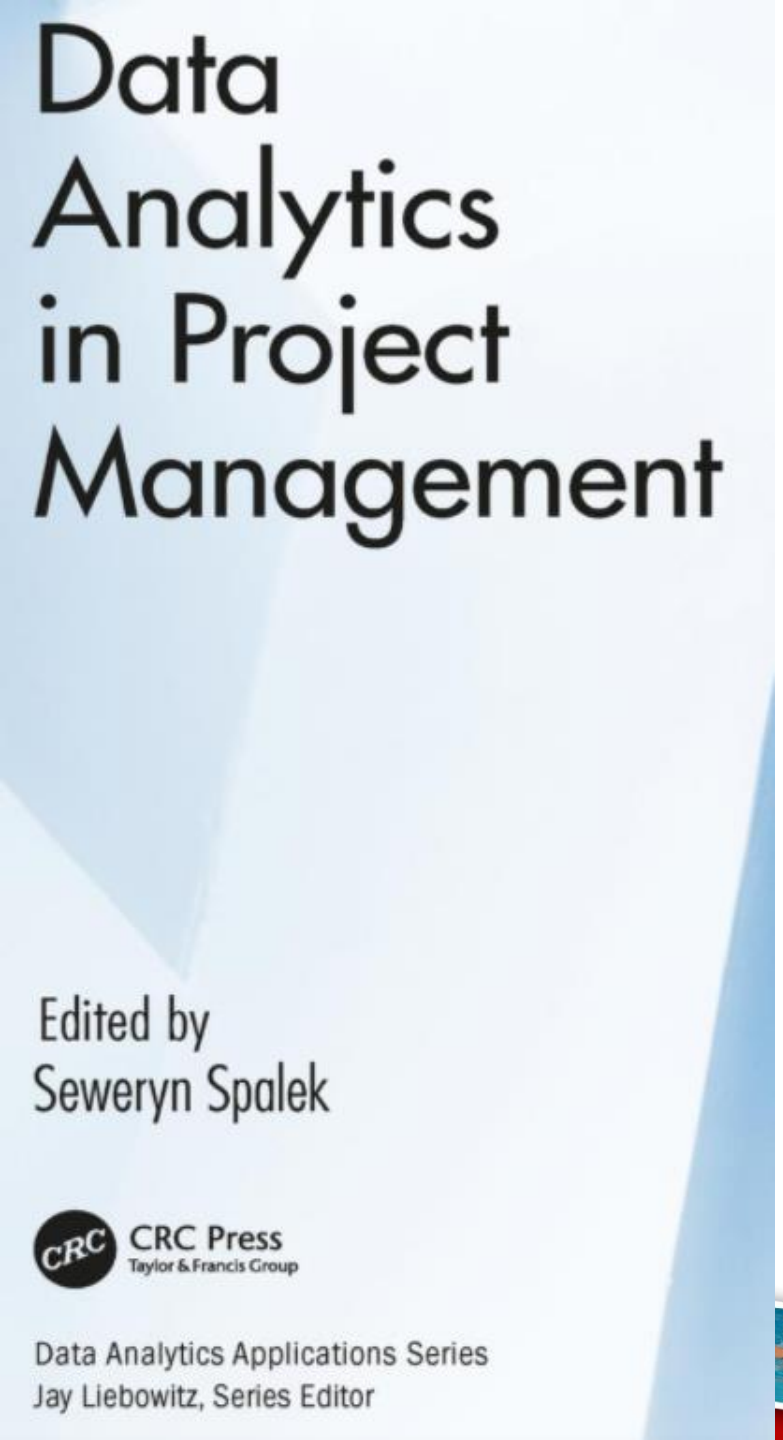


Why data analytics in Project Management?

Dave E. Marcial, Ph.D.

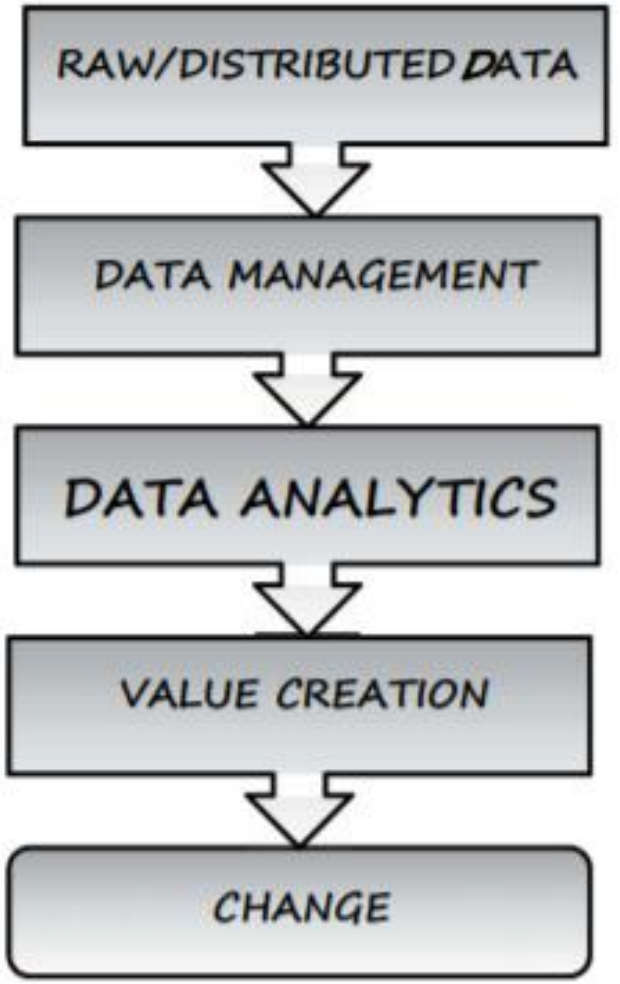
https://bok.asia/book/4976277/ac8c8b?dsource=recommend&regionChanged=&redirect=8374337#:~:text=Data%20analytics%20in%20project%20management%20Spalek%20%2C%20Seweryn,the%20importance%20of%20data%20analysis%20in%20project%20management.

- Business analytics ensures the expected value of change, while that change is implemented by projects in the business environment.
- With the significant increase in the number of projects and the amount of data associated with them, it is crucial to understand the areas in which DA can be applied in project management (PM).

In this presentation, we will discuss

DA in relation to

key areas, approaches, and methods in PM.



- Broadly speaking, data analytics entails the systematic use of data to guide decision-making in organizations.
- It requires acquiring pertinent data, organizing it, discerning meaningful patterns in it, and determining how the newly gained insights can guide decision-making.
- By following this process, decision makers minimize reliance on guesswork and gut feeling and engage in evidence-based decision-making.

Data analytics in Project Management…

- ✓Because it leads to data driven decision-making that yields superior project outcomes, and
- ✓because it requires projects to operate outside the narrow confines of traditional project management practice with its focus on the triple constraints, enabling them to be an integral part of the business.

Why is Analytics Important in Project Management?

- The high availability of analytical technology can enable project managers to use various analytical reports and drill-down charts to break down complex project data and predict their behavior and outcomes in real-time.
- Project managers can use this predictive information to make better decisions and keep projects on schedule and budget.
- A data-driven analytics approach enables teams to analyze the defined data to understand specific patterns and trends.
- Executives can use this analysis to determine how projects and resources perform and what strategic decisions they can take to improve the success rate.

https://technologyadvice.com/blog/information-technology/data-analytics-project-outcomes/

How can project managers make use of a data-driven approach to improve project outcomes?

1. Capturing Projections and Early Signals

- Data plays a significant role in any organization. Using analytics, managers and executives can watch for early signs of slippage in terms of budgets, costs, and timelines and take proactive action. Analytics also helps managers capture the rate of work, so they can easily predict whether the project will be completed on time. Managers can use a burn-down chart, for instance, which is a graphical representation of work left to do over time.
- Moreover, deep and insightful analytics can help you improve resource utilization and better forecast revenue and costs. With analytics, organizations can take a broader view and combine unrelated data streams to offer deep insights into projections and early warning signs in complex projects.

https://technologyadvice.com/blog/information-technology/data-analytics-project-outcomes/

How can project managers make use of a data-driven approach to improve project outcomes?

2. Quality of Deliverable

- Managing a new project can be a daunting task. There are different stakeholders, approvers, teams, budgets, outcomes, and expectations to manage. To manage all of this, analytics have become a major part of modern project management.
- As a project manager, you need to understand how analytics can reduce your workload, improve processes and enhance the outcomes of your project. Quality is an ultimate measure of your project's success upon delivery. Analytics help you plan, monitor and review the quality throughout your project.

How can project managers make use of a data-driven approach to improve project outcomes?

3. Assisting Strategic Decisions

- Analytics helps organizations make decisions that are based on facts instead of gut feeling.
- Real-time project analytics reveals a wealth of information that helps organizations align with their strategic objectives.
- Analytics allow managers and executives to deepen their understanding of how ongoing and proposed projects fit into the overall portfolio and organization vision.

History…

- If you have more time, watch the YouTube video about Building the Pyramids of Egypt ...a detailed step by step guide
- **This video illustrates that data analytics in project management is not a new thing. It is an old process.**

- factual information (as measurements or statistics)
  used as a basis for
    reasoning,
    discussion, or
    calculation (https://www.merriam-webster.com/dictionary/data)

Data

Big Data

fundamentally too big and moves too fast, thus exceeding the processing capacity of conventional database systems

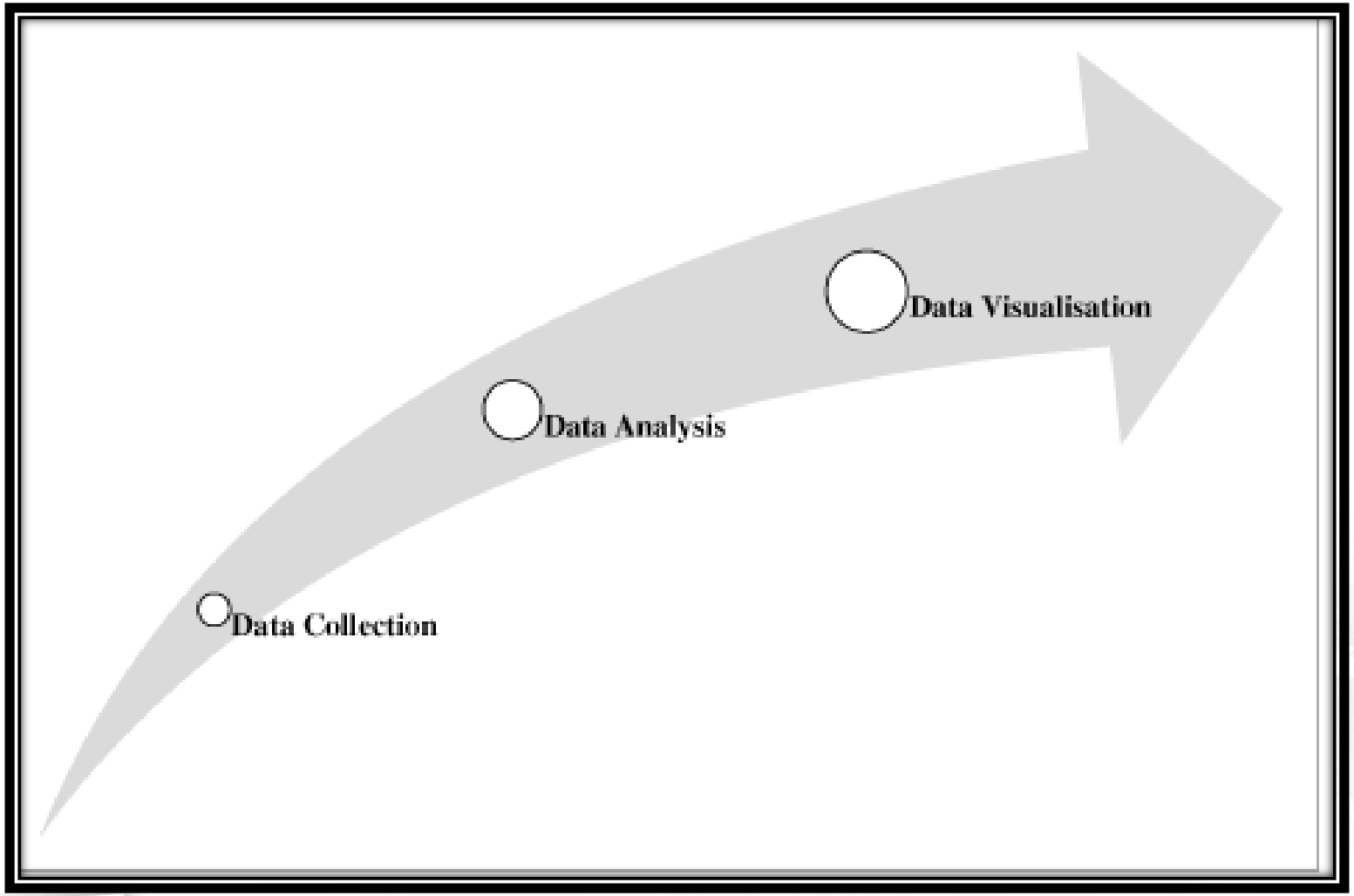
(Manyika et al, **2011, cited in** Daniel, 2014)

Big Data research is mainly aimed at examining how to efficiently aggregate and correlate massive volumes of data to identify recurring behavioural patterns and meaningful trends instead of cataloguing the status quo (Daniel, 2014)

Big Data Dimension (Daniel, 2014)

Volume	Velocity	Veracity	Variety	Verification	Value
• large amount of information is often challenging to store, process, and transfer, analyse and present.	• relating to increasing rate at which information flows within an organisation	• refers to the biases, noise and abnormality in data. It also looks at how data that is being stored, and meaningfully mined to the problem being analysed. Veracity also covers questions of trust and uncertainty.	• referring to data in diverse format both structured and unstructured.	• refers to data verification and security.	• most importantly, has the data been utilised to generate value of the insights, benefits and business processes, etc. within an organisation?

Three essential stages of Big Data (Daniel, 2014)



Analytics

- the method of logical analysis (https://www.merriam-webster.com/dictionary/analytics)

Descriptive analytics

- quantify relationships in educational data

Leon (2010)

Predictive analytics

- encompasses a variety of statistical techniques from predictive modeling, machine learning, and data mining that analyze current and historical facts to make predictions about future or otherwise unknown events

Nyce, Charles (2007)
Eckerson, Wayne (May 10, 2007)

Prescriptive analytics

- entails the application of mathematical and computational sciences suggests decision options to take advantage of the results of descriptive and predictive analytics

Davenport,Tom (2012).

Analysis Type and Project Management

Analysis Type

Analysis Type	Question Answered	Purpose	Functions to be Covered	Responsible
Descriptive analysis	What has happened?	Establish current state performance through historical business analysis	• Dashboard/KPI development • Performance benchmarking • Insights/segmentation • Fact-based assessments	• PMO • Data analyst • PPM responsible • Business managers
Predictive Analysis	What will happen?	Predict outcomes, propensity, customer behavior, preference, or entity	• "What-if" marketing scenario development and forecasting • Predictive classification of risk, behavior, or outcome	• PMO • Data analyst • PPM responsible • Customer feedback
Prescriptive analysis	What should we do?	Analytic methods to show implication or impact of a series of decision options	• Simulate organizational financial/ops impact across a series of strategic options • Develop optimal path against a set of potential choices	• PMO • Data analyst • PPM responsible • Finance

https://www.northeastern.edu/graduate/blog/data-analyst-and-project-management/

The phases of analytics and the alignment to Project Management:

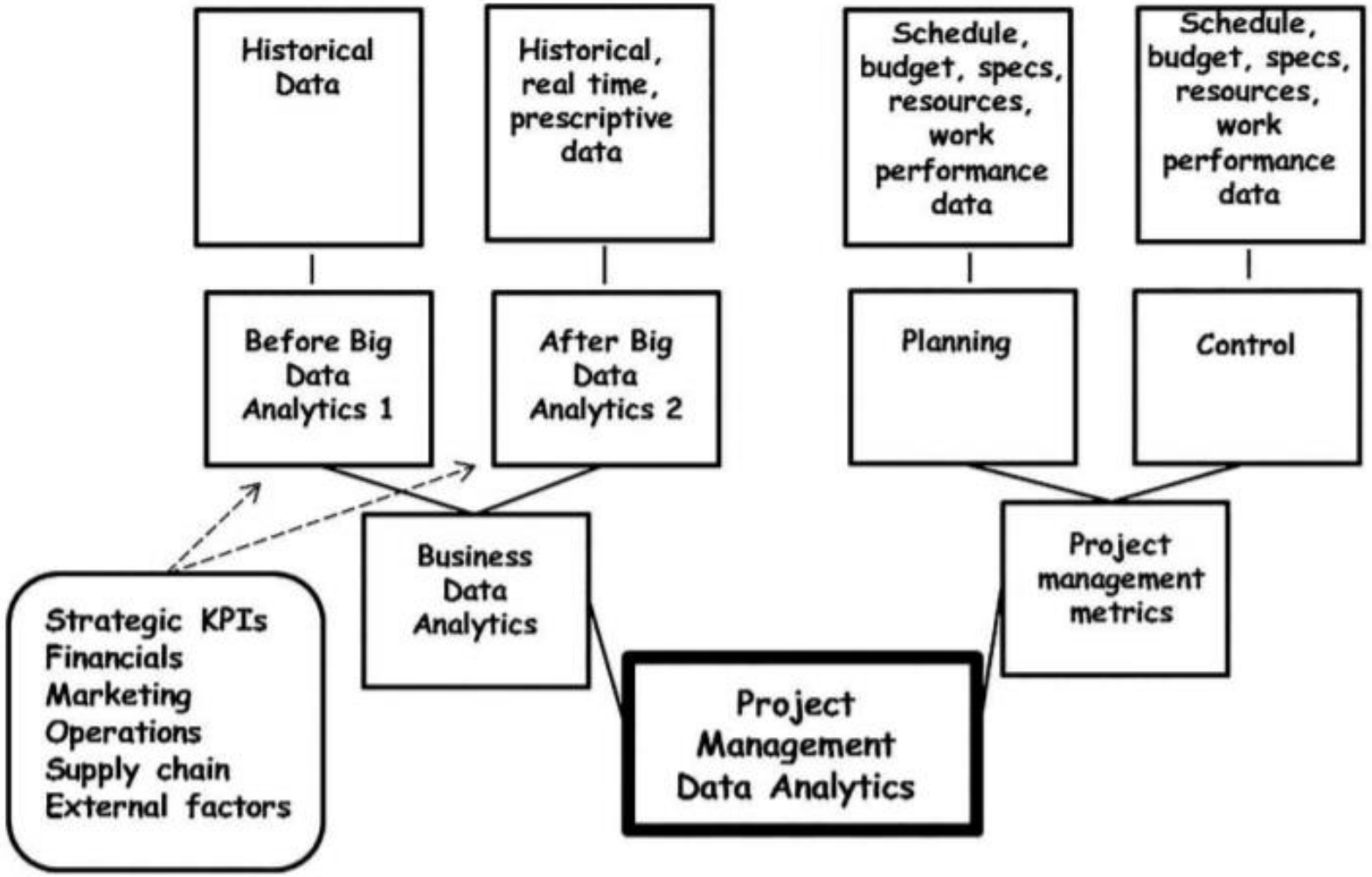


FIGURE 2.1
Project data analytics mind map.

offers a mind map that highlights the constituent components of project data analytics. It portrays how conventional business data analytics and project performance metrics come together to constitute project data analytics. It shows how project data analytics goes beyond concern for the standard project metrics that have formed the basis of analyzing project performance since the 1950s, with their focus on schedules, budgets, resource allocations, specifications, and work performance assessments, and accommodates business and environmental factors as well.

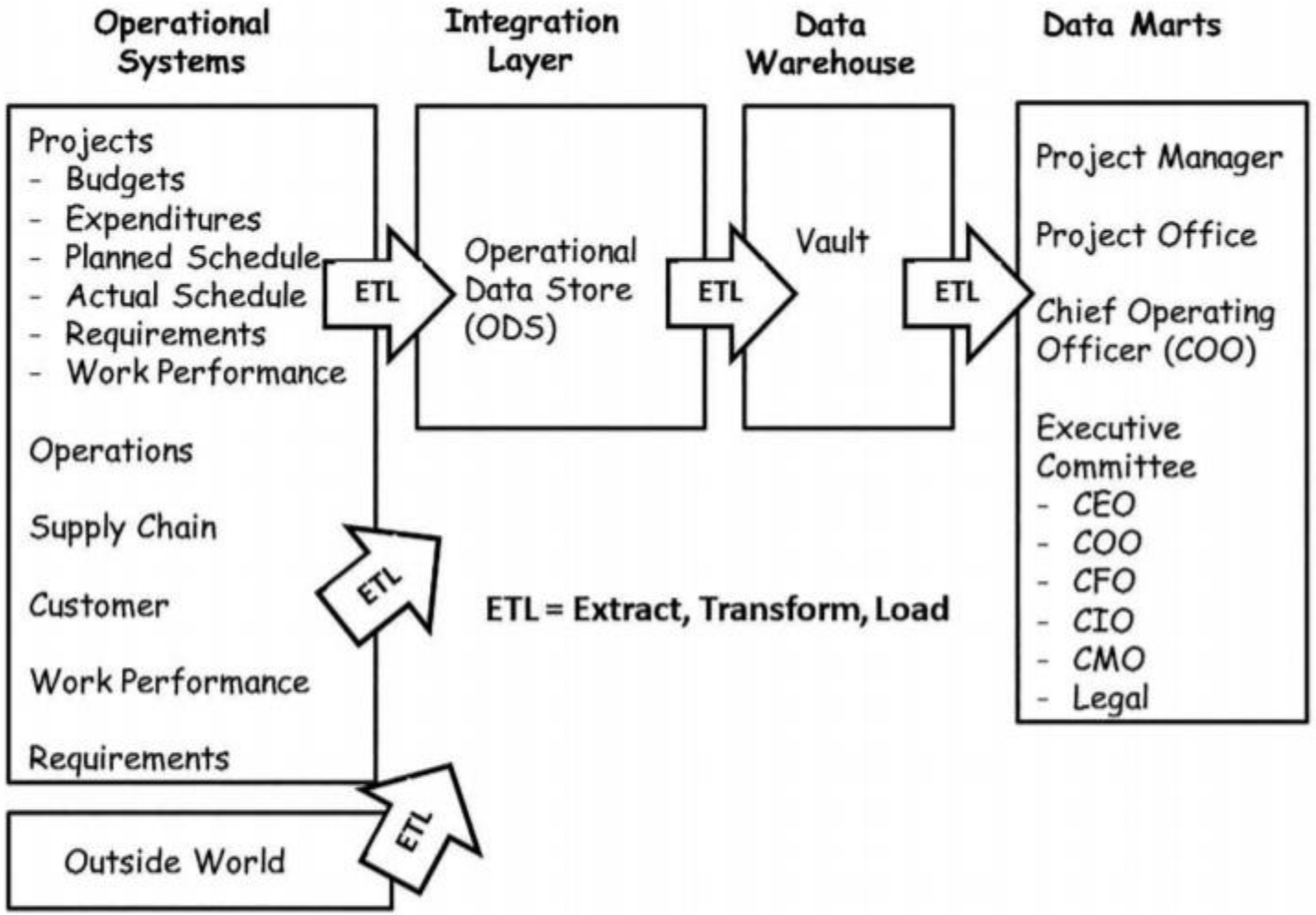


FIGURE 2.2
Data warehouse for a project-based organization.

- depicts a data warehouse configuration for a hypothetical project-based organization. Operational systems identifies the sources of data that will be put into the data warehouse. In the figure, this includes standard project data, as well as other categories of data that contribute to effective project data analyses (including data coming from the outside world). The raw data are massaged (through ETL) before being placed in a storage area (operational data store [ODS]). They undergo further massaging before being stored in the data warehouse vault. Once stored there, they can be accessed by different marts, i.e., users who will employ the data for their specific decision-making purposes.

As a result of multidimensional analytical requirements, modern PMOs should gather data from four major areas:

- **Methods and tools**
- **Human resources**
- **Project environment**
- **Project knowledge management**

Analytical Challenges of a Modern PMO

TABLE 4.1

Description of the Levels of a PMO's Analytical Maturity

Level of Analytical Maturity	Description
1	The data is not gathered by the PMO in any systematic way. If any data is collected, it's the result of legal requirements or imposed by single project documentation purposes.
2	The data is gathered sporadically and ad hoc by the PMO on demand. Due to data incompleteness, analytical abilities are very limited. The PMO may present only fragmentary results of the data analysis.
3	The PMO has some established procedures for gathering and storing data. Once stored, the data is analyzed only occasionally or upon specific request. The results may be presented in a more comprehensive way.
4	The data is gathered, stored, and analyzed in a systematic way, according to PMO needs. The results of data analysis cover the full range of project outcomes in the company.
5	The PMO seeks continuous improvements in its analytical abilities towards better alignment with the company strategy.

- It must be clearly stated that an effective approach to project knowledge management must be accompanied by an efficient system of data identification, collection, and storage. Only proper analysis of that data leads to transforming raw information into knowledge that can be utilized in projects,

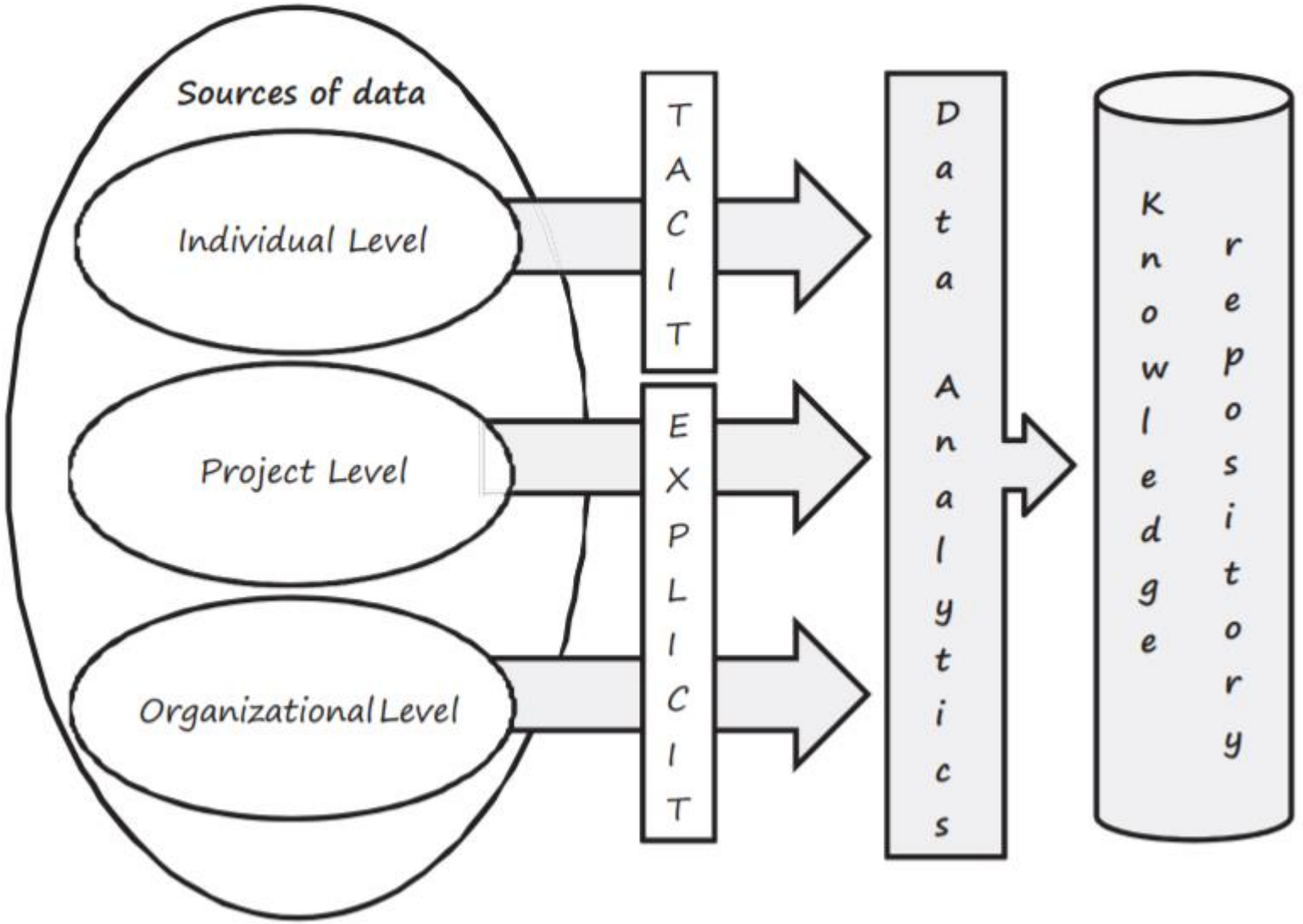


FIGURE 4.1
The process of transforming project data into knowledge.

- The PMO's analytical abilities should be able to combine the data from all areas to better support decision-making processes in current and forthcoming projects. However, the picture of data sources will definitely evolve over time. That is an additional challenge for a PMO. If a PMO would like to effectively embrace this evolution, it should have built-in agility, as well. Only in being adaptive to changing analytical requirements may the PMO present the value added it should create in that demanding area of expertise.

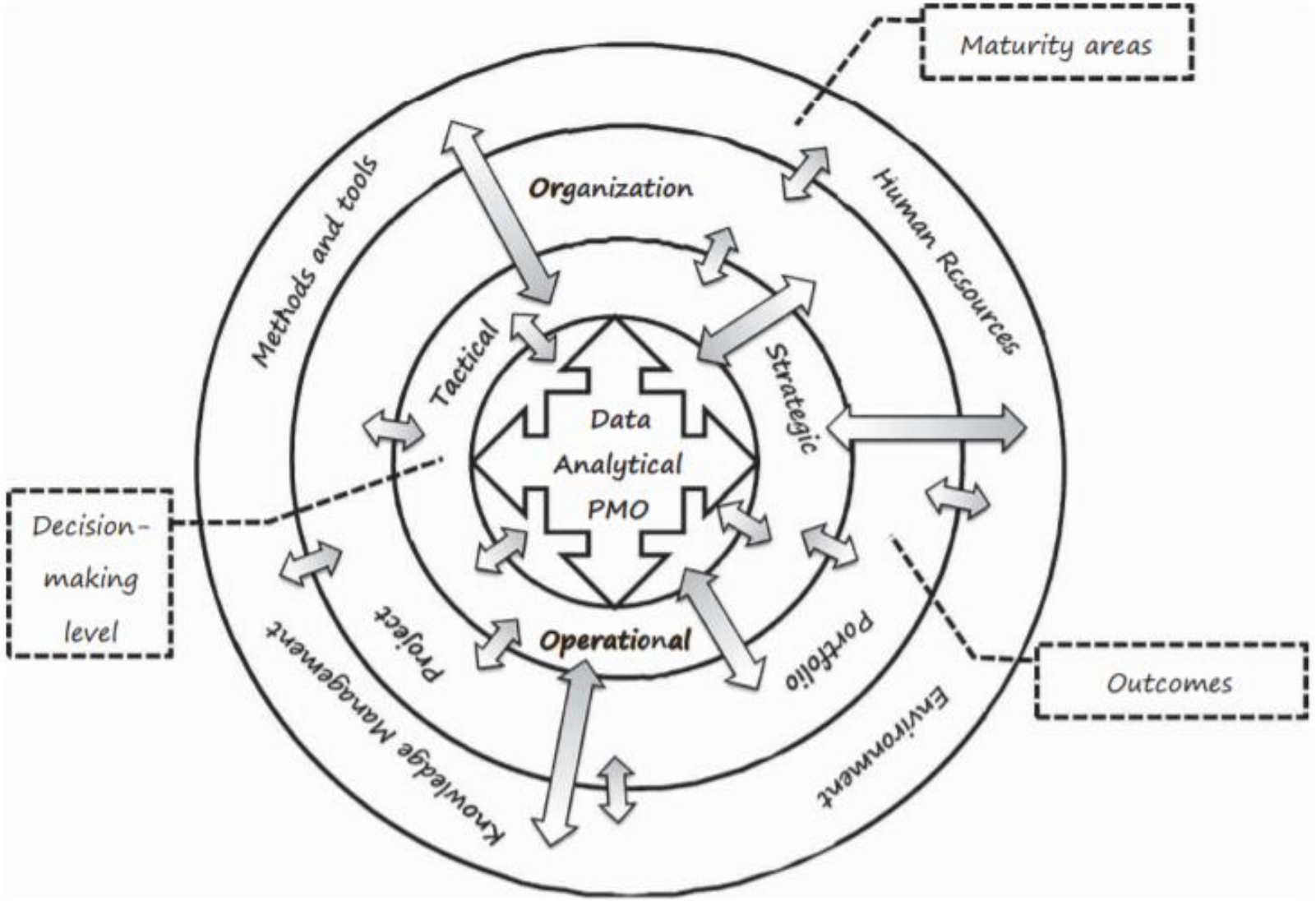


FIGURE 4.3
Analytical challenges for the PMO based on the data flows from different sources.

Data Analytics and Portfolio Management

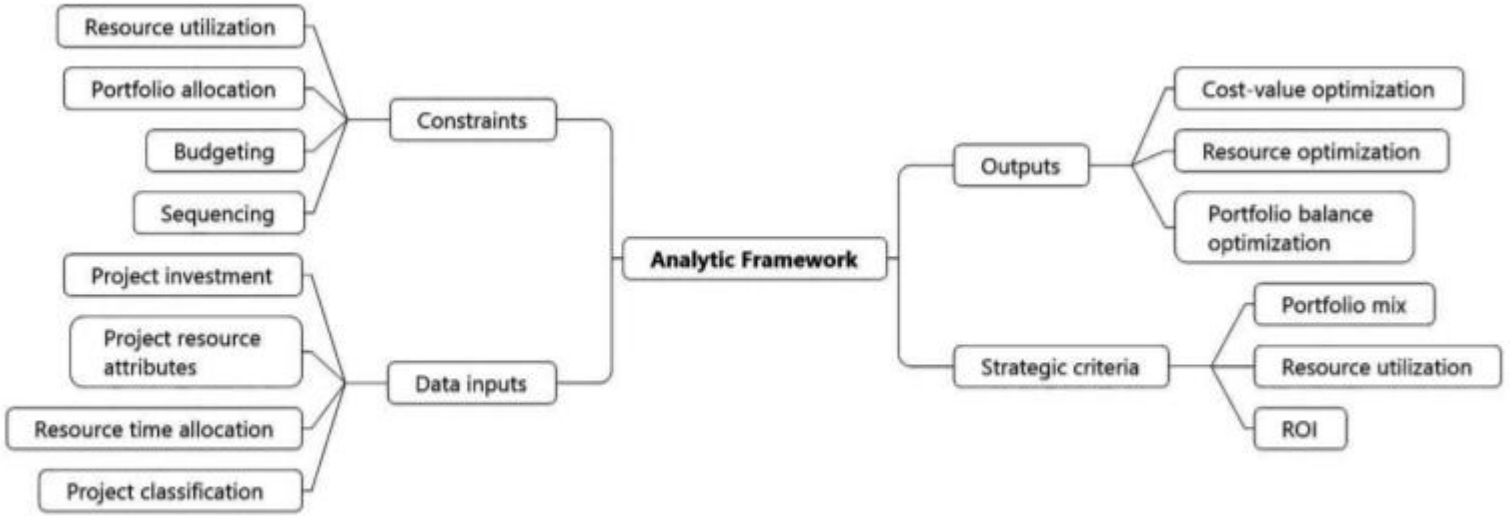


FIGURE 5.1
Analytic framework.

summarizes the above points and highlights how having the right data inputs combined with constraints and other strategic criteria can produce optimal outputs across four dimensions of portfolio optimization

Portfolio optimization is one of the main parts of the prescriptive analysis described above. Organizations should endeavor to get to this point because it delivers important value and significantly improves strategic execution. In order to optimize any part of the portfolio, organizations need to understand the constraints that exist (e.g., budgetary, resource availability, ethical, political, and so on)

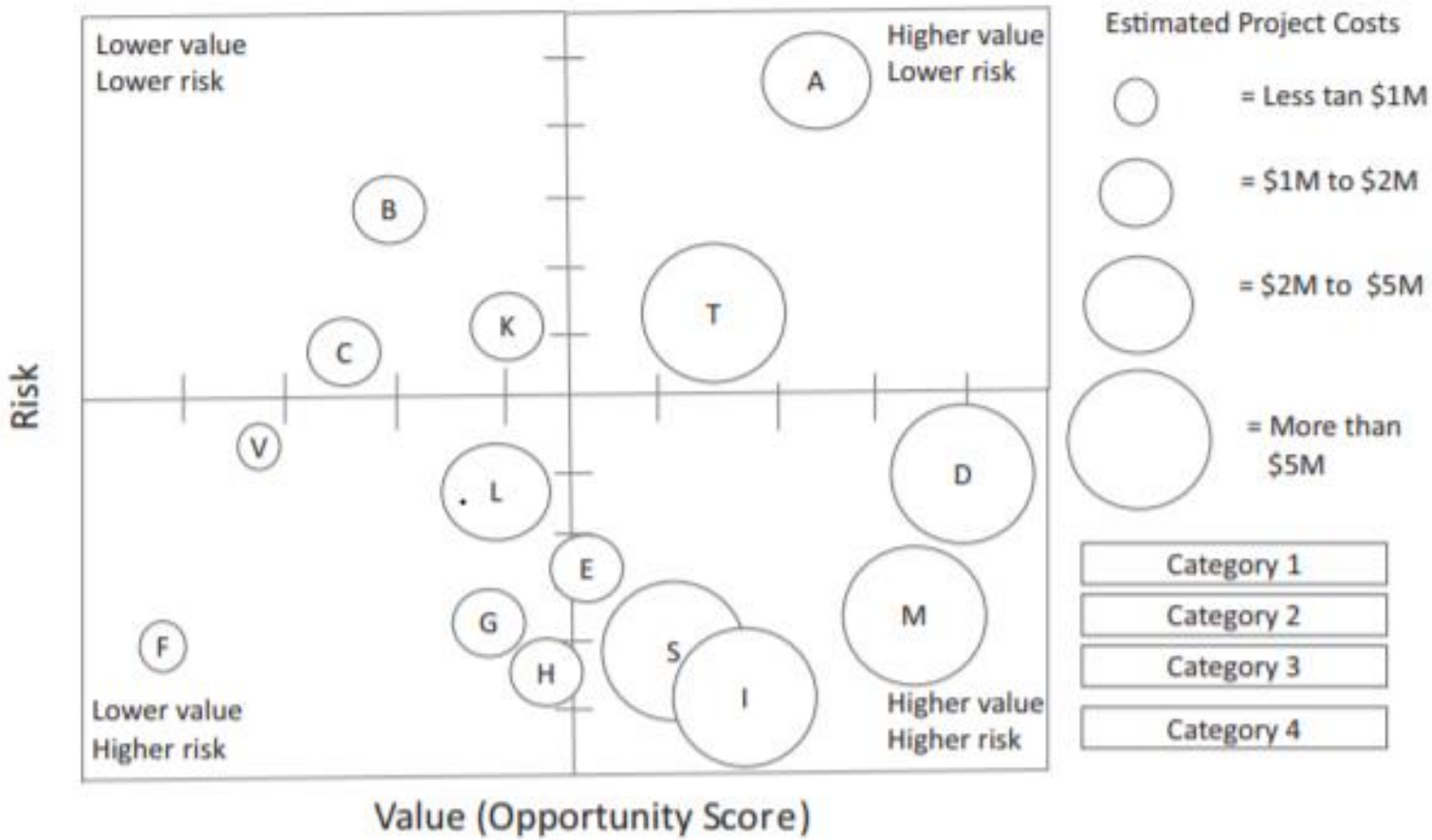


FIGURE 5.3
Example of best portfolio bubble chart.

Post at the Forum section if you have questions.