Libraries since their inception 4000 years ago have been in a process of constant change. Although, changes were in slow motion for centuries, in the last decades, academic libraries have been continuously striving to adapt their services to the ever-changing user needs of students and academic staff. In addition, e-content revolution, technological advances, and ever-shrinking budgets have obliged libraries to efficiently allocate their limited resources among collection and services. Unfortunately, this resource allocation is a complex process due to the diversity of data sources and formats required to be analyzed prior to decision-making, as well as the lack of efficient integration methods. The main purpose of this study is to develop an integrated model that supports libraries in making optimal budgeting and resource allocation decisions among their services and collection by means of a holistic analysis. To this end, a combination of several methodologies and structured approaches is conducted. Firstly, a holistic structure and the required toolset to holistically assess academic libraries are proposed to collect and organize the data from an economic point of view. A four-pronged theoretical framework is used in which the library system and collection are analyzed from the perspective of users and internal stakeholders. The first quadrant corresponds to the internal perspective of the library system that is to analyze the library performance, and costs incurred and resources consumed by library services. The second quadrant evaluates the external perspective of the library system; user's perception about services quality is judged in this quadrant. The third quadrant analyses the external perspective of the library collection that is to evaluate the impact of the current library collection on its users. Eventually, the fourth quadrant evaluates the internal perspective of the library collection; the usage patterns followed to manipulate the library collection are analyzed. With a complete framework for data collection, these data coming from multiple sources and therefore with different formats, need to be integrated and stored in an adequate scheme for decision support. A data warehousing approach is secondly designed and implemented to integrate, process, and store the holistic-based collected data. Ultimately, strategic data stored in the data warehouse are analyzed and implemented for different purposes including the following: 1) Data visualization and reporting is proposed to allow library managers to publish library indicators in a simple and quick manner by using online reporting tools. 2) Sophisticated data analysis is recommended through the use of data mining tools; three data mining techniques are examined in this research study: regression, clustering and classification. These data mining techniques have been applied to the case study in the following manner: predicting the future investment in library development; finding clusters of users that share common interests and similar profiles, but belong to different faculties; and predicting library factors that affect student academic performance by analyzing possible correlations of library usage and academic performance. 3) Input for optimization models, early experiences of developing an optimal resource allocation model to distribute resources among the different processes of a library system are documented in this study. Specifically, the problem of allocating funds for digital collection among divisions of an academic library is addressed. An optimization model for the problem is defined with the objective of maximizing the usage of the digital collection over-all library divisions subject to a single collection budget. By proposing this holistic approach, the research study contributes to knowledge by providing an integrated solution to assist library managers to make economic decisions based on an “as realistic as possible” perspective of the library situation.