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Student Engagement & Mentoring in Technology

Chapter 4: The Value of Data

In today's economy, information is often one of the most valuable assets of a business. Every business has sensitive information, from potted plants to customer records, and protecting that information is a crucial business concern. If that information falls into the wrong hands, it could damage the organization's reputation, injure its customers, or cause financial losses.

You will learn the following topics:

- data and information as assets
- importance of investing in security
- relationship of data to creating information
- intellectual property
- digital products
- data-driven business decisions

Data & Information

As an IT professional, you are responsible for protecting the information that your organization values. The first key step to that is recognizing that data and information are indeed assets that have value to your business, just like your vehicles, buildings, and other equipment.

Data

Let's talk a bit about the difference between data and information. Data is the raw facts that our systems and processes generate and collect regularly. You can think of data as just bits of knowledge. For example we might put a thermometer in our factory to monitor a piece of sensitive equipment. That thermometer might record a temperature reading every 10 minutes to determine the temperature inside the equipment.

The end result would be a spreadsheet or a database table containing all of the temperature recordings over time, such as the one shown below. Each of these temperature readings is one fact and all this data. We have a spreadsheet providing data about our temperature readings.

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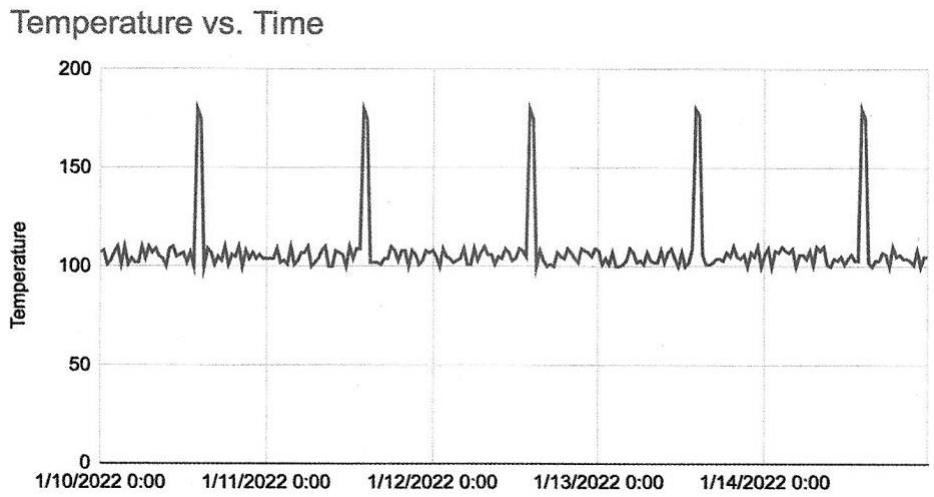
Time	Temperature
1/10/2022 0:00	107
1/10/2022 0:30	108
1/10/2022 1:00	101
1/10/2022 1:30	103
1/10/2022 2:00	107
1/10/2022 2:30	110
1/10/2022 3:00	101
1/10/2022 3:30	110
1/10/2022 4:00	101
1/10/2022 4:30	104
1/10/2022 5:00	102
1/10/2022 5:30	102
1/10/2022 6:00	110
1/10/2022 6:30	104
1/10/2022 7:00	110
1/10/2022 7:30	107
1/10/2022 8:00	109
1/10/2022 8:30	105
1/10/2022 9:00	104
1/10/2022 9:30	100

Information

Information is data that has been processed and analyzed. A system or person has put some effort into putting that data in the context of the business so that it is useful to us. The spreadsheet of temperature information above is all correct but it isn't very useful to us. It's just a collection of data that isn't in any context.

Below, we can start to see what happens if we create a plot showing how the temperature of this equipment changes over time. Now we have information.

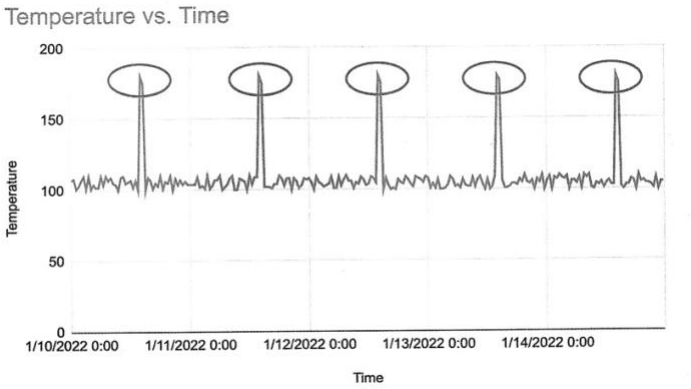


Data-Driven Business Decisions

Looking at the above chart, we can quickly see that the temperature of this machinery spikes to dangerously high levels every afternoon at around 2:00 PM. That's information that we can act upon. We can tell people responsible for this equipment that they need to figure out what is happening every afternoon that's causing this potentially dangerous situation. This story is an

example of data-driven business decisions. When we have the right information at our disposal, we can act upon it to improve our business. There are a few stages to this process.

1. We must first capture and collect data that might have meaning to our business. Whether that's temperature data like our previous example or data about our customers, products, or the operating environment, there are many different kinds of data that might be valuable to us.
2. Once we have that data, we can correlate it and perform analysis to help us find its meaningful information.
3. With that information in hand, we can provide reports to business leaders, helping them make data-driven decisions.



INTELLECTUAL PROPERTY

The information assets that an organization uses to create business value are a type of property that belongs to that business, just as real estate and physical items are examples of property. We use the term intellectual property to describe the information assets that belong to an organization.

The law provides businesses with three different ways that they can protect their intellec-tual property against theft or misuse: copyrights, trademarks, and patents. Each one of these legal tools provides different types of protection for different types of intellectual property.

Copyrights

Copyrights protect creative works against theft. Information protected by copyright includes books, web content, magazines, and other written works as well as art, music, and even computer software. Many organizations now spend much of their time creating digital products. Digital content may also be protected by a copyright.

Copyright protection is automatically granted to the creator of a work upon creation. Although copyright owners may choose to register their copyright with governmental authorities, this is not a legal requirement. In the United States, the Library of Congress administers the copyright program through the U.S. Copyright Office.

The length of copyright protection varies widely according to the country of registration, the type of work, and whether the author is an individual or a corporation. In all cases, it is a very long time. For example, if you create a new work today, the copyright protection for that work lasts for 70 years beyond your death. Once a copyright expires, work moves into the public domain and may be used freely by anyone without requiring licensing or permission.

Copyrights are denoted using the symbol shown below

©

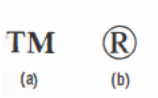
Copyright symbol

Trademarks are used to protect the words and symbols used to identify products and services. Information protected by trademark includes brand names, logos, and slogans.

Owners of trademarks must register their marks with the government to achieve full pro-tection. In the United States, this is handled through the United States Patent and Trademark Office, a U.S. Department of Commerce division.

Trademarks may last indefinitely, but registration must be renewed every 10 years. Trademarks are only valid as long as they are actively used. If an organization stops using a trademark in commerce after five years of non-use, it is said to have abandoned the trademark.

Trademarks are denoted using the superscript **TM** symbol. Once they are granted registration status by the government, they may be denoted using the symbol shown below.



Patents

Patents protect inventions, providing the inventor with the exclusive use of their invention for a period of time. The purpose of a patent is to stimulate invention by assuming inventors that others will not simply copy their ideas in the marketplace. In order to be granted a patent, and inventor must demonstrate that their ideas meet 3 criteria:

1. It must be *novel,* meaning that it is a new idea that nobody has thought of in the past.
2. It must be *useful* meaning that it provides some benefit to someone and that it is actually possible to use the invention.
3. It must be *nonobvious,* meaning that there was some inventive work involved.