GENERATION DATA

USING DATA FOR PROFIT

TECHNOLOGICAL RESOURCES

START WITH A STORY

No story this time - just a picture!

- It is not enough to have a lot of data; companies are pressed to make the rights investments in the right infrastructure. But when there are hundreds of big data tools and services, it can be bewildering! Where do you start?
- It is challenging for small and large companies alike, but the risks are larger for small companies as their budget is more restricted and they have less access to specialist knowledge.
- Most business spend four to six percent of their budgets on IT (https://blog.techvera.com/company-it-spend). Especially for small businesses, this doesn't leave a lot of room for mistakes.

EXPOSITION

1. UNDERSTANDING DATA ARCHITECTURE
- Data architecture refers to both the conceptual design and the physical infrastructure of the systems we use to collect, store, manage and use data.
- Sometimes we draw a distinction between data architecture and information architecture. Simply put, data refers to raw, unorganized facts. Think of data as bundles of bulk entries gathered and stored without context. Once context has been attributed to the data by stringing two or more pieces together in a meaningful way, it becomes information. Data architecture is the development of programs that interpret and store data. Information architecture refers to the development of programs designed to input, store and analyze meaningful information. (Source: Lebanthal[1])
- Data architecture is foundational. It looks at incoming data and determines how it's captured, stored and integrated into other platforms. One such platform is likely a piece of information architecture, like a CRM, that uses raw customer data to draw meaningful connections about sales and sales processes. The CRM is the information architecture in this example because it specializes in taking raw data and transforming it into something useful.

2. DATA TECHNOLOGIES
Data tools are complex and heterogeneous. A plan of action for how data should be handled and moved, under what system, must therefore be developed. The goal is to make all current and future data, in any form, available for any application in the organization, in order to reduce complexity and enhance ease of access and leverage use.[2]

2.1   ENTRY LEVEL TOOLS
All businesses, no matter what size, can benefit from competent use of CRMS, website and social analytics and web-based VOIP services.

Making the most of your CRM
1. Make the CRM software easy to use. Find out what each employee or department really wants and what the CRM needs to do, and customize it to fit those needs. Provide CRM training to all employees.

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[1] https://www.bmc.com/blogs/data-architecture-vs-information-architecture/
[2] https://www.sciencedirect.com/science/article/pii/S014829631630488X

2. Integrate as many data sources as possible. Companies should never think of CRM as a standalone system, integrate their CRM with other client-facing or client-informing systems, and especially social media.
3. Keep it up to date. CRM systems are only as good as the data housed in them. Have a consistent process for updating and managing customer data
4. Start analyzing! Defining the kind of conclusions that you want to get, and work backwards from the expected results to the analyses that will provide those results (or prove otherwise).

Website and social analytics

Google Analytics is a free web analytics service offered by Google that tracks and reports website traffic. It provides in-depth look at your website performance and integrates with all of Google's marketing products: Google Ads, Search Console, and Data Studio.

Even though "web analytics" sounds like a very small area of your digital presence, the implications of Google Analytics are in fact huge. Analysing your website is the best way to give you a holistic view of the effectiveness of all the campaigns you are running to promote your product/services online.

VOIP

Use call tracking analytics to:
• Monitor and manage call flow
• Provide supervisors with real-time opportunities for immediate correction and guidance
• Identify personnel and skills areas that need additional training
• Recognize and promote high-performers
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Big data tools timeline

This is just some of the basic tools for data analysis. As for more advanced tools, the array and application of digital tools for working with big data is constantly expanding.

2.2   BIG DATA TOOLS

Rising, Kristensen, Tjerrild-Hansen, 2014[3], identify three distinct technical categories that forms a pivotal role in creating a low-cost data utilization framework businesses, especially SMEs:
● A scalable cloud network of servers - allowing for developing a small scale operation, that can then be expanded upon.
● A framework for data management, processing and storage, such as Hadoop and MapReduce.
● Analytics software, such as Tableau, SAS, SPSS, etc.

Another way of looking at this is using some of the 5Vs of big data.
If characteristics of data are Volume, Variety and Velocity, then different tools have grown up to help process data in these ways.
- For addressing VOLUME of data, batch processing is best and Hadoop remains main family of tools
- For addressing VARIETY of data, NoSQL databases have developed.
- For addressing the need to process data at VELOCITY, real time analytic programmes have been developed, notably Spark.

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[3] https://web.stanford.edu/class/msande238/projects/2014/GainIT.pdf

3. WORKING IN THE CLOUD

Whether you are using it to run applications that share photos to millions of mobile users or to support business critical operations, a cloud services platform provides rapid access to flexible and low cost IT resources. With cloud computing, you don't need to make large upfront investments in hardware and spend a lot of time on the heavy lifting of managing that hardware. Instead, you can provision exactly the right type and size of computing resources you need to power your newest idea or operate your IT department. You can access as many resources as you need, almost instantly, and only pay for what you use.

Cloud computing is based on resource pooling: companies serve a large number of customers using multi-tenancy systems, in which different resources are dynamically allocated and de-allocated according to demand. From the user's end, it is not possible to know where the resource actually resides.

3.1 Benefits of working in the cloud

- **Broad range technology frees up resources**. Cloud services make it easy and fast to access a broad range technology such as compute, storage, databases, analytics, machine learning, and many other services on an as-needed basis. Helps companies focus IT resources on developing applications and transform customer experiences rather than managing infrastructure and data centers.
- **Economical**: Using the cloud allows you to trade capital expense (data centers, physical servers, etc.) for variable expense; you pay only for the service or the space you use.
- **Accessible:** The cloud allows access across a wide range of platforms and devices making resources more accessible and also more reliable. If the office network goes down, data are backed up to the cloud and still available on a tablet, for example.
- **Scalable:** The cloud's ability to scale up or down means your company doesn't have to hoard data or computing capacity for the rare instances where demand spikes. On-demand scalability is sometimes better expressed as elasticity.
- **Security and risk management** Setting up strategies to overcome cyber attacks, power outages or equipment failure, is difficult, and expensive. Having the data stored in cloud infrastructure will allow your organization to recover from disasters faster

Challenges of working in the cloud

- **Migration.** Migrating big data to the cloud presents various hurdles which require a concerted effort from managers and IT leaders.
- **Less Direct Control over Data.** Storing data remotely and using a third-party's security and compliance protocols can be a big organizational change and may cause some discomfort. Understand and evaluate the provider's protocols so you know what your roles and obligations are.
- **Network dependency and latency.** The availability of the data is highly reliant on network connection to the internet. The issue of latency (delays) in the cloud environment could come into play given the volume of data that's being transferred, analyzed, and processed at any given time.

3.2   WHO ARE THE PRINCIPAL CLOUD PROVIDERS?

There are many providers of cloud services for big data but we focus on the big three.
Amazon is dominant. In a 2018 report, Synergy Research Group noted that spending on cloud infrastructure services jumped an astounding 51 percent over the prior year's quarter, noting: "AWS worldwide market share has held steady at around 33% for twelve quarters now, even as the market has almost tripled in size." [4]

Datamation's overview states:
- **Amazon Web Services** – With a vast tool set that continues to grow exponentially, Amazon's capabilities are unmatched. Yet its cost structure can be confusing, and its singular focus on public cloud rather than hybrid cloud or private cloud means that interoperating with your data center isn't AWS's top priority.

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[4] https://www.oryxalign.com/aws-azure-google-a-public-cloud-comparison-report/

- **Microsoft Azure** – A close competitor to AWS with an exceptionally capable cloud infrastructure. If you're an enterprise customer, Azure speaks your language – few companies have the enterprise background (and Windows support) as Microsoft. Azure knows you still run a data center, and the Azure platform works hard to interoperate with data centers; hybrid cloud is a true strength.
- **Google Cloud** – A well-funded underdog in the competition, Google entered the cloud market later and doesn't have the enterprise focus that helps draw corporate customers. But its technical expertise is profound, and its industry-leading tools in deep learning and artificial intelligence, machine learning and data analytics are significant advantages.

4. CHOOSING THE RIGHT TECH SOLUTION

A four-step model is recommended, but it will be strengthened by the involvement of the right people.

WHO should form part of committee and take the decision? The ideal committee format would include.
- someone very familiar with the functional requirements and mission of your organization (perhaps a teacher, administrator, instructional supervisor, or division head)
- someone very familiar with current system capabilities (perhaps a technical support person)
- someone who has been through a system implementation process before, ideally within the organization (perhaps a seasoned staff member)

Be aware that most software related projects are not only influenced by the "objective" criteria, but by subjective factors. Eg.
- Personal preferences of project leaders, influential external advisors or company management;
- Software vendors or systems integrators who are well established in the company;
- Time and budget constraints in the selection process itself

Understand the costs of the data infrastructure with a reference to the cost of cloud services and be able to simulate estimations.