How to Build the Data Literate Organization

By Dr. David P. Marco, Fellow IIM, CDMP (Master), CDP, CBIP

President

EWSolutions

EWSolutions' Background

EWSolutions is a Chicago-headquartered strategic partner and full life-cycle systems integrator providing both **award winning** strategic consulting and **full-service implementation services**. This combination affords our client partners a full range of services for any size enterprise information management, metadata management, data governance and data warehouse/business intelligence initiative. Our notable client partner projects have been featured in the Chicago Tribune, Federal Computer Weekly, Journal of the American Medical Informatics Association (JAMIA), Crain's Chicago Business, FBI, The Doings and won the 2004 Intelligent Enterprise's RealWare award, 2007 Excellence in Information Integrity Award nomination, DM Review's 2005 World Class Solutions award, 2016 CIO Review 20 Most Promising Enterprise Architecture providers and 2018 Innovation award.

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Meritorious Service Award

CRAIN'S CHICAGO BUSINESS

Information Integrity Coalition
2007 Excellence in Information Integrity Award Nomination

JAMIA

Institute of Information Management

DMF DATA MANAGEMENT FORUM
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2018: Most Innovative in Data Management Solutions

DM Review 2005
World Class Solutions Award Data Management

intelligent enterprise REAL Awards TRANSFORM 2004 WINNER
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Client: Department of Defense

Chicago Tribune

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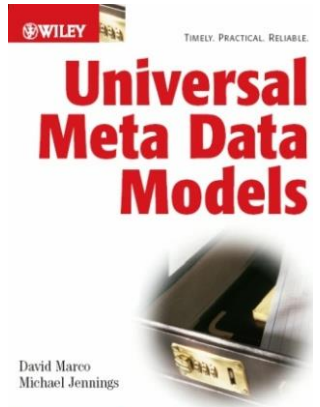
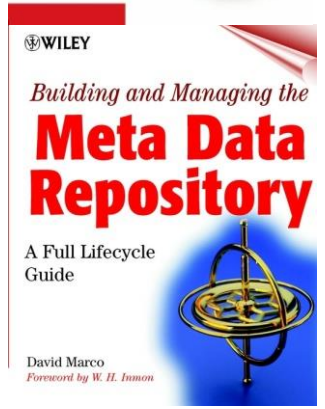
Dr. David P. Marco – Professional Profile

Best known as the world's foremost authority on metadata management and the father of the Managed Metadata Environment, he is an internationally recognized expert in the fields of data governance, data literacy, big data, data warehousing, master data management and data management. In 2004 David Marco was named the **"Melvil Dewey of Metadata"** by **Crain's Chicago Business** as he was selected to their very prestigious **"Top 40 Under 40"** list. David Marco has authored several books including the widely acclaimed **"Universal Metadata Models"** (Wiley, 2004) and the classic **"Building and Managing the Metadata Repository: A Full Life-Cycle Guide"** (Wiley, 2000).

- 2021 was awarded an **honorary Doctor of Philosophy in Data Management** for his contributions to the field of Data Management.
- 2020 received a lifetime professional **Fellowship from the Institute of Information Management** (their highest honor)
- President of Data Management University (**DataManagementU.com**)
- Author of several best-selling information technology books, including the top 2 sellers in metadata management history
- **2016 Data Management Channel Expert** for Business Analytics Collaborative
- **2008 DAMA Data Management Hall of Fame (**Professional Achievement Award**)**
- **2007 DePaul University named** him one of their **"Top 14 Alumni Under 40"**
- Selected to the prestigious **2004 Crain's Chicago Business "Top 40 Under 40"**
- Worked with over 90 client partners to successfully build their data management & governance programs
- Presented hundreds of keynotes/seminars across four continents
- Published hundreds of IT articles some of which were translated into Mandarin, Russian, Italian, Portuguese and others
- Taught at the **University of Chicago** and **DePaul University**
- Holds PhD, Fellow IIM, CDMP (Master), CDP, CCP and CBIP certifications





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Agenda

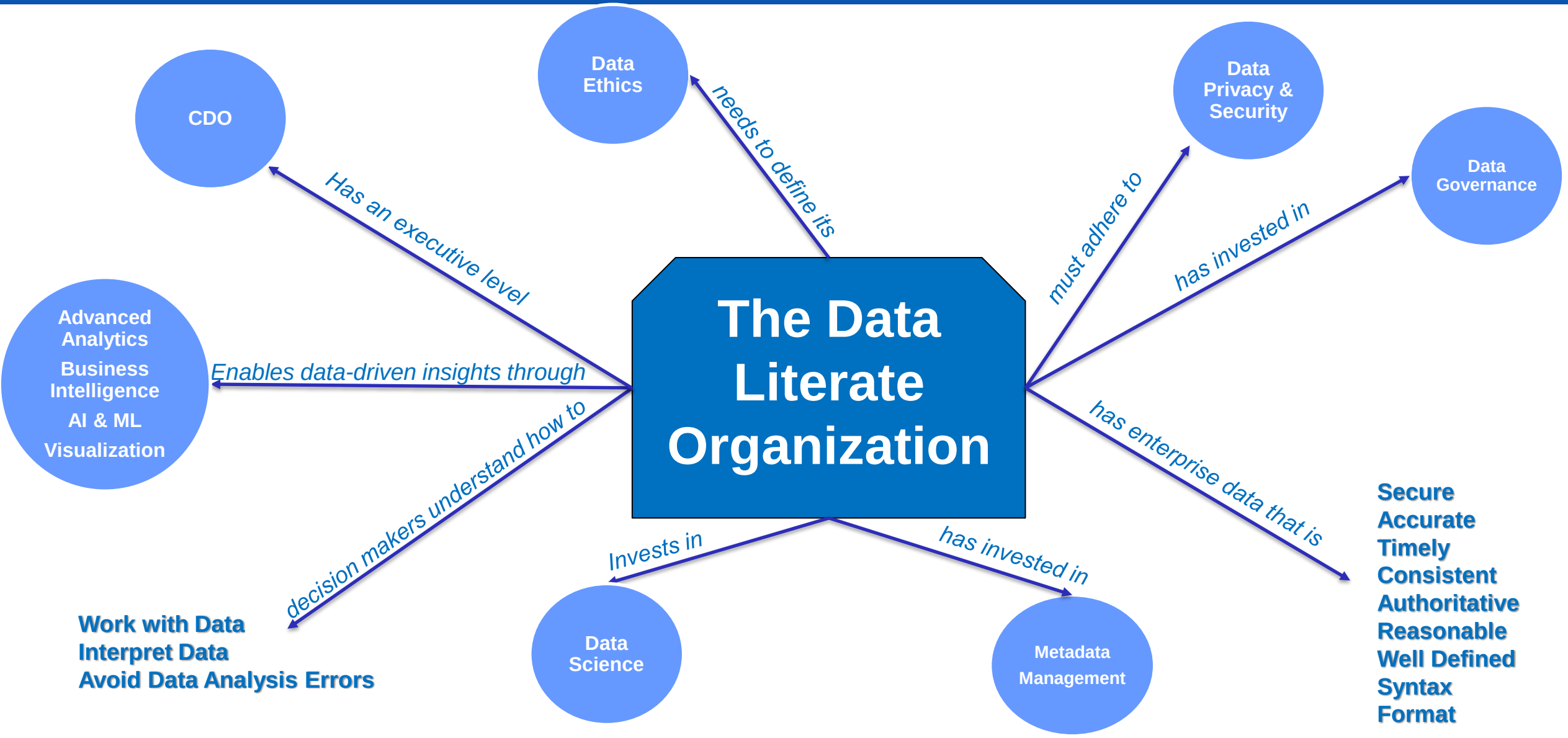
- Data Literacy Background & Fundamentals
- Data Literacy Return on Investment (ROI)
- Data Literacy Levels
- Data Literacy Roles
- Data Literacy Personas

Data Literacy Background & Fundamentals

Data Literacy Defined

- There are many definitions of data literacy
- Data Literacy: measures a person's ability to read, work with, analyze and argue with data (MIT and Emerson University)
- "Corporate Data Literacy: is the ability of an organization to read, analyze, utilize for decision, argue with and communicate data throughout the organization." (Data Literacy Index)
- "Data literacy is the ability to read, write and communicate data in context, including an understanding of data sources and constructs, analytical methods and techniques applied — and the ability to describe the use case, application and resulting value." (Gartner)
- ***Data Literacy:*** is the ability to create, manage, read, work with, and analyze data to ensure and maximize the data's accuracy, trust, and value to the organization

The Data Literate Organization



Data Literacy ROI

"Statistical thinking will one day be as necessary for efficient citizenship as the ability to read and write."

--H.G. Wells (1866-1946)

Data Literacy ROI

- A meager 24% of the global workforce is fully confident in their ability to read, work with, analyze and argue with data (Data Literacy Index)
- The cost of having a data illiterate workforce negatively impacts organizations through:
  - Poor business decisions
  - Malfunctioning systems
  - Customer churn
  - Brand erosion

Data Literacy ROI

- In general, data is held in silos without an enterprise understanding, definition or consistency
- **It is like every department speaking its own language**
- **Data should be the unifying language of any organization**

Marketing

Manufacturing

Research & Development

Operations

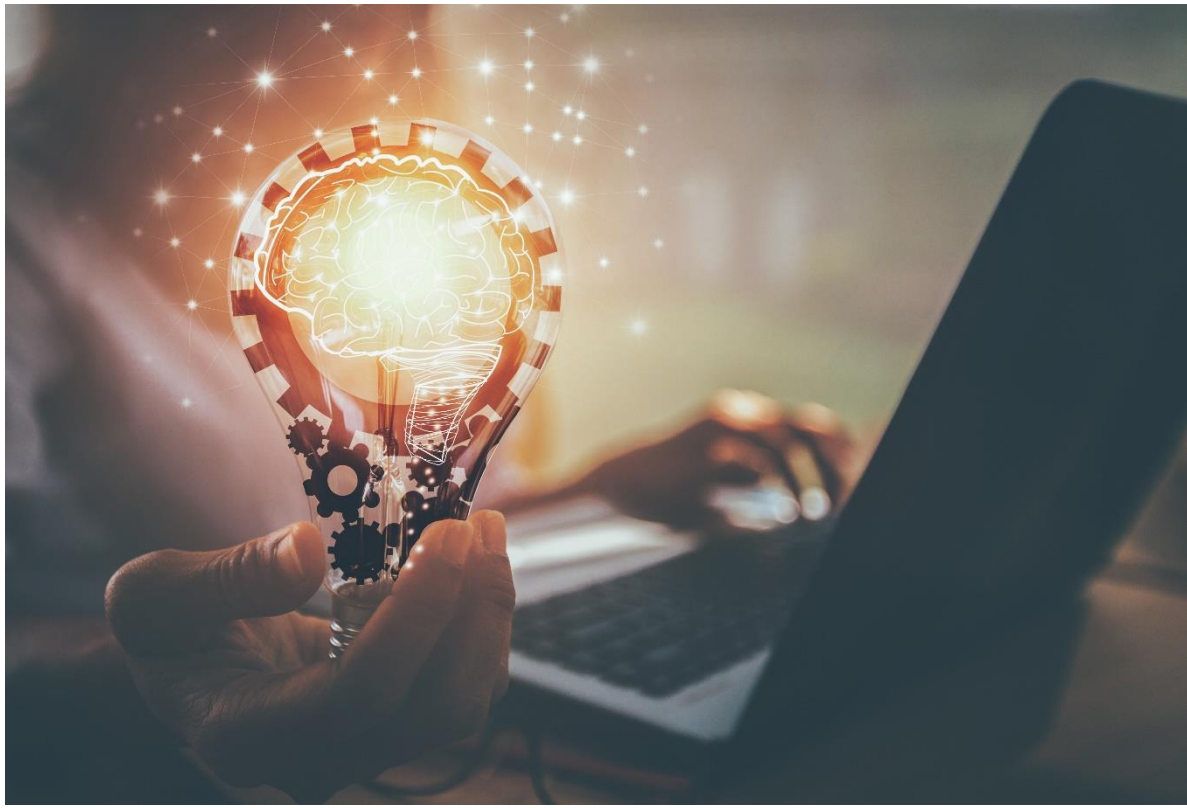
Sales

Data Literacy Index

- Data Literacy Index (October 2018) was commissioned by Qlik, Accenture and others and is part of The Data Literacy Project
- Some interesting revelations:
  - Average corporate size was $10.7B enterprise value
  - Companies that ranked in the top third of the Data Literacy Index (DLI) are associated with **3% – 5% greater enterprise value** (market capitalization)
  - Businesses that have higher corporate data literacy scores can have $320 – $534M in higher enterprise value
  - Improved corporate data literacy positively affects other measures of corporate performance including gross margin, Return-on-Assets, Return-on-Equity and Return-on-Sales

Data Literacy Index

- 93% of business decision makers believe that data literacy is relevant to their industry and that its important for their employees to be data literate
- 63% of large businesses plan to increase the number of data literate employees
- 24% of the global workforce is fully confident in their ability to read, work with, analyze and argue with data



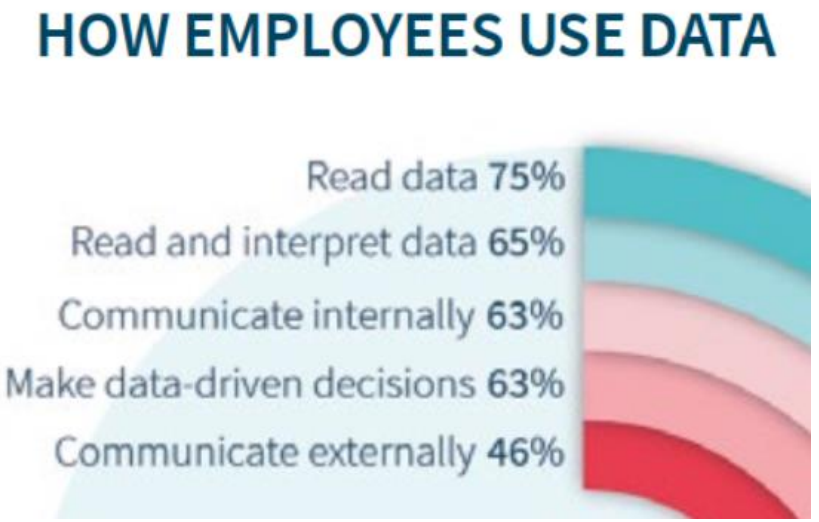
Data Literacy ROI

- 60% – 73% of all enterprise data is never analyzed, according to recent studies
- 32% of business executives surveyed said that they're able to create measurable value from data
- 27% said their data analytics projects produce actionable insights
- **6% of companies ranked as "mature" on the Data-Driven index**

From "Closing the Data Value Gap", Accenture

Data Literacy ROI*

- 74% of employees in a survey of 9,000 full-time workers said that they feel overwhelmed or unhappy working with data
  - 36% of the overwhelmed group report spending at least one hour a week procrastinating over data-related tasks
  - 36% of the overwhelmed group state that they find an alternative method to complete the task without using data
  - 14% of the overwhelmed group avoid the task entirely
- 21% of the global workforce are fully confident in their data literacy skills (ability to read, understand, question and work with data)
- 25% of employees felt fully prepared to use data effectively when entering their current role
- 48% of respondents said they use "**gut instinct**" rather than "**data-driven insights**" to make decisions

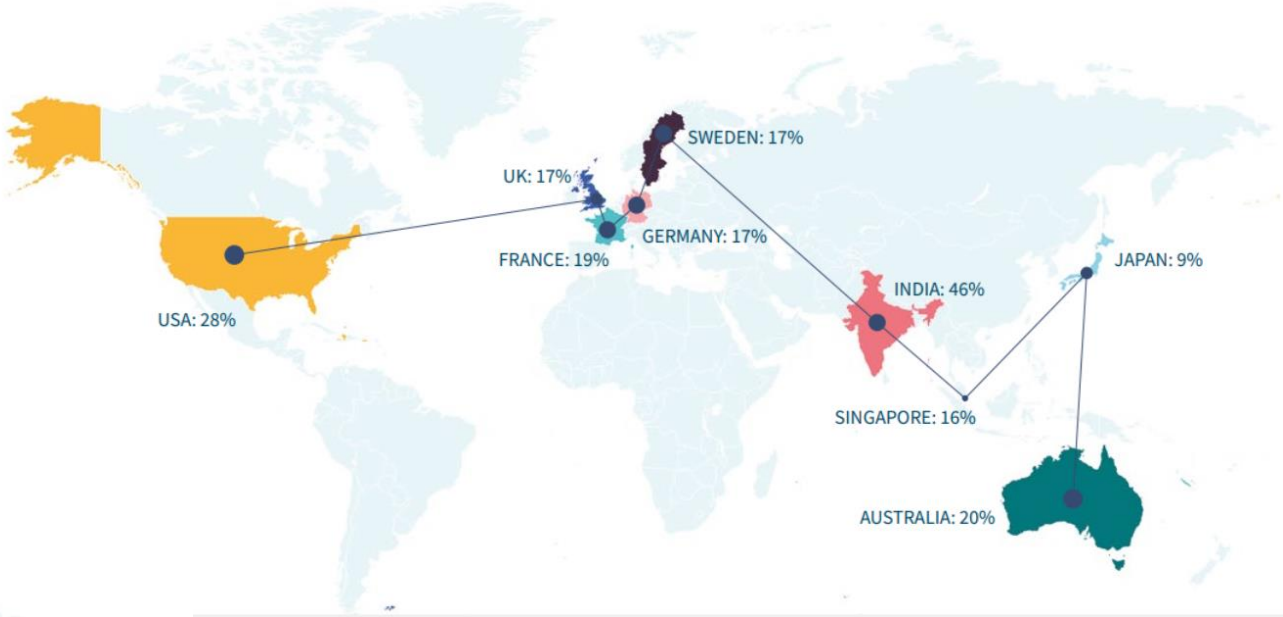


*"The Human Impact of Data Literacy", January 2020, Accenture, Qlik

Data Literacy ROI

- India (46%) outpacing the rest of the world in data literacy, almost doubling the USA (28%) at #2

A: THE LOCAL DATA-LITERATE WORKFORCE



B: WORKERS WHO REPORT A SIGNIFICANT AMOUNT OF TIME WAS SPENT IN MAINSTREAM EDUCATION LEARNING HOW TO USE DATA IN THE WORKPLACE

- It's clear that many US workers are learning to be data literate on their own time
- India's investment in data literacy has paid off

"The Human Impact of Data Literacy", January 2020, Accenture, Qlik

Data Literacy ROI

- Poor data literacy is ranked as the second-biggest internal roadblock to the success of the office of the chief data officer, according to the Gartner Annual Chief Data Officer Survey.
- Gartner noted **50% of organizations lack the data literacy skills** that can drive business growth and transformation
- Gartner stated that 80% of organizations may initiate deliberate competency development in the field of data literacy to overcome extreme deficiencies. Also, 50% of organizations may lack sufficient artificial intelligence ("AI") and data literacy skills to achieve business value

Data Literacy ROI Summary

- Enables Data Analytics
  - 360-degree view of customer
  - Market basket analysis
  - Profit/loss, etc.
- Better Decision Making
  - If are analysts are not data literate, they will make incorrect business decisions
- Enables Proper Management
  - Product life-cycle management
  - Customer life-cycle management
  - Bill-of-Materials management
- Better Operations Management
  - Less errors and easier integration
  - Less inefficiencies
- Anything that requires working with data

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Data Literacy Levels, Roles & Personas

EWSolutions™ Data Literacy Levels, Roles, Personas

Data Literacy Levels categorize an individual's data literacy knowledge, capabilities and skills

- Expert
- Leader
- Advanced
- Literate
- Basic
- Remedial


Data Driven


Data Discernment


Data Indifference


Data Skeptic

Data Use Roles categorize how an individual primarily interacts with their organization's data

Data Minimalists	Data Users	Business / Data Analyst
Data Scientist	Data Leader	Data Executive

Data Literacy Personas categorize an individual's beliefs on data and its value to an organization

Data Literacy Levels

Data Literacy Levels

- **Data Literacy Levels** categorize an individual's data literacy knowledge, capabilities and skills
- Data literacy levels are a valuable rubric for measuring the data literacy of individuals
- There are 6 levels of proficiency in data literacy*:
  - Remedial
  - Basic
  - Literate
  - Advanced
  - Leader
  - Expert

Leverages some of Gartner's 5 Data Literacy Levels

Data Literacy Levels

Remedial

- **Definition:** Understands basic mathematics (add, subtract, multiply, divide, average, etc.), but is not data literate and may not understand what data literacy means
- Individuals at this level look at data without the capability to understand beyond a superficial level
- They accept the numbers on a report and do not ask key questions:
  - Is this the correct visualization or report technique to meet the business objectives for this analysis?
  - What are the precise definitions for the fields on this report / visualization?
  - How were the fields calculated and is that the correct calculation?
  - Where was the data extracted for this report and when was it extracted?
  - How was the data transformed for this analysis?
  - Many more!!!
- **Example:** A remedial level business or data analyst would view a report or visualization and accept the numbers “as-is”, without any discernment and use them to make or recommend business decisions

Data Literacy Levels

Basic

- **Definition:** Understands elemental data literacy concepts but has minimal understanding of more in-depth concepts and practices
- Individuals at this level understand enough to ask basic questions:
  - What are the business objectives for this analysis?
  - Do I have a basic (**NOT** precise) understanding of the definitions for the fields on this report / visualization?
  - How were the fields calculated and is that the correct calculation for this purpose?
  - Where was the data extracted for this report and when was it extracted?
- Staff at this level do little to go past these basic questions; don't understand more advanced data literacy concepts like qualitative vs. quantitative analysis, correlation does not always equal causation, etc.
- **Example:** A basic level business or data analyst that would look at a report or visualization and ask the data architect or analyst simple questions, and may accept unsupported responses to their questions before using the analysis to make or recommend influential business decisions

Based on Gartner's 5 Data Literacy Levels

Data Literacy Levels

Literate

- **Definition:** Understands data literacy concepts and can create, manage, read, work with, and analyze data
- Individuals at this level understand the many analysis "traps" that an analyst can encounter
- **Example:** A data literate business or data analyst would look at a report or visualization and question the content until they understood exactly what each field means at an atomic level. They would dig deeper and understand the danger of making or recommending influential business decisions without accurate information and would not rely on a poorly designed analysis, or use an incorrect analysis technique

Data Literacy Levels

❑ Advanced

- **Definition:** Leads an analytics team to meet the needs of a single business domain
- Individuals at this level are not only data literate but they ensure their business domain has sufficient analysis capabilities that can be used for effective business decisions
- Highly knowledgeable on their particular business domain
- **Example:** A director for a data analysis team with advanced data literacy skills would ensure that the data quality for their analysis projects meets the thresholds defined by the business domain

Data Literacy Levels

Leader

- **Definition:** Understands the major business domains within an industry and leads enterprise analytics teams – often listed as Chief Data and Analytics Officer
- Not only data literate but they understand how to ensure their organization has various forms of analysis and supporting technologies that can be used for effective business decisions across the enterprise
- Highly knowledgeable cross domain expertise
- **Example:** A VP of Analytics or the CDO would work with the data governance and the DQM programs to ensure the organization's analytics efforts meet data quality minimal thresholds from the various business domains. A data literate leader would ensure that the technology and architecture would be efficient and can enable streamlined and accurate business decision making

Data Literacy Levels

Expert

- **Definition:** Has such an evolved understanding of data literacy and advanced analytics that they can and have led enterprise analytics across multiple industries
- Deep understanding and practical experience in all areas of data management and data literacy
- Proven track record of success with multiple organizations and across different industry verticals
- Individuals at this level are rare

Data Literacy Levels

- **Learning Point:** Not everyone in an organization needs to be an Expert and many organizations will not have a single Expert on staff
- A company should designate a recommended data literacy level for each role classification
- **Best Practice:** Before starting data literacy training, an organization must evaluate their current data literacy levels to establish a baseline for measuring training effectiveness

Data Literacy Levels Summary

Remedial Understands basic mathematics, but is not data literate and may not understand what data literacy means	**Basic** Understands elemental data literacy concepts, but has minimal understanding of more in-depth concepts and practices	**Literate** Understands data literacy concepts and can create, manage, read, work with, and analyze data
Advanced Leads an analytics team to meet the needs of a single business domain	**Leader** Understands the major business domains within an industry and leads enterprise analytics teams	**Expert** Has such an evolved understanding of data literacy and advanced analytics that they can and have led enterprise analytics across multiple industries

Data Use Roles

Data Use Roles

- **Data Use Roles** categorize how an individual primarily interacts with their organization's data
- There are 6 common data use roles*:
  - Data Minimalists
  - Data Users
  - Business/Data Analyst
  - Data Scientist
  - Data Leader
  - Data Executive

Leverages KPMG's 4 Data Literacy Roles

Data Use Roles

Data Minimalist

- Have limited interaction with data
- The typical data interaction is narrowly focused (e.g., 1000 units of product X shipped today, 1000 units of product X were received today, etc.)
- Recommended Minimal Data Literacy Level – **Basic**

Data Users

- Works with data on a regular basis
- Uses data to make some narrowly focused decisions. Normally, their decision making will only affect their specific job function
- Recommended Minimal Data Literacy Level – **Basic**

Data Use Roles

Business / Data Analyst

- Works with and analyzes data throughout the day
- Uses data to assist one or more business domains with decision making
- Recommended Minimal Data Literacy Level – **Literate**

Data Scientist

- Works with data and applies sophisticated statistics and analytical formulas to enable decision making
- Usually works across the major business domains to enable advanced analytics
- Often required to communicate their analysis in writing or presentations
- Recommended Minimal Data Literacy Level – **Literate**

Data Use Roles

Data Leader

- Leads one or more data and advanced analytics teams, including teams of data scientists
- Understands how to communicate the value of data and the need for an organization to make data driven insights
- Understands need for data management functions and their alignment to support data literacy
- Recommended Minimal Data Literacy Level – **Leader**

Data Executive

- Uses data to make major business decisions that will have a significant impact on the organization
- Often comes from Data Leader roles
- Recommended Minimal Data Literacy Level – **Literate**

Data Use Roles Summary

Data Minimalist Have limited interaction with data	**Data Users** Works with data on a regular basis	**Business/Data Analyst** Works with and analyzes data throughout the day
Data Scientist Works with data and applies sophisticated statistics and analytical formulas to enable decision making	**Data Leader** Leads one or more data and advanced analytics teams, including teams of data scientists	**Data Executive** Uses data to make major business decisions that will have a significant impact on the organization

Data Literacy Personas

Data Literacy Personas

- **Data Literacy Personas** categorize an individual's beliefs and attitudes on data and its value to the organization
- Personas do not assess knowledge, they assess attitudes
- The personas provide focus on necessary training and cultural change
- 4 Data Literacy Personas
  - Data Skeptic
  - Data Indifference
  - Data Discernment
  - Data Driven

Data Literacy Personas

- **Data Skeptic:** questions the validity of using data to drive decision making or to use it for their job function
- Doubts the value of data driven decision making
- Believes that gut-instinct and experience should always override data analysis
- **Learning Point:** A person is not a data skeptic if they believe in the value of data driven analysis; however, they believe that their organization's data is flawed or their analysis are poorly built, causing them to not use these tools

Data Literacy Personas

- **Data Indifference:** lacks interest in data. Has no opinion on data's value or non-value
- This person may use data in their job function; however, they don't understand data and just follow whatever guidelines they have been given
- **Learning Point:** For some staff it makes sense for them to be data indifferent, especially for those that don't use data in their job function

Data Literacy Personas

- **Data Discernment:** grasps and comprehends that data has value and is necessary for their organization
- In general, most staff fall into this persona
- **Learning Point:** This person may not have high level of data literacy, but they do appreciate data and realize it has great potential

Data Literacy Personas

- Personas help to improve understanding of the organization's culture and opinions on the importance of data
- In some organizations, people work with data at a leadership level but are Data Skeptics. This is a classic sign of an organization with poor data literacy that will face challenges to improve the current state
- Organizations that have few Data Skeptics tend to have better data literacy and can improve their data literacy current state more easily

In the Final Analysis

In Conclusion

- Data illiterate decision-makers prevent your organization from becoming data driven
- There are **NO MAGIC BULLETS**
- Don't cut corners and do it on the "cheap"
- Be smart, diligent and patient
- You will achieve GREAT results

Questions & Answers

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