Chapter 1 Context: Overview of Museum Automation

Museum Information

It can be argued that the business of museums is information. Information is of paramount importance in fulfilling the basic functions of collecting, recording, preserving, managing, researching and communicating. Museums need to manage many types of information in the operation of facilities, fulfilling mandates, administering finances, getting members, soliciting funds, acquiring objects, or mounting exhibitions.

This view, shown schematically in Figure 1, is becoming more commonly accepted but it still is not universally accepted. The information handling requirements for museum activities such as accounting, financial, educational, staffing, and public programs are still often seen to be completely separate from collections management. Until recently, it was not common to systematically assess **all** the information needs and especially to find points of information integration.

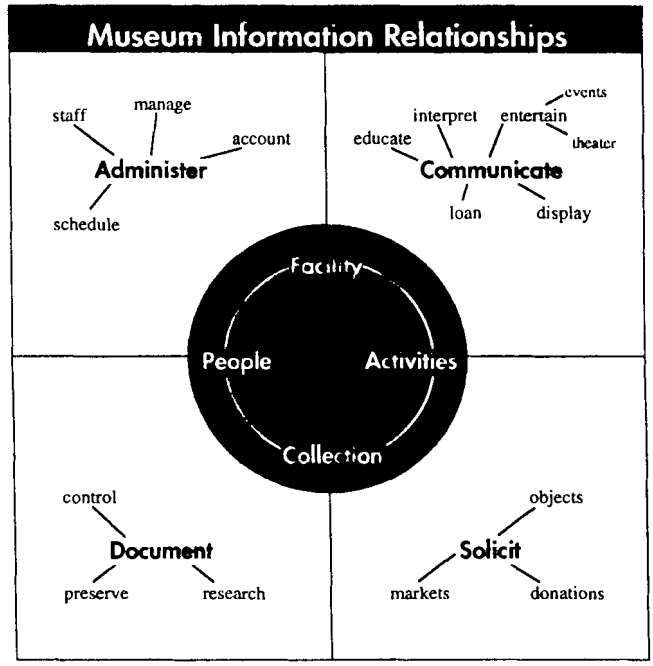

figure 1

Administrative and curatorial staff adopted the available tools-of-the-day to assist with recording, organizing and filing information. Over time, pen and pencil were replaced by typewriters; ledger books by filing cabinets. These tools reflected both the functional requirements of the section of institution employing them and the personal preferences of the individual users. It has been possible to create idiosyncratic, yet functional financial records management and collections documentation systems because of the isolation.

Recently, technological advances in computing systems and telecommunications—collectively referred to as information technology—have

created a new set of tools that can be applied to management of museum information. Automated systems based on computers and sophisticated, expensive software applications are displacing established manual methods, forcing changes to the way information is managed, used and the way information management systems are implemented. Better technology encourages information management needs to be viewed in an overall perspective in an attempt to integrate the material and improve information's accessibility.

Although people perform different tasks in a museum they often want access to the same information, especially people and collections related information. Figure 1 demonstrates a complex web of relationships which emerges when one tries to trace all the places where information about people, for example, might be used.

Why have museum information management systems, manual or automated, been so disconnected and isolated? The answer is rooted in history and practicality. Historically, functions were automated and the practice was to have separate accounting, library, membership and development, and documentation systems. This was dictated by the computers of the day and the costs involved. Systems were very expensive and focused on a single purpose. Museums' approaches were no different from other businesses that first automated existing practices, then later looked to see how the way things were done could be modified to take better advantage of the technology.

The dilemma facing museums now is how to accommodate the ideal in integrated information systems with the reality dictated by finances, logistics and planning. How can "small islands of automation" be phased in over time and still work coherently?

This is not an easy problem to solve but there is comfort in that everyone else in business, commerce, and academia is faced with the same basic problems. This means there will be advice and solutions available from other quarters that can be adopted by museums.

Chronology

In the 1960's commerce was converting record and financial management to large mainframe computer systems. Museums followed suit—not as quickly by any means—and due to the high cost, only large institutions and national organizations could experiment with automation. Not surprisingly, documentation and financial management were the first areas to be considered for automation.

In the 1970's management audits were forcing museums to become more accountable. Administrative staff requested curatorial departments provide more information pertaining to the collections especially inventory information where smaller quantities of information was needed about every object. This precipitated a name change from Documentation Systems to Collections Management Systems as their functions changed to incorporate more features pertaining to collection use and control. Hardware also changed and as mini computers became more affordable, more types of museums could acquire systems.

Groups of museums or museum departments bonded together to reduce costs and share experiences. Unfortunately there were few successes and the projects that proposed the use of a single system succumbed to the inevitable pressures encountered when trying to impose a single solution on a variety of problems.

Chronology of Events

	late 60's	70's	early 80's	late 80's
Organizations	Smithsonian IRGMA MCN	National Efforts large institutions NIP - Canada IG - France	mid sizes especially Art Museums	all sizes all types
Concepts	Generalized Systems	Closed Groups w/ Direct Connection Single Machine National Catalogs	Networks	workgroups
Systems	few and self developed Griphos Selgem	Customized Applications GOS, ISIS, DARIS, MISTRAL, MODES	Commercial Applications MINISIS BASIS ORACLE	Macintosh Revelation many DOS & UNIX-based applications
Functions	Cataloging, Documentation	Administrative Collections Inventory Control	Collections Management Membership & Development Financial	
Issues	Large Cost	Inflexibility Update and Retrieval	Standards	Functionality Integration

figure 2

In the 1980's there was an explosion of activity in museum automation. The introduction of the microcomputer brought computing capability to institutions of all sizes and resulted in the appearance of new vendors with museum systems to serve many functions. This was a very important development because now almost everyone's needs could be satisfied by purchasing a package rather than developing one from scratch.

By the 1990's automation projects appear in almost every aspect of museum activity from financial systems in administration to multimedia experiments in exhibition and public programming systems. The introduction of the microcomputer brought automation and processing power to many who had little previous experience. That access coupled with enticing mass advertising claims from commercial systems outside museums led to many automation projects.

Each of these stages had successes that advanced the causes of automation and many of the early efforts are still playing a leading role. The first museum computer network is still in existence as the MCN and national initiatives such as CHIN in Canada are thriving. While each had problems to overcome such as high costs and low budgets, software that was far from adequate to serve the complete need, and the need to keep up with changing technology, the benefits from pursuing automation accrued in the form of experience gained and increasing amounts of information in electronic form.

This chronology summarises in a very brief form a great deal of activity. The bibliography provides much more detail on each of the trends and concepts.

Most of this information is of peripheral interest in a short course but some explanatory notes are provided.

Organizations

IRGMA - The Information Retrieval group of the Museums Association was the predecessor of the Museum Documentation Association in the UK that led to the creation of the GOS and MODES systems.

MCN - The Museum Computer Network originated life as an early consortium of New York area institutions including the Met and the Museum of Modern Art that agreed to use the GRIPOS system provided by the New York University Institute for Computer Research in the Humanities.

NIP - The National Inventory Program of the National Museums of Canada. Led to the formation of the Canadian Heritage Information Network (CHIN).

IG - Inventoire Generale of the National Museums of France.

Systems

GRIPOS, SELGEM, GOS, SIBIS, MINISIS, BASIS, ORACLE are database management system environments out of which many of the applications of the day were constructed. DOS and UNIX are operating systems.

The Dream and the Reality

The optimism felt in the late 1960's about computerization has yet to be realized completely and it is probably safe to say that automation in museums has fallen far short of expectations. The literature is full of tales of failed projects and anecdotes abound, variations on the theme: "if you really want to mess things up get a computer."

Blame can be attached to both the consumers and developers but really it does not matter. The same phenomenon of failed expectations occurred wherever automation was attempted—whether it was profit or non-profit projects. There are lessons to be learned for both museums and system vendors. The reasons for failure are complex and analysis of the problems have been recently articulated and discussed at length. To summarize the reasons for failure three points have consistently emerged:

- Mismatched expectations
- Inadequate planning
- Underestimation of museological requirements.

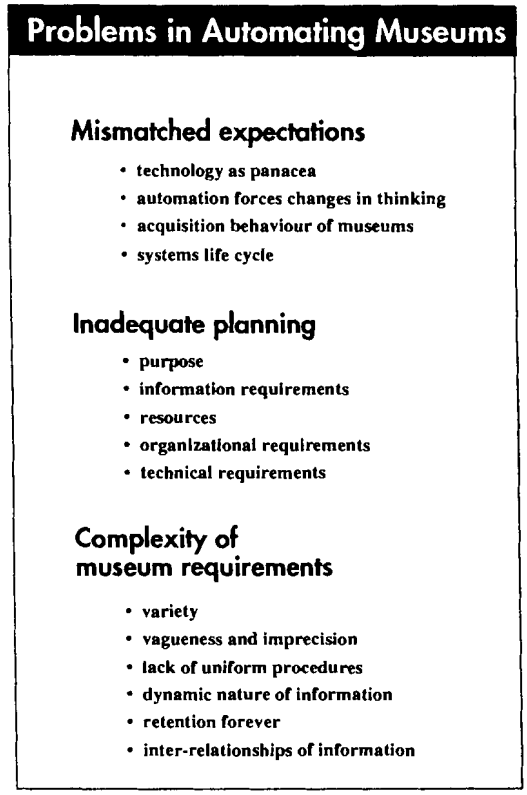

figure 3

One expects to learn from mistakes. Part of the reason museum automation projects have been considered failures is the unreasonable expectation of "getting it right the first time for all time". No one else accomplished this feat, so why should museums accomplish the impossible? All projects must recognize that without resolving the problems of lack of information, inadequate planning and the underestimation of requirements, long term success will continue to be elusive.

Mismatched Expectations

Mismatched expectations is a euphemism for the ignorance and insensitivity to each other's needs that both consumers and producers of information systems continue to show. Until recently most museums had no idea about the potential for automation. Those that did often had a very unclear sense of their needs and chose to let systems vendors do the analysis of need resulting in being sold a system rather than a solution.

Vendors have exhibited a serious misunderstanding of the way museums purchase technology and both participants often overestimate the ability of computer technology to satisfy needs.

One often misunderstood phenomenon is the length of time it takes museum staff to make up their minds. The time between initiation and implementation (the buy-cycle) is characteristically 18–24 months for museums. In healthcare systems six months is typical and thought to be excessive by systems vendors; commercial systems are typically shorter. This can be accounted for by conservatism, hesitation through inexperience, and the nature of funding cycles. The slowness of the museum acquisition process has had a serious effect on vendors and museum staff who expected a quick and painless implementation.

The reasons for the slow-paced adoption of automation by museums is the subject of much discussion. Doty (see Ref. 4) gives a good overview of the issues along with an extensive bibliography. It is probably only of peripheral interest in a short course but warrants greater investigation in courses that can spend more time examining the antecedents of the status quo. Although there are signs of change, museum staff are typically unschooled in the systems development lifecycle. Because of this, museum systems vendors have tried to explain the process by publishing instructions. People who design computer systems all the time expect that the "usual" systems development lifecycle process is followed, if not explicitly, then implicitly. If this assumption is wrong then serious breakdown in communications is possible.

Inadequate Planning

Inadequate planning, preparation and budget are the biggest causes of failed systems. It is essential to know the purpose of proposed systems, who creates and consumes the information, what is going to be needed to make it work, how much it will cost to get there and who has to be involved.

These areas are characteristically under-addressed in museum automation projects.

Complexity of Museum Needs

Museums have been notorious for operating independently and in isolation. The experience of others is not always heeded in part because of the belief that museum problems are unique and complex. To a certain extent this is true: there are some important differences between museums and other business that have lead to real problems if "normal business solutions" are implemented without thought.

Diversity, vagueness and imprecision in terminology use by museum staff and a lack of uniform descriptive standards are thoroughly troublesome to the systems development process.

It is almost impossible to build a generalized application that works for all types of museum objects, from natural history specimen type collections to art objects, and also accommodates all varieties of procedure. So too, the need imprecision such as for qualified date range (e.g. post-Revolution to circa 19th century) cause havoc in systems designed for the contemporary mm/dd/yy date format.

Museum object data is also dynamic and cumulative: not only is it likely to change over time, it is essential to track it and have it available. It is one matter to implement an accounting application where the functions and data are well known and understood, and a record doesn't change after entry. But designing a collections management application that has to accommodate different opinions at different times is no easy task. Imagine telling an accounting application designer that an entry might belong to one General Ledger line or perhaps another or perhaps even both at once and you might want to change your mind tomorrow about the amount. And, by the way, we want every year always available forever.

This guide does not explore all these issues or other issues such as whole/part relationships, geographical places in detail, but they are reviewed again briefly in Chapter 4, in the discussion of specifications.

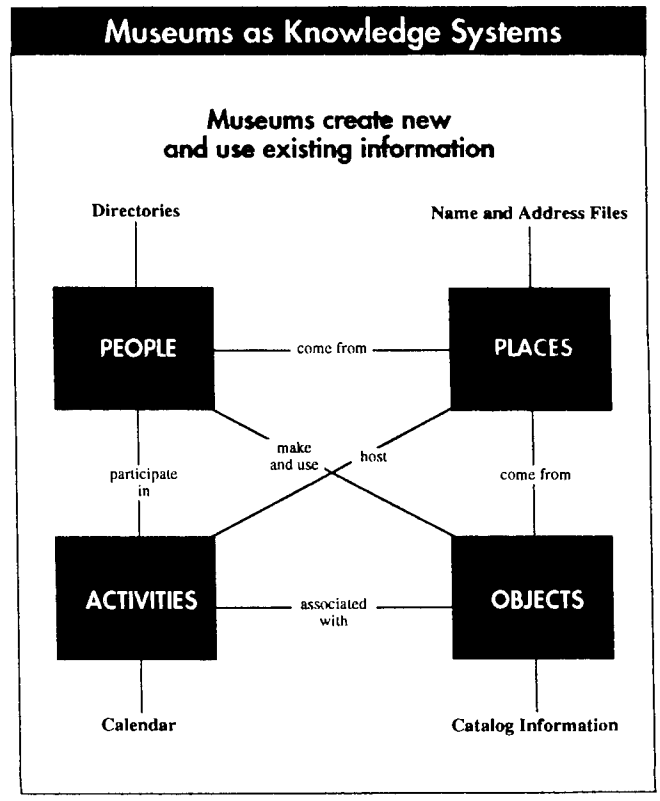

figure 4

Current Trends

This approach here is to have you think of museums as information systems that create new information and use existing information in an interrelated way to fulfill mandates and control administrative processes. As in any system, the parts may function semi-autonomously but there are interdependencies that have an impact on their operation in the whole. Figure 4 shows one conceptual view of this. Figure 1 also illustrates a museum information system. Taken together the illustrations show how everything could be viewed conceptually as systems within systems.

This means that museum automation has to be part of the museum's overall plan and must be integrated into the institutional planning efforts. It can not be done effectively by a single person operating outside normal procedures.

Solutions

There are a number of different ways to deal with the complex requirements and conflicting needs of museum information systems. It is possible to integrate all information management for efficiency and enhanced service, and still retain the ability to automate small functional groups in phases for practical reasons. In reality this means that automated information systems need to provide a primary and a focused service (such as collections management, accounting or publishing). The systems have to be established in such a way that secondary or future demands for information from exhibit designers, the registrars office, administrative departments, curatorial staff, the development department, and the public can also be met. It is important to investigate whether the same information is needed in different places.

One very effective approach is to manage information resources like money, facilities or any other asset. A useful parallel is to consider the planning and organization required to spend $100,000 on buying an object for the collection. Business and commerce calls this type of organization by some variation of the name "Information Resource Management". The name itself is not so important as the practice of preparation, planning, implementation, and review in a cyclical fashion.

Information Resource Management

Recognizing the relevance of information resource management to activities and information that spans many departments, a number of museums have introduced planning on an institution-wide basis.

There are a number of different approaches, each with their own methodology, lexicon and rubric. There are dozens. Three used in prominent 1990's projects are Structured Systems Analysis and Design approach (SSAD) currently popular in UK museums, the Business Systems Plan (BSP) approach used by the Virginia Museum of Fine Arts, and other proprietary methods such as Technology Information Products (TIP) used by the Smithsonian Institution.

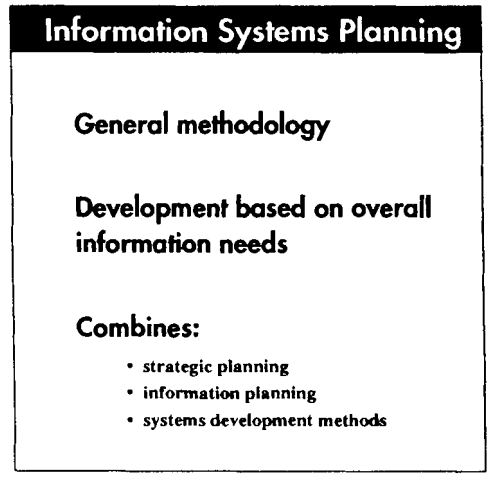

figure 5

Information Systems planning is the name of a generalized methodology for development and implementation of applications that predicates any application development on a thorough understanding of the overall information needs of the organization. It is expressed many different ways that are variations on the theme of combining information planning with corporate strategic plans and standard systems development methods to efficiently produce applications that will effectively serve the organization.

The purpose of any planning methodology is to articulate textually and graphically, the museum information relationships shown earlier in Figure 1. By clarifying what it is that museums do, and identifying the information required, an overall context is created within which specific software applications can be developed. This planning process is usually done to different degrees depending on the institution's budget and size. The process results in documents such as: Informatics Master Plan, Information Systems Framework, Information Technology Policy, depending on which methodology was chosen.

Typically these planning studies look at both activities and data. There are also a variety of methods for examining elements of information and the relationships between them. Methodologies based on structured analysis look at data with one set of tools, data dictionary and data flow diagrams. More recently the technique of Data Modeling has been applied in the context of developing relational databases.

These concepts can be confusing because of the different names used by the different methodologies. Figure 6 shows the association between technical terms and the general concepts.

These approaches provide representations of information and illustrate relationships. These are tools used in information planning to help define how applications can best be built to serve the needs.

Information Systems Planning

Technical name	Common concept
Business model	what is it that we do?
Functional model (functional requirements)	of all we do, what will the system address?
Information model (current practice, information flow)	what are the tasks involved in what we do and how are they connected?
Data model	what data is needed to support what we do?
Acquisition method	how will we buy or build the system we need?
Implementation requirements	how do we go about installing it and making it work?
Resource requirements	what is it going to cost and what else will be required?

figure 6

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Notes 1.One positive side effect is that the vendors serving museums are doing it because they want to, not because they have any hope of exploiting an easy and lucrative market.