



BUSINESS CASE FOR THE ACQUISITION OF A MANAGEMENT INFORMATION SYSTEM

**BUSINESS SYSTEMS GROUP
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1. Introduction/Background

A key element of developing a performance management process for the University is to ensure the effective co-ordination of its business systems. This will ensure that data can be readily collected and extracted in a timely, accurate and consistent way. In turn, this will facilitate analysis of the data to allow for identification of risks and opportunities to inform decision making.

A number of other UK Universities, including Warwick, Nottingham, Birmingham and Leeds are now seeing the benefit of this approach and it is important, therefore, that the University of Liverpool remains in line with its peers to continue to provide both an efficient service and to remain attractive to students and staff.

There are a number of possible options available to organisations and this Business Case is designed to explore the relevant options and make recommendations for future development. Any investment in technological solutions such as data warehouse, IT interfaces, etc can incur considerable financial cost and it is, therefore, important to review options fully prior to making decisions. To date consultation has taken place with key users internally, with other Universities and with external providers. The findings from this consultation are summarised in Appendix 1.

2. Business Systems

The University has a number of business systems and processes to provide management information data. This data forms the basis of the performance assessment/analysis to inform management decision making. In addition, it is fundamental to a number of statutory returns, predominantly to HESA, which ultimately show the University's performance and position nationally, and in comparison to its peers. It is essential, therefore, that common data definitions and standards are agreed and that data quality and accuracy is of the highest standard.

Much of the management information currently produced around the University is at best delivered through stand alone business systems and at worst through self developed Excel spreadsheets, often created and maintained by a specific individual. Whilst the need to integrate business systems has been recognised, this has not been implemented fully across the institution. Not only can this approach result in inconsistencies and poor data quality, it is time consuming, often involving manual data entry and manipulation. Organisations now have considerably more information available to assess the state of their business and the demands for information, both internally and externally, have increased considerably in recent years. It is, therefore, essential that the appropriate technology is

implemented and resources made available to support these ever increasing demands. Without this level of investment, staff will continue to spend precious time in routine data entry tasks and very little time carrying out any analysis and interpretation of that data to aid future decision making. It is most likely that staff working with any form of management information within the University spend an average of 80% of their time on data collection and manipulation, leaving only 20% of their time to assess and analyse the information and to consider future development areas. This is clearly not a cost effective and efficient use of resources. There are an increasing number of areas where data integration is not working effectively across the institution and some recent examples include PGR Studentship Data and Council key performance indicators.

The University has taken an approach to purchase 'best of breed' for each of its business systems. This means that every business area has a specific system (standard or bespoke) identified to be the best available for that specific need (examples include Agresso Finance system, Jasper (Alta HR) for Human Resources, Banner for student information etc) and is continuing in this approach for current developments (e.g. Integrated Facilities Management Information System, Integrated Research Information System). Whilst there is an element of interfacing between these systems through the University's information portal, TULIP, there is not an integrated approach to data within these individual business systems.

In addition, there is also a need to develop more sophisticated planning tools to allow longer term forecasting and planning. This will inform, in particular, student number planning to enable appropriate recommendations to support the University's objectives regarding its business mix both now and in the future.

Some useful definitions are shown in Appendix 2.

3. Potential Options

There are a number of potential options for the University, which will take differing times to implement and which would have different financial implications. Each option may have a number of technological solutions which should be further explored to ensure any products meet the needs of the University. Appendix 3 shows the potential options diagrammatically.

3.1 Maintain Current Position (Option 1)

The University could retain its current position and not make any changes to the systems already in place.

Advantages

- No additional financial implications or investment required.
- There will be no change to current systems and processes, hence no need for staff training.

Disadvantages

- Management information processes will not move forward as business systems will continue to operate in isolation.
- Working practices will remain unchanged; hence systems will continue to operate independently.

- It will be difficult, if not impossible, to implement an effective performance management framework for the University's committees and other management structures.
- The University will fall behind its peers, many of whom are already making progress in this area.
- Effective use will not be made of resources and staff will continue to spend a significant proportion of their time collecting and manipulating data rather than in analysis and assessment.

3.2 Integration/Data Warehouse (Option 2)

The University could purchase off the shelf or bespoke technology to act as a data warehouse. This would mean maintaining current business systems with additional technology to overlay these systems and extract data into a central point. This process means the data warehouse would act as a central repository for all of the institution's historical data, making it easier for analysts to carry out detailed assessment and analysis of the data.

Advantages

- Data Warehouse technology would utilise existing business systems by extracting data to a central point. Dashboard, balanced scorecard or other reporting tools would allow a user friendly and consistent approach to presenting data against KPIs and other performance measures both at institutional and department levels, providing a shared and common understanding of data.
- Less expensive than full Enterprise Resource Planning (Option 3) technology hence recognises the investment already made by the University in 'best of breed' systems across different areas of business.
- Data will be easily extracted and reported to consistent standards.
- Ready availability and ease of manipulation of the data allows greater time to be spent on analysis and assessment. Data analysts and those providers of management information would be able to utilise techniques such as data mining to fully understand the data and its meaning.
- Standard reports can be developed easily (e.g. annual report on KPIs) to provide data sets quickly and automatically, allowing time to report conclusions and recommendations.
- Availability of data and relevant reports will facilitate improved project management and co-ordination.
- Implementation could be carried out in a staged approach to address corporate/KPIs at an institutional level initially and then down to department levels, allowing time for training/development of staff and relevant changes to business processes.
- This option would be relatively straightforward to implement, although the issues highlighted below, particularly around data quality and standards, would require considerable time/resource to address.

Disadvantages

- Current systems have different data definitions and hence produce inconsistent results. Considerable work would be required to ensure standard approach within each system initially, before implementation of any data warehouse/interface technology.

- Although current systems have been promoted as ‘best of breed’, this may not actually be the case. If initial systems are ineffective and have poor data quality or other issues this may impact on the effectiveness of the data warehouse.
- Security and confidentiality issues could be perceived by individual systems owners, hence a ‘culture’ change with regard to data sharing and exchange will be required.
- IT analysts will be required to support the development and implementation of the project. This is likely to be of the order of two IT/business analysts and one management information analyst, with overall project management facilitated through existing resources. The cost of the initial phases of this type of technology would be of the order of £150K.

Potential technology:

Cognos, SAS (Business Intelligence), Business Objects (Business Intelligence Platform and/or QPR), Account-Ability Ltd (Active Dashboard/Business Intelligence).

3.3 Enterprise Resource Planning (Option 3)

The University could replace its existing business systems fully with a complete new system that uses web based technology for all its applications and requirements. This would provide a full suite of complimentary products, applications and reporting tools across the whole business area. This approach has all of the benefits of a data warehouse as well as some additional benefits. However, this technology is costly and time consuming to implement and the benefits may not realistically provide value for money, given the level of investment already made in ‘best of breed’ business systems.

Advantages

- Holistic solution to data provision and data reporting, utilising dashboards or other reporting tools.
- High standard of data quality, easy to extract and retrieve management information to inform performance analysis and assessment.
- Consistent data definitions through a complimentary suite of products will result in reduced inconsistencies and data quality/accuracy issues.
- Data is stored and retrieved in real time, hence accurate data is readily available allowing greater time for analysis and assessment.

Disadvantages

- Most expensive option, involving software, hardware and staff costs. Maybe financially prohibitive.
- Not necessarily the best value for money option, particularly given the investment in individual business systems across different areas of the University.
- Technology would take considerable time (in excess of 12 months) to implement and be operationally effective.
- IT specialist analysts will be required to support the development and implementation of the system. Based on the experience of other institutions, this is likely to be of the order of two IT/business analysts per business area (i.e. Finance, Human Resources, Student, Facilities Management, Research), and one management information analyst, with overall project management facilitated through existing resources. Due to the nature of this technology and the extent of the change the demands for specialist staff and expertise would be significantly greater than the Integration/Data Warehouse (Option 2).

- Enterprise Resource Planning products are currently targeted largely at non-educational organisations and, therefore, the student and research elements are largely immature and would require further development.

Potential technology:

Oracle, SAP, Cognos.

4. Conclusions and Recommendations

In an environment where the need for information and data to support decision making is ever increasing, the University needs to move forward in relation to the ability to provide management information in a consistent and cost effective way. This will both allow greater time for analysis of the information and ensure the University remains in line with its peers, many of whom are making progress in this area.

Based on the research and consultation carried out to date, it is recommended that the University adopts a data warehouse approach (Option 2). This will provide a central repository for the University's data, improve consistency and accuracy of data, and hence facilitate greater analysis and use of wider analytical techniques such as data mining. In addition, this approach recognises the investment already made (both in IT and staff/other resources) in separate business systems. There has been considerable investment over a number of years (e.g. ca £2m for IRIS, £500K for IFMIS), which, in the current financial climate, should not be overlooked in any recommendations and decision making. The need for appropriate technology to effectively co-ordinate business systems and facilitate performance management has already been highlighted through the University's planning processes, most notably by Planning & Development and Computing Services Department.

The University must be prepared, however, to change its approach to data sharing and accessibility, as well as review such processes that require fundamental data to be collected and verified, accepting that certain protocols around security and confidentiality must be adopted. The work of the Integration of Policy Group and the developments around Organisational Structures will form a key aspect of this decision making process.

Subject to agreement of the above recommendations, the next stage is the completion of project feasibility and Project Initiation Documentation for agreement by the Senior Management Team.

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Appendix 1 Consultation

a. University of Liverpool

Department	System	Comments
Computing Services Department (CSD)	All	On-going and joint discussions about future options around data warehouse and reporting options/technology.
Facilities Management (FM)	IFMIS (Integrated Facilities Management Information System)	Supplier identified and implementation of the new system expected to commence in March 2008. Fully integrated system which should provide reliable and robust management information. Interfaces will exist with other systems e.g. Financial and HR..
Finance	Agresso	Up-grade to version 5.5 and roll out across the university will be complete by 2009.
Human Resources (HR)	Jasper (Alta HR)	System supplied by the University of Birmingham. Developing forecasting and workforce planning capability. Current issues around defining organisational structures.
Research and Business Services (RBS)	IRIS (Integrated Research Information System)	Product currently in development to co-ordinate all research related information/activity. Interfaces exist between IRIS and other systems (particularly Agresso for monitoring of award once approved). Stage 1 release of the system expected in July 08.
Student Administration and Support (SAS)	Banner	System utilised for student information. Business Objects used to write more complex queries and complete reports for management information.

b. Other Universities/HE Institutions

Institution	System	Comments
University of Birmingham	Business Objects/QPR	Planning functions and structures most similar to UoL. QPR and Business Objects products used. Head of Business Intelligence recently appointed. Visit scheduled for 20 th June 2008.
University of Edinburgh	None	MI produced from excel spreadsheets, data collected manually, no technology or data warehouse. Targets developed in line with corporate strategic plan. Performance monitored against strategic issues at corporate level. Department performance indicators not collected or measured centrally. Balanced scorecard approach – 32 indicators and 42 KPIs (strategic plan). Reported bi-annually/annually. Data definitions (and caveats) agreed. Strategic Plan and Balanced Scorecard tools well received by University staff.
University of Greenwich	Business Objects/Advizor	Business Objects used extensively for financial and student reporting/planning. Oracle based data warehouse with Business Objects to analyse the information/data. Also run an interactive dashboard, Advizor which is a cutting edge visual tool allowing users to analyse data in a highly intuitive and interactive way.
University of Leeds	SAP DW SAP BI	Strategic Plan contains vision for 2015 and number of 'targets' to achieve vision. Mantle Project with project board/plan etc to determine MI needs. Balanced scorecard approach – approx. 25 indicators, supported by other information (projects etc) all based around key themes within strategic plan. Manual at present with some automation.

		<p>Purchased SAP DW (data warehouse) and SAP BI (business intelligence) approx. 7 years ago but not utilised to date. Building MI dashboard at present.</p> <p>Key individual/'champion' in each faculty as the expert for planning and performance issues has assisted with development and roll out of institutional objectives to departments.</p> <p>Core strategic targets are set to achieve 'vision'. Rolled out to schools/faculties utilising 'champions'. Significant analysis carried out on performance versus targets and identification of the gap to be filled. Intake quotas defined not 'targets'.</p>
Liverpool John Moores University	Oracle	<p>Oracle based system for reporting KPIs through a dashboard. KPIs recently reviewed in line with new corporate plan. Dashboard particularly well developed around student number MI e.g. applications, registrations, progression. Visit scheduled for 5th June 2008.</p>
University of Nottingham	Cognos	<p>Recently purchased, unlikely to be implemented or in use in any meaningful way until June 2008.</p>
University of Warwick	Cognos	<p>Utilise the full range of Cognos products for planning (student number and research planning), forecasting and reporting/analysis, although project/development work is still underway with only student number planning well developed. Next stage of project to include Research data.</p> <p>Implementation treated as a formal project with Business Analysts/IT specialists based within the MI/planning team to ensure technology meets business requirements. Implementation very much carried out in-house rather than relying on Cognos consultants due to the need to retain knowledge and expertise and to reduce costs.</p> <p>'Performance Management' training for staff seen as key to optimise both new way of working and use of technology.</p>

c. Suppliers/Organisations

Supplier	System	Comments
Account-Ability Ltd	Corporate Planner; Active Dashboards	<p>Corporate Planner product currently used by the Finance Department for financial forecasting. Used widely across HE sector. Potential capability for further development to include student number planning, fee income modelling, research planning.</p> <p>Active Dashboard displays a number of key indicators taken directly from the individual live systems, hence no requirement for a data warehouse. Very inexpensive (e.g. £22K for 50 users), but unlikely to address data quality and integration. Business intelligence/data warehouse product also available at considerable costs.</p>
Brixx Solutions Ltd	Brixx Planner	<p>Bespoke product being developed for forecasting and modelling at a fixed price of £15K.</p> <p>No other customers within HE sector, UoL agreed to 'pilot' the development of a product.</p> <p>Focus around student number planning and research planning to develop an Income & Expenditure (I&E) type model.</p> <p>Training received and initial draft of the product provided (Feb 08), appears very user friendly and to be a valuable addition to student number planning. Final product (software/toolkit) expected in summer (June/July) 2008.</p>
CACI (Business Objects)	QPR Performance Management; Business Intelligence	<p>QPR Performance Management System/Scorecard utilises information from existing business systems in to a data warehouse to provide reporting tools against strategic/key performance indicators. Very effective drill down functionality. Can provide performance information at instructional level and at every level down to individuals. Produces information based on metrics/data as well as against milestones/achievements (e.g. against a project plan). Cost is based</p>

		<p>on a site licence.</p> <p>Xcelsius product is a dynamic and interactive dashboard which can be sent to users as an interactive PDF with only minimal licence costs for one-two 'developers' (e.g. £800/licence). Has a performance reporting dashboard and a modelling ('what if') capability.</p> <p>Advizor tool can be used to display complex information in a simplified form and to quickly identify relationships and correlations. GIS and mapping capability also available.</p> <p>Considerable experience within the HE sector and advantageous in that Business Objects XI already established/used by UoL. Agreed to investigate/analyse UoL data sets further.</p>
Cognos (IBM)	<p>Planning and Forecasting; Reporting and Analysis; Data Integration</p>	<p>Currently have 35 UK Universities as customers. Warwick and Nottingham use all three systems, Kent use planning only, Cambridge use reporting only etc.</p> <p>Planning and forecasting tool basic cost of £20-30K, but costs are very dependent on number and type of licences required.</p> <p>Planning tool unlikely to add anything over the Brixx option.</p> <p>Reporting and scorecard/dashboard system very attractive but may be expensive due to licensing arrangements.</p>
SAS	<p>Business Intelligence/Data Integration Product</p>	<p>Business Intelligence product which would utilise existing business systems (and even excel spreadsheets) to co-ordinate data in to a 'warehouse'. Data extraction and manipulation much faster and easier.</p> <p>No experience in UK HE sector, but considerable experience in the USA HE sector. Have worked with UCAS and HEFCE.</p> <p>Cost of less than £100K (based on number of students, rather than a cost per licence). Agreed to investigate/analyse UoL data sets further.</p>

Appendix 2 Useful Definitions¹

The **balanced scorecard** is a concept for measuring whether the activities of an organisation are meeting its objectives in terms of vision and strategy.

By focusing not only on financial outcomes but also on the human issues, the balanced scorecard helps to provide a more comprehensive view of a business which in turn helps organisations to act in their best long-term interests. The **strategic management** system helps managers focus on performance metrics while balancing financial objectives with customer, process and employee perspectives. Measures are often indicators of future performance.

The term **business intelligence** (BI) refers to technologies, applications, and practices for the collection, integration, analysis, and presentation of business information and also sometimes to the information itself. The purpose of business intelligence is to support better business decision making.

A **data mart** is a specialised version of a **data warehouse**. Like data warehouses, data marts contain a snapshot of operational **data** that helps business people to strategise based on analyses of past trends and experiences. The key difference is that the creation of a data mart is predicated on a specific, predefined need for a certain grouping and configuration of select **data**. A data mart configuration emphasises easy access to relevant information for a single defined purpose. For example snapshots of student data are taken for the provision of departmental FTEs.

A **data warehouse** is the main repository of an organisation's historical data, its **corporate memory**. It contains the raw material for management's **decision support system**. The critical factor leading to the use of a data warehouse is that a data analyst can perform complex queries and analysis, such as **data mining**, on the information without slowing down the **operational systems** and also get a consistent and documented view of the data whether at a summary or detailed level.

Enterprise Resource Planning (ERP) systems integrate several **data** sources and processes of an organisation into a unified system. A typical ERP system will use multiple components of computer software and hardware to achieve the **integration**. A key ingredient of most ERP systems is the use of a unified **database** to store data for the various system modules. The two key components of an ERP system are a common database and a modular software design. A common database is the system that allows every department to store and retrieve information in real-time and a modular software design is a variety of programs that can be added on an individual basis to improve the efficiency of the business.

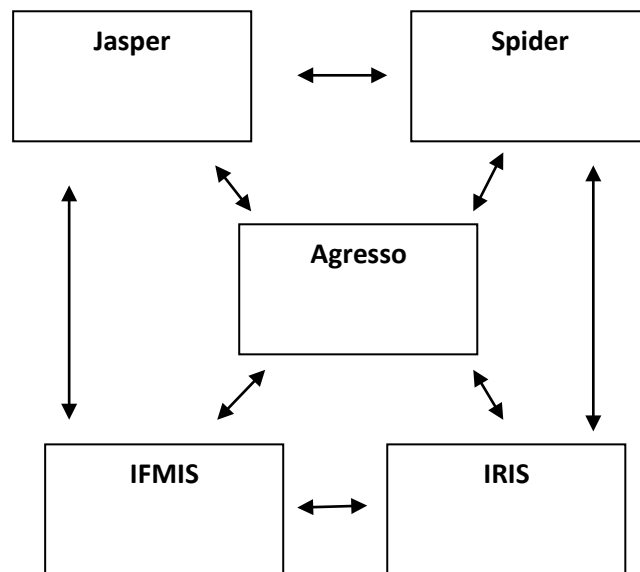
¹ Definitions from Wikipedia, April 2008, [Main Page - Wikipedia, the free encyclopedia](#)

Key Performance Indicators (KPIs) are financial and non-financial metrics used to quantify objectives to reflect strategic performance of an organisation. KPIs are used in Business Intelligence to assess the present state of the business and to prescribe a course of action.

Appendix 3 Potential Options

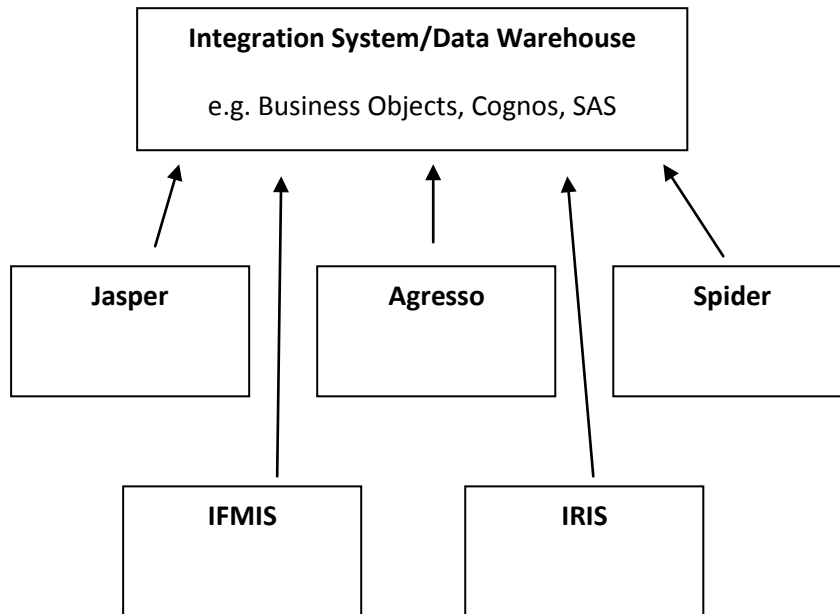
The following are designed to show each option in a diagrammatic form to identify how interfaces and/or integration of data would be achieved. Options 1 and 2 utilise existing business systems, whereas Option 3 involves an entirely new system with bespoke modules designed within it. The diagrams are all designed for illustrative purposes only and are not intended to represent final products or processes.

OPTION 1 Maintain Current Position²



² Illustrative diagram only – not necessarily representative of actual interfaces

OPTION 2 Integration/Data Warehouse



OPTION 3 Enterprise Resource Planning

