Introduction to Management Information Systems

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1 Introduction

Contrary to what many techies imagine, the primary business of most businesses is not technology. Historically, most economic sectors have operated just fine without the internet, electricity, steam power, horse power, etc. That said, technology does enable new and more efficient ways of doing things, often with staggering productivity gains.

If we were doing this course at the dawn of steam power, we would be primarily concerned with ways steam power can help businesses do more things faster. Steam power transformed just about all aspects of business: shipments, production, delivery, communication, etc. Then it happened again when electricity became commonplace. It is still happening with computer technology.

2 Competition on Tech

Businesses compete on several fronts:

- Deliver a product cheaper than the competition. There are two ways of doing this: reducing costs or accepting a lower (sometimes negative) profit. Most businesses attempt to reduce costs, often by automating and making operations more efficient using technology.
- Deliver more products than the competition. Businesses need advertising to grow revenue. They also need the capability to grow the capacity to deliver more. Both are often accomplished with information technology.
- Expand into other product lines. The research and development of new products, market research, and advertising are often accomplished with the aid of technology.

Often the difference between a successful corporation and a failed one is their use of technology.

3 Hardware vs Software

A computer system is often viewed as made up of hardware and software. An easy way to think of this: if we can kick it, it is hardware, otherwise it is software. For example, we can kick a printer, but we cannot kick the anti-virus software, no matter how much we would want to.

The hardware may be viewed as a combination of three major components:

- Compute: a CPU, or a resource that is primarily responsible for computation.
- Storage: a disk or other permanent storage system.
- Network: the communication glue that ties everything together.

On a single computer scale, the compute is the CPU & RAM, storage is a disk, and the network is the bus that lets all components communicate. Often there is also an external network that connects the computer to the Internet.

On a data center scale, the compute are machines (and machine instances) with powerful CPUs, lots of RAM and a moderate sized disks (often solid state disk, or SSD). The storage are machines with large arrays of large capacity disks, moderate amounts of RAM, and comparatively low power and lower count of CPUs: this resource is responsible for reading/writing disks, not computation. The network glue ties compute instances to storage instances.

Software has many (often intermingled) categories for an exhaustive list. Below is just a tiny sample:

- Operating Systems: A system that manages the hardware sources. Obvious ones are Windows, Linux, etc. The less obvious ones are Hadoop (manage resources on a cluster), Spark (manage compute resources on a cluster), AWS (Amazon's compute (EC2) and S3 (storage) are essentially an operating system for distributed applications).
- Productivity Software: Word processors, Spreadsheets, etc.
- Servers: web servers, database servers, etc.
- Application Software: software designed for a particular task, such as managing customer interactions, etc.

4 Managing IT

As with all management (and life in general), the primary "problem" is resource allocation. Resource here can mean money, equipment, people, time, etc. Of all the possible allocations, which will give the best return with the least risk?

For example, a company may borrow $1m, and then sit on it, realizing a negative return (paying interest). How can the company utilize that $1m to earn a positive return (after paying interest).

The options may include: spending the money to build their own mini-data-center, or hiring technologist to move existing operations to a cloud provider. Each of these will have costs and benefits—there are usually no right answers—and the right (and wrong) decisions may only be obvious in retrospect.

There are different levels of IT management.

- Enterprise level direction setting: deciding on an overall tech strategy. What areas of the business will be automated, etc. Cost/Benefit analysis.
- Enterprise architect level: deciding on the technology architecture, technology stack, etc.
- Product/Project management level: Building solutions to meet business needs.

Many organizations also include separate branches for data management, risk management, security management, etc.