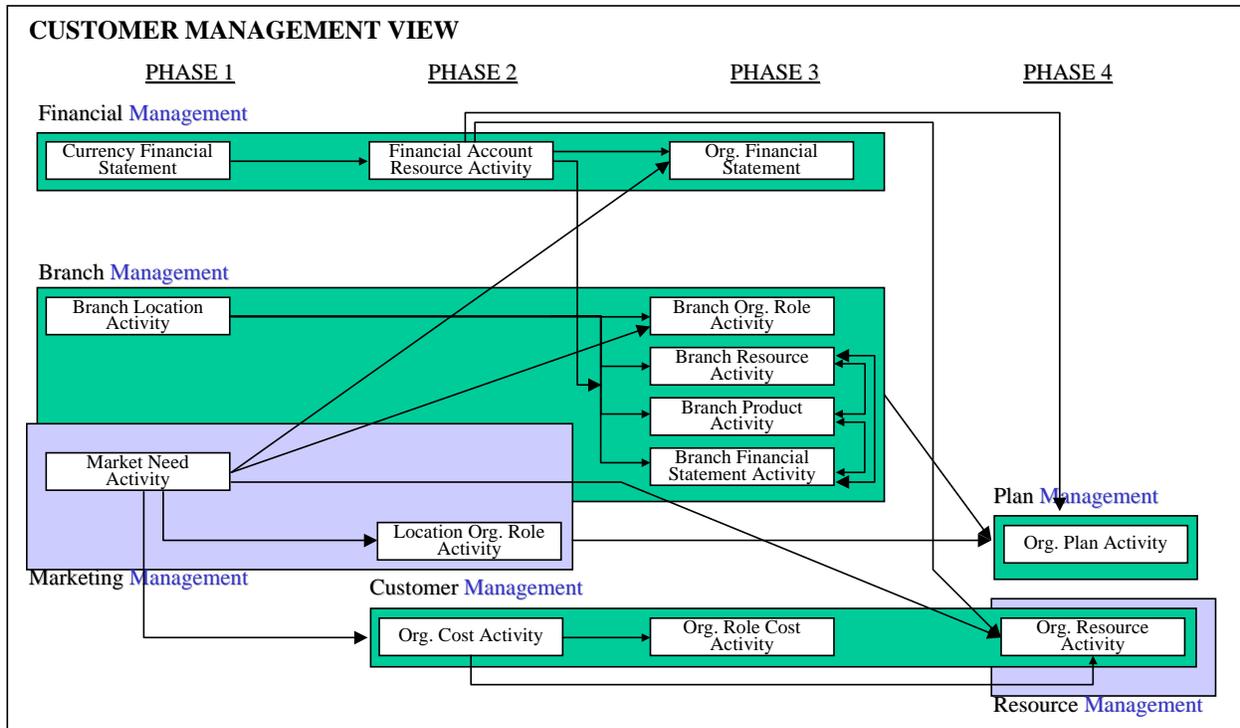


Figure 25: Project Map Showing Customer Management Activities

The Basic and Advanced Systems for Customer Management are:

Basic Systems for Customer Management

- ⇒ Principal Customer information
- ⇒ Detailed Customer information
- ⇒ Customer group information

Advanced Systems to Differentiate Customers

- ⇒ Customer profit contribution analysis system
- ⇒ Customer credit analysis
- ⇒ Customer transaction information
- ⇒ Newly opening or Closing account information
- ⇒ Customer advisory system

Projects for Customer Management identified from the Cluster Report in Appendix 2:

- | | |
|---------------------------|--------------------------|
| ⇒ CUSTOMER CREDIT PRODUCT | ⇒ ORG RESOURCE |
| ⇒ INDUSTRY ORG | ⇒ ORG ROLE CREDIT |
| ⇒ INDUSTRY PRODUCT | ⇒ ORG LOCATION |
| ⇒ INDUSTRY RESOURCE | ⇒ ORG PRODUCT PRICE |
| ⇒ ORG BRANCH | ⇒ ORG ROLE PRODUCT PRICE |
| ⇒ ORG COST | ⇒ ORG ROLE LOCATION |
| ⇒ ORG CREDIT | ⇒ ORG LOLE BRANCH |
| ⇒ ORG FINANCIAL STATEMENT | ⇒ ORG RISK |
| ⇒ ORG INDUSTRY | ⇒ ORG ROLE COST |
| ⇒ ORG NEED | |

Customer Management Merits (i.e. Benefits)

- ⇒ Widely used, so will arouse considerable support
- ⇒ Direct Contribution to Marketing : Business promotion
- ⇒ Provides basic customer information for Electronic Banking marketing and other delivery channels

Customer Management Demerits

- ⇒ For effective systems development, the focus of Customer Management Systems is broad. This means that there is a possibility that a customer-related project may be too big to achieve good results in a short period of time
- ⇒ Difficulty in collecting exterior information beyond KJB information sources

2.9.4.2.3 Product Management

This area determines the performance of each product, assesses the product portfolio structure and differentiates products for customers. KJB has very few Product Management Systems.

Figure 26 shows that *Currency Financial Statement Activity*, *Branch Location Activity* and *Market Need Activity* are all prerequisites for activities in Product Management. The KIMIS project team has identified a number of basic and advanced Product Management Systems. These systems are:

Basic Systems for Product Management

- ⇒ Product principal information: product history, product structure, basic prices, etc
- ⇒ Product list

Advanced Systems for Product Management

- ⇒ Product price analysis (realized)
- ⇒ Customer product analysis
- ⇒ Product performance analysis
- ⇒ Product portfolio analysis

Projects related to Product Management from the Cluster Report in Appendix 2:

- ⇒ BRANCH PRODUCT
- ⇒ INDUSTRY PRODCUT
- ⇒ PRODUCT COST
- ⇒ PRODUCT FINANCIAL STATEMENT
- ⇒ PRODUCT NEED
- ⇒ PRODUCT PLAN
- ⇒ PRODUCT PORTFOLIO
- ⇒ PRODUCT PRICE
- ⇒ PRODUCT PROMOTION
- ⇒ PRODUCT RESOURCE
- ⇒ ORG PRODUCT
- ⇒ ORG PRODUCT PRICE
- ⇒ ORG ROLE PRODUCT
- ⇒ ORG ROLE PRODUCT PRICE
- ⇒ ORG PRODUCT RISK
- ⇒ ORG ROLE PRODUCT RISK

Product Management Merits (ie. Benefits)

- ⇒ Compared to Customer Management, relatively easy to control the range of projects
- ⇒ High possibility for easy extraction of product related data from KJB

Product Management Demerits

- ⇒ To produce big benefits, the range for system development needs to be wide - which makes the control of projects difficult

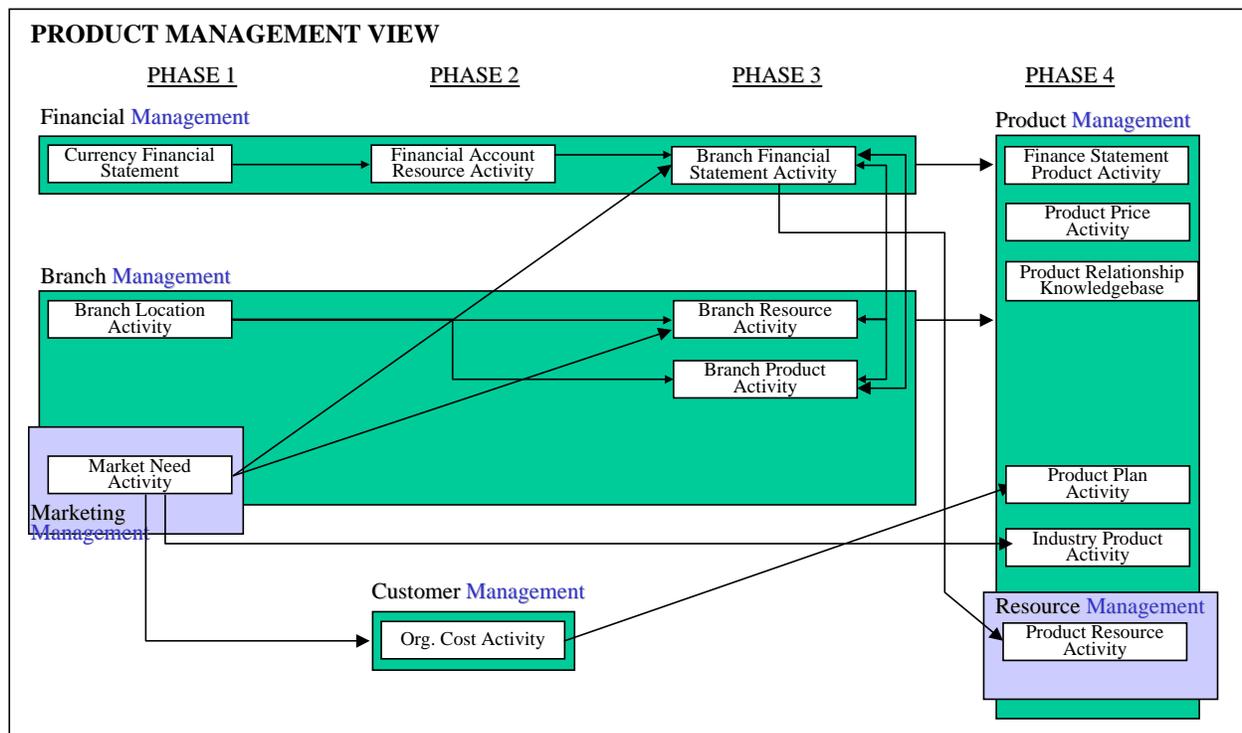


Figure 26: Project Map Showing Product Management Activities

2.9.4.2.4 Portfolio And Treasury Management

This area helps in understanding the performance of Funds Management and the condition of Assets Control, so contributing to sensible decisions in funds and assets management.

Figure 27 shows that *Currency Financial Statement Activity*, *Branch Location Activity* and *Market Need Activity* are all prerequisite activities for Portfolio Management. The KIMIS project team has identified a number of basic and advanced Portfolio Management Systems. These systems are:

Basic Systems for Funds and Assets Management

- ⇒ Securities information
- ⇒ Other funds and assets information

Advanced Systems for Funds and Assets Management

- ⇒ Portfolio analysis for funds management
- ⇒ Fund Allocation and Control
- ⇒ Securities Investment analysis
- ⇒ Present value analysis of holding securities

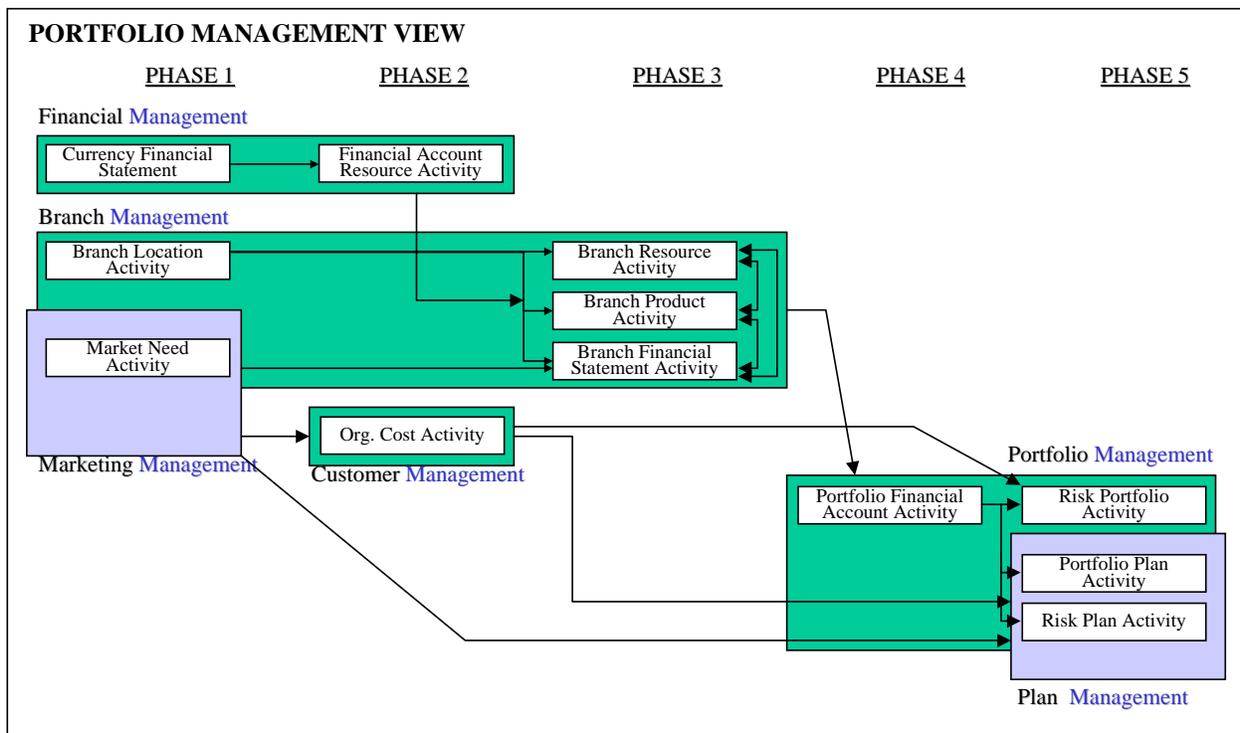


Figure 27: Project Map Showing Portfolio Management Activities

Projects for Funds and Assets Management from the Cluster Report in Appendix 2:

- ⇒ PRODUCT PRICE
- ⇒ PRODUCT PORTFOLIO
- ⇒ PORTFOLIO FINANCIAL ACCOUNT
- ⇒ RISK PORTFOLIO
- ⇒ PRICE RISK ANALYSIS

Funds and Assets Management Merits (i.e. Benefits)

- ⇒ Relatively easy to control the range of project because of its speciality

- ⇒ Can import advanced knowledge of Funds Management from other banks (including overseas) through benchmarking other banks' advanced systems
- ⇒ Timeliness: notify right information on the list of holding securities, the present value and performance to management

Funds and Assets Management Demerits

- ⇒ Highly linked to Risk Management, but there is much difficulty in system development as this area is dependent on the availability of knowledge base resources.

2.10 Recommendations for Action

The Strategic Model and SISP will enable KJB to align its information systems directly with its strategic plans, and build an Information Warehouse to provide information for management. However these benefits will only be achieved if the strategic model is expanded to tactical and operational model detail, and priority systems and databases are implemented. The following recommendations therefore address the initial steps that should be taken to achieve this.

2.10.1 Tactical Modelling Focus

The Project Plan Model in Figure 23 clearly indicates that Market Management and Financial Management have prerequisite activities that are used also by other model views. These are the *Market Need Activity*, *Currency Financial Statement Activity* and *Financial Account Resource Activity* and would normally be the starting points for tactical modelling. However KJB already has systems that support these activities; they would only be used as a starting point if they were problem areas for the Bank. As this is not the case; other model views may provide a more appropriate starting point.

The earlier assessment of project priorities indicated that an emphasis on Customer Management and on Portfolio and Treasury for initial tactical modelling offer considerable potential to KJB. These will also need to include some of the prerequisite activities from Financial Management and Market Management.

2.10.1.1 Recommendations

- ◆ *The first model view for tactical modelling should be Customer Management.*

Figure 25 illustrated the Project Plan Map for Customer Management. It showed *Market Need Activity* from Market Management as a prerequisite in Phase 1. This activity is the responsibility of Market Management to define fully; it should only be defined here to a level of detail suitable for Customer Management. More detailed definition of *Market Need Activity* will be completed in a later Market Management project. The focus on Customer Management will therefore be on *Org Cost Activity* and *Org Role Cost Activity* in Phases 2 and 3. But the documentation available regarding tactical plans for Customer Management does not provide sufficient guidance.

- ◆ *Tactical business plans should first be defined for Customer Management*

Goal Analysis was covered in the Strategic Planning and Data Modelling Workshop attended by the KIMIS project team. This should be used to define the Mission, Goals, SWOTs (Strengths, Weaknesses, Opportunities, Threats), Strategies and KPIs for Customer Management. This can be achieved by doing Tactical Business Planning in initial planning sessions attended by all KIMIS project team members.

The tactical business plans that are developed should then be used as input for tactical modelling of Customer Management.

◆ *Financial Management should be the second model view for tactical modelling*

As Financial Management activities are prerequisites for Portfolio Management (see Figure 27), some tactical modelling of Financial Management (Figure 24) will need to be completed before starting to do tactical modelling in the Portfolio Management model view. This will involve data modelling of *Currency Financial Statement Activity* and *Financial Account Resource Activity*.

◆ *Tactical business plans should first be defined for Financial Management*

While Financial Management Plans are well documented in a Bank, clear tactical business plans that define the Mission, Goals, SWOTs (Strengths, Weaknesses, Opportunities, Threats), Strategies and KPIs for Financial Management should nevertheless be explicitly documented for use as input to tactical modelling.

◆ *Portfolio Management should be the third model view for tactical modelling*

When tactical modelling for Financial Management of *Currency Financial Statement Activity* and *Financial Account Resource Activity* has been completed, tactical modelling in the Portfolio Management model view can commence. This is illustrated in Figure 27.

◆ *Tactical business plans should be defined for Portfolio Management*

Clear tactical business plans that define the Mission, Goals, SWOTs (Strengths, Weaknesses, Opportunities, Threats), Strategies and KPIs for Portfolio Management should be explicitly documented also for use as input to tactical modelling.

◆ *Schedule Concurrent Tactical Modelling Projects*

Tactical business planning and tactical modelling for these model views should be conducted with three project teams working initially together. These teams should then progressively move to concurrent tactical modelling as illustrated in Figure 28.

All teams initially should do tactical business planning of Customer Management and then work concurrently in tactical data modelling of separate parts of the Customer Management tactical model. This ensures all teams have a basic understanding of the tactical data model for the Customer Management model view.

Once Customer Management tactical modelling is progressing well, the Financial Management team 2 and Portfolio Management team 3 should do tactical planning, then tactical modelling of Financial Management. These two teams thus gain a good understanding of the tactical model for the Financial Management model view, while Project team 1 continues tactical modelling of Customer Management.

In turn, team 2 continues with Financial Management, while team 3 does tactical planning and tactical modelling of Portfolio Management based on their knowledge of Financial Management.

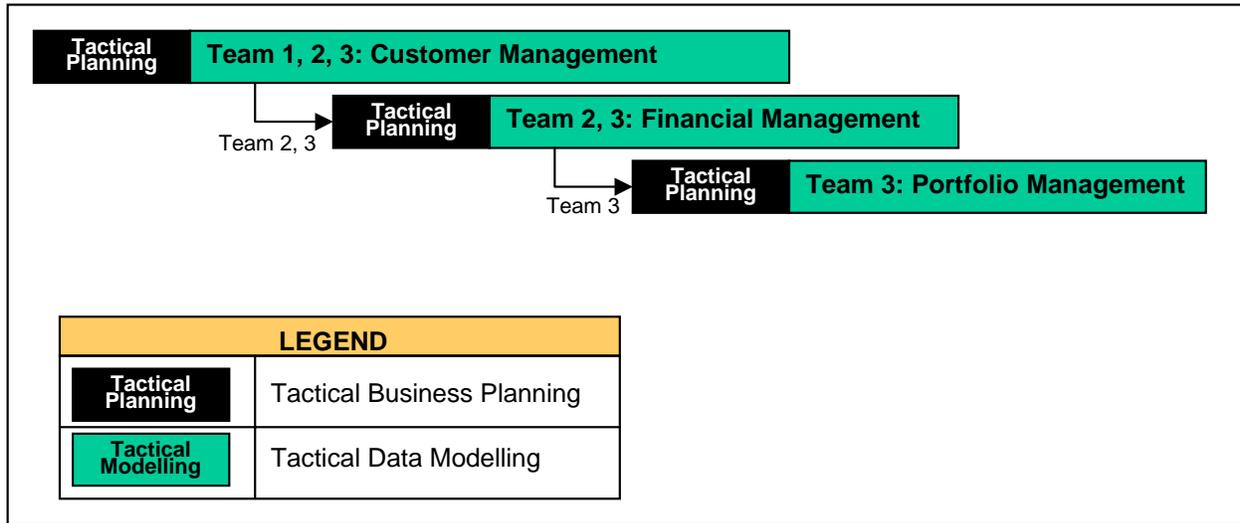


Figure 28: Concurrent Project Team Activity

More detailed project plans will be developed for each project team, as they progress through tactical modelling of priority activity clusters in their respective model views.

This three tier concurrent project strategy provides an effective application of project team knowledge and resources to the initial model view of Customer Management, while spreading knowledge of these prerequisite model views into project teams who will later work on tactical models of dependent model views.

As the project teams progress through tactical modelling, the tactical model for each model view will be documented in a Tactical Information Systems Plan (TISP) report in a format similar to this SISP.

This completes the body of the SISP Report. The following section documents the Appendices.

2.11 References

Information about Visible Advantage is available from the Visible Systems Corporation web site at <http://www.visible.com/>.

Additional Information about Enterprise Engineering, which is based on business-driven Information Engineering, is available from the IES web site at <http://www.ies.aust.com/>.

3 SISP Appendices

As you will appreciate, the Kwangju Bank strategic model includes much information that is confidential to the Bank. This is normally documented in detail in the reports produced as a result of processing by Visible Advantage. These detailed reports are included in the Appendices of the Strategic Information Systems Plan.

However the confidential nature of the reports in each Appendix precludes their publication for downloading from the Internet. A description of the contents of these reports and their use is documented as part of the Cover Page for each Appendix. These cover pages have been included below, to illustrate the detailed material documented in the Appendices of the SISP Report.

3.1 Appendix 1 - Model Views and Strategic Maps

A strategic data map shows the data and information needed by management to support the strategic plan. The data entities needed to support KJB's strategic planning statements were initially identified in the strategic model by reviewing high-level planning statements (goals and objectives) to isolate major data subjects and their inter-relationships. This resulted in a strategic data model of over 200 entities. The links between each entity and relevant goals and objectives that they support were then documented. Finally, the elements of the strategic model are linked to KJB's organizational structure and its functional structure, allowing subsets of the model to be generated from *Visible Advantage* for any area of interest.

The data maps in this Appendix document different model views of the KJB Strategic Model. Each includes the data required by a number of activities (documented in Appendix 2) and illustrates the data entities and relationships needed to support this business activity. A line drawn between two entities indicates that a relationship exists between them. This relationship is called an *association*. At a strategic level, an association represents reporting paths, communication paths, management controls, audit controls, or other coordination that is required to manage the operation of parts of the business that refer to entities joined in the association. The symbols at each end of an association line provide further information about the association. An association with a "crows foot" ($\text{---}\langle$) indicates *many*, whilst the absence of a crows foot indicates *one*. A zero on the line ($\text{---}\text{O}\text{---}$) indicates *optional*; a vertical bar ($\text{---}|$) indicates *mandatory*; while a zero and a vertical bar together ($\text{---}\text{O}|$) indicate *optional becoming mandatory*. For example, the association between MARKET and NEED is an *optional many to mandatory many* association ($\text{>O}\text{---}|<$). This shows that a MARKET must have at least one NEED to be of interest to the Bank, while each NEED may be present in zero, one or many MARKET.

Some data maps have been expanded to show the names of the *attributes* within each of the entities. Attributes indicate specific details stored in entities. In these data maps, the majority of the attributes are being used as *keys* to uniquely identify a real-world occurrence of an entity, or to support the relationships between entities. Keys can be quickly identified in the list of attributes for each entity, since they are followed by the "#" symbol (e.g. the attribute **market id #** in the entity MARKET is a unique identifier for each market). Attributes that contain additional information about an entity are called *non-key attributes* (e.g. the attribute **market total profit this period** in the entity MARKET).

As is often the case in a strategic data model, many of the non-key attributes are not yet documented; only those necessary to uniquely identify entities and their relationships, or to clarify the meaning of the model and ensure its completeness, are modelled. For example, to ensure that the strategic model contains all the entities necessary to accurately model KJB's Key Performance Indicators (KPIs), it is necessary to identify the non-key attributes required in the calculation of each KPI. It is also necessary to ensure that the appropriate entities exist within the strategic model to contain these attributes. But it is not necessary to identify other non-key attributes within the strategic model at this stage; these will be defined during tactical and operational modelling of priority activities in the organization.

3.2 Appendix 2 - Cluster Reports of Projects and Activities

Clusters are sets of highly cohesive data, information or knowledge. Each cluster is a separately implementable subset of the data model that represents the related data entities needed by each business activity or process. An analysis of the data entities contained in the cluster objectively and precisely identifies subsets of the data model for which organizational or functional responsibility can be determined, as well as identifying data frequently shared by multiple processes and people. A sample cluster (from the Strategic Model) is shown below.

10. MARKET NEED ACTIVITY (derived)
- 1)PERIOD
 - 2)NEED
 - 1)CSI
 - 3)MARKET NEED (MARKET NEED ACTIVITY)
 - 2)MARKET
 - 1)PLAN TYPE
 - 2)PLAN
 - 4)MARKET PLAN (MARKET PLAN ACTIVITY)

This cluster was derived by Visible Advantage based on the relationships established between the entities in the following area of the Strategic Model illustrated at right.

Clusters can have both bold and non-bold entities. The entities in bold indicate that the data represented by these entities is required to implement this business activity. The entities that are not in bold represent other clusters of information that must be considered in the implementation of the bold entities. These non-bold "embedded" clusters represent prerequisite cross-functional activities. Each group of non-bold entities of a cluster will also separately exist as an independent cluster with its entities in bold.

To read, or analyze a cluster, begin with the last entity in the cluster. This last entity is referred to as the end-point entity.

Read the purpose of the entity as shown in Appendix 6 - Entity Report. Do the same for each entity above the end-point entity. This analysis will result in each cluster of entities being provided a name that represents an activity of the business. In this example, the name of the cluster is MARKET PLAN ACTIVITY. If we provide a narrative about the cluster as a business activity, it is developed as described in the body of the SISP report and may read something like this.

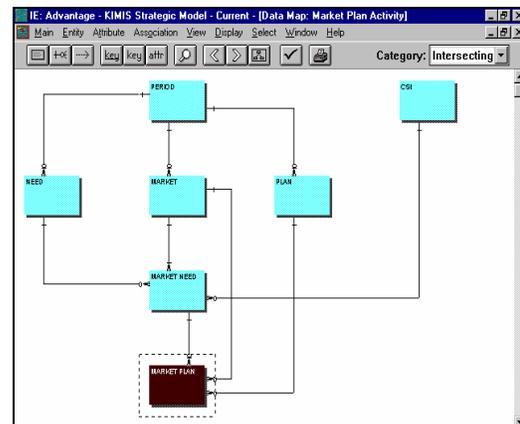
"A Marketing Plan is defined for each market where we operate or plan to operate. This plan addresses the needs of each market, whether domestic or overseas, for banking and financial products and services. It defines the current plan and sets Key Performance Indicators to monitor market penetration and growth over time.

Market needs are determined by regular surveys of our customers' and prospective customers' requirements for banking and other financial products and services that we can provide now or in the future.

Our main focus is to support the needs of our domestic markets (ie. the needs of our loan market for small firms in the Kwangju area). But our goal for global expansion requires that we also address the needs of overseas markets; these may be different to those of our domestic markets."

"Our Marketing Plans take these different market needs into account. They establish firm objectives and strategies in each market where we plan to operate for market entry, market growth and market penetration - to achieve the defined KPIs.

To gain competitive advantage from opportunities offered by Internet technologies, each Marketing Plan will define objectives and strategies for Electronic Banking and Electronic Commerce. This will help Kwangju Bank achieve its global banking goal. The Internet particularly will enable KJB to enter overseas markets at low cost, for rapid market growth and penetration."



Once all clusters have been named and described, you will see that the functions and organizations of KJB have been accurately represented in the data model. As you look through this Appendix, note that several of the entities shown in this cluster also exist in other clusters. This indicates the overlap of information requirements across business activities. It indicates cross-functional activities with shared data, shared processes, or both. This reflects the need for communication across business activities and organizational units. Identification of shared data is a benefit of Enterprise Engineering.

3.3 Appendix 3 - Planning Statement Reports

The KJB strategic planning process identified strengths, weaknesses, opportunities and threats (SWOTs). Goals were defined and objectives were then developed to monitor and guide the achievement of each goal. Key Performance Indicators (KPIs) provide more detailed targets.

The first Planning Statement Report in this Appendix lists the titles of the strategies, KPIs and SWOT components that support each goal. The title of each statement identifies the goal to which it relates, and also indicates the type of statement.

The following Planning Statement Reports in this Appendix give a higher level of detail for each planning statement. These reports show the text that defines each statement; for goals, objectives and KPIs it also shows the links defined in *Visible Advantage* between these statements and the data entities in the strategic model.

3.4 Appendix 4 - Goals and Objectives by Function

A goal is a statement of a future state or a broad target that the enterprise desires to achieve. Goals describe WHAT milestones the enterprise will strive to accomplish or progress toward in support of achieving the Mission of KJB, rather than specifying how.

Objectives and Key Performance Indicators (KPIs) are used to define Performance Measures. A performance measure is a quantifiable state or target against which goals and strategies are measured. As Objectives are defined to measure the success of business goals and strategies, these performance measures are incorporated into the objective. Both goals and objectives should indicate “what” are measured (KPI or performance measure), the time frame(s) in which the measure occurs, and the level to attain (ie, 80%, < 10%). “How” these objectives are achieved is later defined as Strategies.

| Model Views | BRANCH | COST | CUSTOMER | EXTERNAL FACTOR | FINANCE | KJB Strategic Model | KJB STRATEGY | MARKET | MARKETING | PERFORMANCE | PLANNING | PLANNING & RESOURCE |
|--------------------------------------|--------|------|----------|-----------------|---------|---------------------|--------------|--------|-----------|-------------|----------|---------------------|
| Statements | | | | | | | | | | | | |
| G - BROAD PRESENCE | ✓ | | | | ✓ | ✓ | ✓ | | ✓ | | | ✓ |
| G1 - EXPAND NETWORKS IN JONBUK | ✓ | | | | | ✓ | ✓ | | ✓ | | | ✓ |
| G2 - BRANCH REARRANGEMENT | ✓ | | | | | ✓ | ✓ | | ✓ | | | ✓ |
| G3 - BUILD UP TOTAL MARKETING SYSTEM | ✓ | | | | | ✓ | ✓ | | ✓ | | | ✓ |
| G4 - STRENGTHEN ELECTRONIC BANKING | ✓ | | | | | ✓ | ✓ | | ✓ | | | ✓ |
| H - INFORMATION BUSINESS | ✓ | | | | ✓ | ✓ | ✓ | | ✓ | | | ✓ |
| H1 - BUILD UP INTEGRATED INFORMATION | ✓ | | | | ✓ | ✓ | ✓ | | ✓ | | | ✓ |
| H2 - CREATE EB ENVIRONMENT | | | | | | ✓ | ✓ | | ✓ | | | ✓ |

A business function is a singular on-going group of related activities in an enterprise. Business functions do not typically have well-defined beginning and ending points, as do processes and procedures. Rather they are continuous and cohesive sets of business activity. Examples of business functions include Human Resources, Financial Management, and Sales/Marketing Management. In many instances, organizational units have management responsibilities that span several business functions.

The Goals and Objectives by Business Function matrix indicates the business functions that are involved in the successful satisfaction of the enterprise goals. Those organization units are represented as Model Views that perform these business functions should provide the appropriate personnel to develop strategies for satisfying the goals and to further identify/refine the specific KPIs (performance measures). This matrix lists each goal, with the related objectives of the goal on separate rows, and shows the functions responsible for implementation of those goals and objectives by ticks in the relevant Model View columns. The linking of goals and objectives to functions clearly shows, for each row, all of the functions involved in achieving that goal or objective. Similarly, reading down each function column, all of the goals that each function supports are apparent.

3.5 Appendix 5 - KJB Functions and Business Units

A functional area represents the data, information and knowledge that are required to support a specific function of the business. They are usually defined using the cluster analysis technique described in *Appendix 2 - Cluster Report*. These functional areas and descriptions were developed during planning sessions led by the project team with the business experts. The report lists the areas (Model Views) with descriptions of the areas shown to the right of the "Purpose:" caption.

3.6 Appendix 6 - Activities by Business Function and Business Unit

A Business Activity is a unit of work that can be performed, managed, or monitored by a business function or organization unit. Business activities are determined by performing an analysis of the goals, strategies, and performance measures of the organization. From this analysis, information required to support these performance measures of the business plans is captured in the form of a data model. The entities in the data model are grouped together based on the relationships that must exist between data to support the plans (see Appendix 2 - Cluster Report description). This group of related data model entities is referred to as a cluster. As the contents of each cluster are analyzed, a meaningful business name is assigned to the business activity represented by the contents of entities of the cluster. In conjunction with this name, a brief description of the activity is created.

As the clusters were analyzed, named and described, they were informally classified into Business Activities and Databases of information for use by the business. Business Activities indicate relatively high-volume business transaction processing, whereas Databases indicate business data stored for later reference (sometimes called “Master Reference Data”). Business Activities are typically derived from intersecting entities, while Databases are derived from secondary entities. Names and descriptions are provided for all clusters, whether they are representative of Business Activities or Databases. As a description is developed for each cluster, the name of the cluster may need to be changed to more accurately represent the description.

No activities or databases have yet been allocated to business functions. This is clearly apparent when you view the matrix in this Appendix. An initial assignment to functions will need to be made: perhaps initially assigned by the planning team, for review by management. This matrix should be completed to indicate those functions which have responsibility for, or which have an interest in, different activities or databases. Once this allocation has been made, the Business Activity Responsibility by Function can be determined.

Following the matrices in this Appendix is a planning statement report showing the descriptions of each activity or database.

3.7 Appendix 7 - Entity Report of the Strategic Model

The entity report in this Appendix documents every entity in the strategic model, listed in alphabetical order. This report has been formatted to show fundamental details of each entity (name, type, phase and purpose) along with a list of the attributes and associations linked to the entity.

The entity name is supplemented by the *purpose*, which provides a narrative description of the entity and often provides examples of what values a real-world occurrence of an entity may contain. *Notes* are comments that can be attached to an entity, which often record issues awaiting resolution.

The entity *category* is a way of categorizing entities, based upon their function as a component of the strategic data model.

Attributes indicate specific details stored in entities. In strategic models, the majority of the attributes are being used as *keys* to uniquely identify a real-world occurrence of an entity, or to support the relationships between entities. Keys can be quickly identified in the list of attributes for each entity, since they are followed by the “#” symbol (e.g. the attribute **market id #** in the entity MARKET is a unique identifier for each market). Attributes that contain additional information about an entity are known as *non-key attributes* (e.g. the attribute **market name** in the entity MARKET).

Symbols are used to provide additional information about an association between two entities. An association with a “crows foot” (—<) indicates *many*, whilst the absence of a crows foot indicates *one*. A zero on the line (—O—) indicates *optional* or “*may*”; a vertical bar (—|—) indicates *mandatory* or “*must*”; while a zero and a vertical bar together (—O|—) indicate *optional becoming mandatory* or “*will*”. For example, the association between MARKET and NEED is an *optional many to mandatory many* association (>O—|<). This shows that a Market *must* have at least one Need, but *may* have many; while many Markets or none may hold each Need. A many to many association such as this will typically be decomposed through further data modeling into an intermediate entity (called an “intersecting” entity) and two, one to many associations.