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# Market Information Systems for the Profession and Science of Arts Management

LEE G. COOPER and DANIEL JACOBS

**T**he objective task facing the manager of a not-for-profit art organization is to steer the organization along a path which is broadly dictated by an artistic mission, and in the process secure the resources required to sustain the organization. Resources come from competitive markets for attendance at arts events, patronage of art supporters (individuals, corporations, foundations, and government at all levels), and from auxiliary business activities which range from parking concessions and gift shops to publications programs. What guidelines does the arts manager have for managing an art organization's activities in such diverse, yet interdependent marketplaces? We contend that no useful guidance has yet come from the economic analyses of the arts. We believe that if the science of arts management is to be relevant to the enormously difficult challenges facing the profession of arts management, then we must look to the information available in the marketplaces to find a basis for our science. We proceed by first reviewing the assumptions underlying economic analyses of art organizations, and then we describe some of the principles and specifics of evolving market information systems for art organizations.

## *Assumptions Underlying Economic Analyses*

There are fundamental inadequacies in at least three assumptions underlying standard economic analyses of the arts. First, it is a misrepresentation to equate social or public welfare with the "consumer surplus" when

discussing the arts. Second, it is unnecessary, unrealistic, and unwise to impose a "zero net deficit" constraint on not-for-profit art organizations. And third, the function used for the relation of the output of artistic goods and services to the budget or total costs of an art organization misconstrues the nature of not-for-profit arts. Each of these inadequacies reflects a material divergence of the theoretician's assumptions from the empirical realities of the cultural marketplace. Each will be discussed in turn.

### *Social Welfare and the Consumer Surplus*

Figure 1 displays a standard downward sloping demand curve. If we simplify our task by considering a not-for-profit art organization which offers a single product or service at a single price,  $p^*$ , the shaded area above the line at  $p^*$  and below the demand curve is called the consumer surplus. Standard economic analyses of not-for-profit organizations in general<sup>1</sup> and of not-for-profit performing arts organizations in particular,<sup>2</sup> use the maximization of this consumer surplus as an objective. They then speculate about how art organizations ought to behave, given this objective.

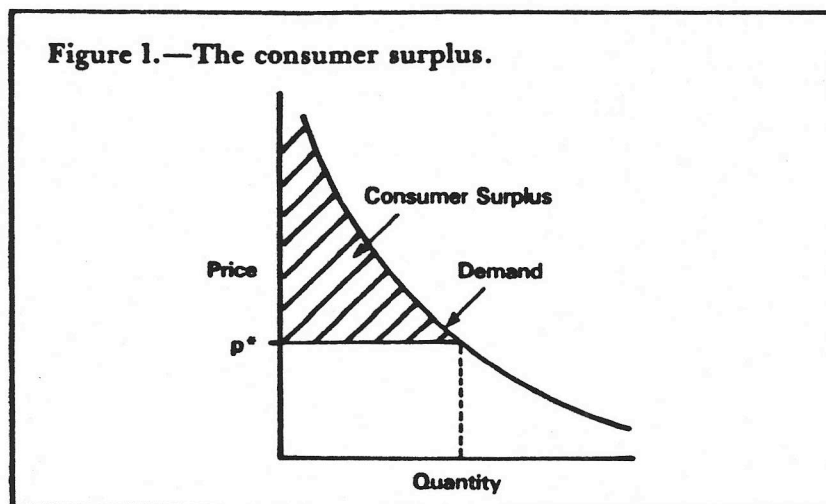
The equating of consumer surplus with social welfare ignores the harsh reality that if the arts do not survive in our time, then much will be irretrievably lost for future generations. It ignores the value of the prestige, the attraction of business and tourism, and the innovative character of the arts.<sup>3</sup> Surely we benefit differentially from the arts. But the arts arrogantly bestow their benefits on all, even those who do not demand them.

We believe that arts managers should attempt to retrieve as much as possible of the consumer surplus for use as much-needed revenue for the organization. Perloff, Bullock, Cooper, Eisner, and Faine present a way of setting marketing goals for an arts organization which retrieves as much as possible of the consumer surplus.<sup>4</sup> Application of this model, which is consistent with the market segmentation approach to price discrimination, does not work against public welfare.<sup>5</sup> Rather it makes art organizations more viable so that they may continue to serve present and future publics while extracting from as many consumers as possible what the consumers themselves determine to be a "fair price."

To assume that the consumer surplus is the proper objective to maximize leads the standard economic analysis to conclusions of unknown validity for not-for-profit art organizations.

### *The "Zero-Net-Deficit" Constraint*

The traditional economic analyses impose the "zero-net-deficit" constraint as if it applied to each budget period. This is unrealistic. In the face of

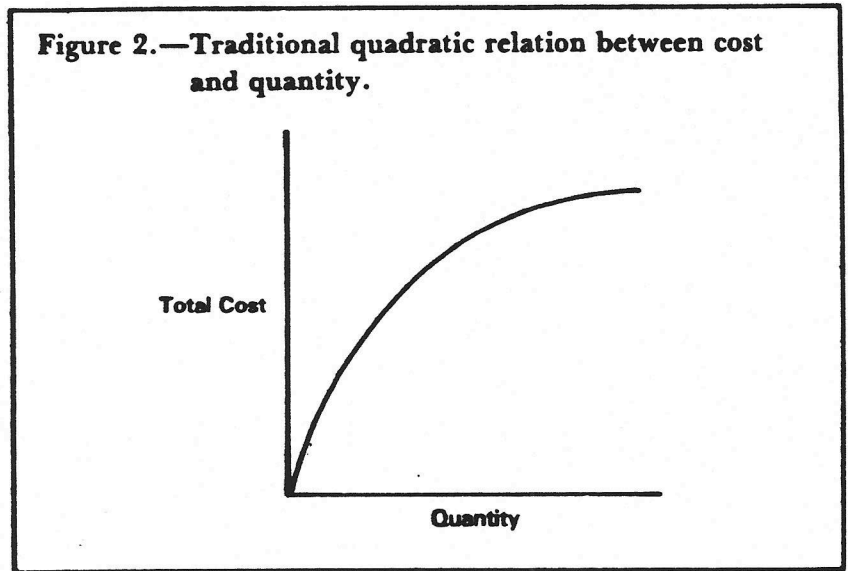


deficits, even not-for-profit art organizations have some access to capital markets. There is no absolute short-term constraint on deficits. On the other hand, an art organization facing a net surplus of revenues is in an enviable position. Perloff, Bullock, Cooper, Eisner, and Faine<sup>6</sup> provide a rationale for surpluses in the not-for-profit arts, as does Young.<sup>7</sup>

As one of the two necessary characteristics of not-for-profit "bureaus" Niskanen asserts, "The owners and employees of these organizations do not appropriate any part of the difference between revenues and costs as personal income."<sup>8</sup> We are not advocating that employees should "own" the net cash flows. But the realities are that the state in which an art organization is incorporated decides if the organization's mission is worthy of not-for-profit status. The federal government then decides if the program of the art organization is such that contributions to the organization should qualify as tax deductions. Given the fact that an organization has been certified as worthy of these special considerations, it seems wise to design livable systems in which employees of art organizations receive better treatment as the financial condition of the art organization improves. Even Niskanen advocates a partially analogous incentive system for bureaucrats.<sup>9</sup> While art organizations have more nonfinancial mechanisms for influencing organizational behavior<sup>10</sup> than do most public bureaucracies, incentive systems which promote the future health of the art organization are sound design elements.

In deriving implications for the behavior of art organizations both Niskanen<sup>11</sup> and Hansmann<sup>12</sup> impose the algebraic constraint that there be no surplus of revenues over costs. The conclusions derived after imposition of this constraint are of unknown value to the arts.

**Figure 2.—Traditional quadratic relation between cost and quantity.**

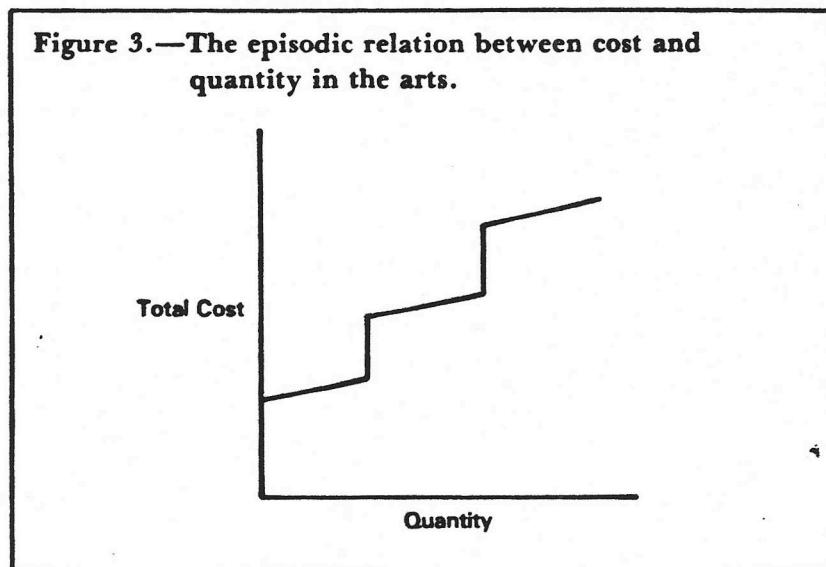


*The Functional Relation of Output and Costs*

Niskanen proposed a simple quadratic relation between costs and outputs such as that presented in Figure 2.<sup>13</sup> Hansmann makes one step toward greater realism by noting that art organizations face high fixed costs relative to variable costs.<sup>14</sup> If this were the only needed elaboration of Niskanen's representation, his conclusions would change very little. Production in the arts, however, is episodic rather than continuous. A theatre company may produce six plays in a season, each play having high fixed cost relative to variable costs. A museum may have three major exhibits in a year. The episodic nature of production systems in the arts makes it impossible to do the kind of optimality analysis Niskanen offers. (The production function has a finite number of discontinuities. As a consequence one cannot compute the first and second derivatives on which the optimization is based.) Thus Figure 3 is more representative of the relation of output and costs.

*What Should We Believe?*

When the assumptions underlying economic analysis are found wanting, it is very difficult to know which conclusions are warranted. For example, Hansmann looked at donations to a not-for-profit performing arts organization as a form of voluntary price discrimination.<sup>15</sup> In this model, each donor con-



tributes the amount which corresponds to his or her consumer surplus. His analysis led him to advocate a reduction in ticket prices as a way of increasing the sum of ticket revenue and voluntary donations. Cheung came to the same conclusion regarding an economic analysis of top ticket prices.<sup>16</sup> His contention was that lowering top ticket prices would protect against unauthorized migration from less desirable seats. On the other hand, Cooper analyzed top ticket prices for the performing arts concerts at the University of California, Los Angeles (UCLA) and found the highest demand for the highest-priced concerts.<sup>17</sup> In this case statistical analysis was simply revealing a policy of raising ticket prices for what management rightly considered to be the most popular concert programs. Traditional normative economics would dictate that prices should be raised still more (until the regression weight for price in the price-demand equation dropped from positive to zero). While this would lead to short-term profit maximization in a for-profit firm, it may not lead to revenue maximization in a not-for-profit firm. One must first consider the interdependencies between top ticket price and the patronage support of individuals, corporations, foundations, and government at all levels.

There is systematic structure to the distribution of resources in the environment. The successful accomplishment of the difficult tasks facing a manager depends on an understanding of the distribution of resources and the pattern of interdependencies among resources. Economics gives the arts manager very little unequivocal guidance. But the information regarding market response to the many activities of an art organization can be obtained.

If the science of arts management is to progress beyond speculation, arts management academics should look to that information as the empirical basis of our science.

### **Market Information Systems**

While attendance, patronage, and auxiliary business activities constitute the three competitive markets a comprehensive information system should encompass, we believe that art organizations should begin with the ticket buyer. There are several arguments to be made for the use of consumer buying activity as the beginning point of a market information systems. Most obvious is the importance of "earned" revenues in the not-for-profit sector of the arts. In the performing arts in particular, the urgent problems in marketing and audience development reduce to seeking an understanding of how the variables under the organization's control (repertoire, price structure, promotional activity, and venues) combine to attract consumers. In addition, competition among presenters and with other providers of entertainment seems to be continually stronger. Focus on the consumer can help the arts manager understand the nature of the competition which confronts the arts. Success in this first consumer market is extremely important; for in a hierarchy of effects, it is mostly individual consumers who become individual patrons; and it is aggregate consumptions which often convinces corporate patrons or foundations of the public service value of an art organization's offerings.

### *History of the DFAP Project*

We illustrate the evolution of a market information system by describing the implementation of such a system for the UCLA Department of Fine Arts Productions (DFAP). (DFAP is a large not-for-profit performing arts presenter.) During the course of this project, both software development and organizational change efforts have come to play important roles. As academics with interest and experience in the arts, we have been able to take advantage of the university setting of DFAP in obtaining resources for support of this activity.

The current project involves computer applications of accounting functions for the recording of ticket sales and other income data at the DFAP. Computing funds come through the UCLA Office of Academic Computing (OAC) under the auspices of a research project undertaken by Dr. Cooper. A remote terminal, installed at the offices of DFAP, provide access to an IBM 3033 mainframe operated by OAC. The programs have evolved into their present form immediately prior to and during the on-site arts management internship undertaken by Mr. Jacobs.

Consideration of the value of computer-based information systems for the DFAP began as early as 1978, when several studies were presented, each of

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which linked DFAP to data-processing applications after its own fashion.<sup>18</sup> At the time, packaged software programs designed specifically for the performing arts were rare or nonexistent, and the possibility that computing services would soon be available to presenters such as DFAP was a new and exciting thought. Cooper reported a system for forecasting concert revenues and attendance from the information which was available to DFAP at the time of each concert booking.<sup>19</sup> Hanssens undertook a regression analysis of how sales at DFAP responded to expenditures for several types of advertising.<sup>20</sup> Cooper and Neve proposed an automated financial reporting system for DFAP, based on current accounting practices and fully linked to university ledgers, budgets, etc. Point-of-sale entry of ticket sales or other revenue was not an explicit concern at that time, nor were other "integrated" functions, such as ticket printing or subscriber account services. The proposal called for coding and other services to be undertaken by Accounting and Information Services (AIS), the University's administrative data processing authority. Codes had been drawn up for the preparation of sample reports, but resources were not forthcoming to support further development. After a hiatus, a new approach to the project was adopted, incorporating more integrated functions, greater independence from the University's accounting system, and a higher degree of market-orientation.

The current project's history of change is clearly marked by its origin within a research-oriented academic framework, and shows a gradual accommodation to the more mundane needs of accounting and control. This is the contrary path to that taken by most software developers who have entered the field of performing arts information systems; these tend to work from a more clerical stance, gradually adding analytic or managerial applications as demand for these functions becomes apparent. Although our system has now certainly been surpassed, in terms of operating sophistication, by performing arts software packages under commercial development or currently available (e.g., AIMS or BOCS), we believe that the direction of our progress has given us important insights which could be used in the continuing development and evaluation of software for the performing arts.

The core of the data base, as it was originally envisioned, consisted of a chronological transaction summary file. Each record within the file was to represent all the ticket purchases for a given day, performance, and ticket price. Thus, if 33 tickets were sold on February 11, 1980, for a performance of the Bella Lewitsky Dance Company, at \$12.00 each, this is exactly the information that would be reflected in one record for the section of the file created on February 11, along with a breakdown of the method of payment, the coded marketing information collected at the point of sale, and the coded concert venue. Tickets sold for the same event on the same day, but at another price, would account for another record in the file. This model for a data base was inspired by a desire to provide material for time-series analysis and other possible



statistical procedures. In conjunction with data on suitable independent variables (e.g., advertising expenditures), it could be determined if marketing dollars were being spent effectively or analysis of series ticket choices such as in Cooper and Nakanishi could be accomplished with this basic file.<sup>21</sup> At the time, this type of summarization was seen as a realistic compromise on the issues of storage capabilities and expense.

With the passage of time, several factors began to indicate a change in file format. As consultations with staff at DFAP progressed, it became clear that the proposed file format, while adequate for many managerial and analytical reporting purposes, did not provide adequate transaction detail for error detection or for a proper audit trail. Additionally, rapid decreases in the cost and difficulty of on-line information storage began to make a comprehensive basic file seem a realistic possibility. Furthermore, there were brought to light many advances in information technology that showed promise for greater integration among computer-assisted functions (e.g., box-office, subscriber service, and targeted direct-mail applications).

These changing conditions have had several effects on the system as implemented. The basic file now represents a more complete transaction-by-transaction chronological record. The approach to fully integrated data-processing applications has caused us to shift our attention from programming to assisting the organization in locating commercially prepared software with the suitable characteristics. It is thought that the rapid advances in software development in the private sector have made our role as programmers obsolete. The system as implemented will consequently remain as an interim solution to the problem of income-side accounting only.

The process of developing software was an education for both the researchers and the prospective users. The extent to which the planning process grew to demand an organizational change effort should not be understated. One of the problems faced in this particular case, but one that is far from unique in the world of arts management, was poor job definition and communication. One of the first concerns was to track the regular reporting channels in order to focus attention on the sources and uses of information. We discovered that, to a very surprising extent, employees did not know exactly how the reports they relied upon were generated, nor did they always appreciate to what end they themselves were asked to prepare reports. Consequently, many regular reports were not being correctly interpreted by their users. In certain cases, frequent reports requiring considerable preparation were never used. The automation of the information system had originally been planned to save time, or as a way to improve the accuracy and timeliness of reported information; it now also became a tool for improving internal communication on matters of reporting responsibilities and on the sources and uses of information.

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Effort devoted to learning the original information paths within the organization was well spent. It has emerged that through a proper understanding of the particular needs in this case, we have been able to reduce the number of contemplated computer-generated reports needed on a periodic basis for management control and decision making. At the current level of implementation, the principal reports are: (1) the daily revenue report; (2) the daily ticket report; and (3) the final event accounting report. The revenue report, which is the principal resource on all income received, can also be produced for any period (not merely for a single day). The ticket report is a cumulative and current detailing of ticket sales, including accurate representation of series seats sold for all performances. The final event accounting details all revenue transactions pertaining to a particular event. Over a period of time and a series of events, analyses of the final event accounting figures can reveal how revenues respond to organizational actions and artistic offerings.

Actual data entry is undertaken by the DFAP income accountant, who works from cash register tapes and other source documents. There is as yet no automated point-of-sale data entry. However, significant time-savings have already resulted for this accountant through the automation of this double-entry procedure. Her manual procedure formerly required repeated processing of the source documents in order to obtain all the needed tallies for several regular reports. This has now been reduced to a single data-entry session, and the daily reports for which she is responsible (described above) are now generated in a matter of moments following the completion of data entry.

### *Organizational Effects and Prospects*

We have observed certain positive organizational effects that have resulted both directly, as a result of purposeful intervention, and indirectly, as a result of system operation. Probably the most significant improvement has occurred in the area of cross-functional communication. We took particular pains to involve both ends of every information transfer in planning for automating the function in question. As a result, many minor misunderstandings that had impeded the flow of useful information were resolved as a matter of course. For example, any process of automating leads one to ask anew the simple questions such as what a heading in a report means. Far too often we discovered that labels meant different things to different people. Are tickets listed in the "Held" column paid for or not? The central ticket office might have a different understanding than the marketing department. Matters of plain fact need only to be communicated to all that use such reports. Additionally, we located people within the organization who could benefit directly from, or could significantly add to, the quality of several information streams. The most noteworthy in this regard was the box-office manager, whose par-

ticipation in planning for automation has had considerable positive impact on the quality of communication, and consequently on the value of managerial decisions within the organization. Indeed, the re-integration of ticketing and other box-office functions into the management philosophy of DFAP is very likely the most important organizational change to which this project has contributed. This is, of course, a key element in the evolution of a market-oriented philosophy of data handling in the performing arts.

Another important accomplishment of the project has been obtaining the hard-won support of staff for the collection and processing of market information (including the responses of consumers to inquiries concerning their purchase motivation). Only by automating this data-collection process will timely tabulation and presentation of results be made possible. Overall acceptance of computers within the organization seems to be closely tied to the perceived value of this function. Part of that "value" is in new research possibilities. With point-of-sale coding of where each customer heard of the concert, we are able for the first time to compare traditional aggregate analysis of media effectiveness with the individual-based record of what sources led to each sale.

Perhaps the most difficult remaining area to require a major organizational change is personnel allocation policy. As yet, the personnel implications of a full-scale, integrated automated information system for DFAP are poorly understood within the Department. Especially in light of the high emphasis to be placed on point-of-sale data collection, there is bound to be a shift away from clerical staffing requirements toward customer service. This is likely to be a positive change in terms of the value of DFAP services to the public, and is therefore to be welcomed. There will however be considerable difficulties encountered during this shift, especially as the University's personnel practices do not favor transfer of employees to new areas within the same department.

Indeed, it is the university environment which now poses the most severe threats to the viability of this project. University administration is justifiably concerned about the proliferation of computer applications on campus, and must be sensitive to duplication of effort and waste of computer resources. It is now incumbent upon DFAP to make the case for its special needs as a performing arts organization, and for the value of highly integrated data processing in meeting the challenges faced by its managers. As part of the effort to formulate and obtain approval for an "integrated" information system for DFAP the following description of inputs, outputs, and capabilities for the system was developed.

#### *Inputs to, Outputs from, and Capabilities of the DFAP System*

Sales or income transactions will directly cause inputs to two important files. The transaction file includes all information relevant to each transaction

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for accounting purposes. In addition, reference flags would indicate connection to secondary files, which could be updated simultaneously or periodically in batch mode. The most important of these will be the account file. Account file entries carry name, address, etc.; subscriber, membership, or other special status indicators; or other information relative to customer service or highly targeted marketing efforts. Transaction-driven entries to the account file would be initiated or updated for series subscribers, mail and credit customers only. The transaction file itself would carry full detail of each transaction, including identifiers for series or performance purchased; register and salesperson; discounts applied to the sale; seat location and type (obtained through reference to the seating inventory); method of payment; and marketing information (as currently collected at point-of-sale). In addition, the status of seats held or unheld by the box-office manager could be recorded.

A more conventional handling of this data regarding expenses generated through operations will suffice. Entries will be prompted by purchase orders, invoices, and other typical source documents. Characteristic features of such programs are: ledger entries as per purchase orders, invoices, etc.; automatic or manual allocation to cost centers as appropriate; pencil entry of expense estimates (if required for budget control).

In order to accomplish correctly the automated functions described here, the system will require certain nontransaction inputs from time to time. Some of these would be required under any system configuration, such as updates of performance schedules descriptions, creation of seating inventories, establishment of seating price schedules, schedule of discount rates and commissions, schedule of revenue allocations from series sales, modifications or additions to account file (see above). Other inputs could be required if certain expense and budget functions are supported. These would include modification to the schedule of expense allocations and the vendor file, and projections and spreadsheet figures.

The following records are affected automatically by user input in the areas described above: seating inventories (modified by sales or hold transactions, or by direct action of authorized manager); sales record (sortable by chronology, performance, discounts, or other criteria; kept in raw form or summarized for historical reference); account file (as above); libraries and schedules of performance and series information (as above).

There will be two classes of system outputs. Operating output will include all mandatory or required products of system operation, such as tickets (printed at point-of-sale), daily cash details (by salesperson) for cash reconciliations, and daily revenue reports (for reconciliation with deposits). Other mandatory outputs include final income accounting statements for each event, periodic expense details, and daily credit sales details for banking of deposits. In addition, account file information screens must be available on demand dur-

ing sales transactions in order to take advantage of automation in meeting customer service requirements. The other major class of system output will support managerial decision making and control. These outputs would be available at the discretion of management, and would include ticket reports (with full detail of series sales, comps, and holds); analytical marketing reports, utilizing point-of-sale marketing information and expense data; income statements (summary or detailed); and sales projections statistically based on historical files. Again depending on the level of functions supported by the system, interactive spread-sheet sessions could also be available.

### **A Science of Arts Management**

We have seen that attempts to harness the information available in the transactions of art organizations can help clarify the management structure and channels of communication. We have seen that art organizations can provide the data needed for interesting and useful management science applications centering on the analysis of marketing effectiveness. While the case of DFAP dealt mostly with market information systems for concert attenders, the next steps of expansion to patrons and possibly auxiliary business activities appear simpler once the first step has been taken. To understand the implications of all this for a science of arts management we only need a little more insight into the nature of science.

Science is characterized as the systematic accumulation of knowledge. Knowledge is produced through the interplay of thought and evidence. The problem with the standard economic analyses of the not-for-profit arts is that there has been a lot of thought, but very little evidence.

Market information systems provide for the systematic accumulation of evidence. If we supply the thoughtful analysis and synthesis of this evidence we can build a science of arts management.

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