: What is evidence?

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Evidence is an abstract idea that plays a significant role in human thinking and decision making. The word evidence becomes more concrete when it names and categorizes a collection of facts and information that is used to determine if a statement of belief or a proposition is correct, true or valid. Evidence is collected, gathered, organized, and summarized in decision processes to persuade a person or group of a conclusion. One may have heard the overused expression "let the evidence speak for itself." This metaphorical cliche neglects the role people play in assembling and presenting evidence. The decision process itself can distort the evidence.

One must acknowledge that there are multiple types of evidence. Some evidence is tangible and verifiable, some is intangible. According to USLegal.com, "Tangible Evidence is an evidence which can be treated as fact; real or concrete. It is capable of being touched or felt and have a real substance, a tangible object." Intangible evidence is non-physical evidence like testimony from an expert. In general, tangible evidence is preferred to intangible evidence.

There is both strong evidence and weak evidence with respect to a decision situation. Strong evidence is directly relevant to the situation and it has been verified. An "example" or illustration is identified as strong evidence. A good "example" shows how one thing relates to another. Strong evidence provides direct proof about the truth of an assertion. Weak evidence may be relevant, but is only partially supported by facts. Examples of weak evidence include personal feelings, minimally relevant details, unsupported opinions and information, and unverified contradictory information. Taflinger (1996) notes "there are many types of evidence: illustrations, statistics, testimony, analogies, and comparisons."

Decision makers must evaluate **all** types of evidence. For example, some common examples of evidence include: 1) a drawing or sketch of an object, person, or event; 2) notes taken contemporaneous with an event; 3) objective data summarized in a data table, chart or graph; 4) an original photograph; 5) a peer reviewed scientific article; 6) a personal experience; 7) a physical object connected to an event; 8) a reconstruction or scale model of a setting; 9) a recording or notes from an interview with an expert; 10) results from a systematic investigation; 11) a real world example that is documented; 12) a statistical analysis of data; and 13) a record and analysis of systematic observations. A prediction, a personal opinion, a hypothetical example, and a hypothesis are **not** evidence. Relevant, reliable evidence can and is used to support arguments.

The scientific and professional literature is expanding rapidly and some research studies are better

designed and more factual than other studies. Some evidence and studies are definitive and reliable, while others are weak and suspect in method or design or both. Peer reviewed research should present the strongest most reliable evidence. How can you know what evidence to trust? Ask about the source, the recency of the data, the data gathering, and the review process that led to the publication or creation of the article/document.

The *March for Science 2018* held in Washington, D.C. on April 14 was one of 500 marches worldwide intended "to send one clear message to public officials: that evidence-based policy decisions are critical and science should not be ignored," cf., Miller (2018). Miller noted "Science advocates say they want to keep the spotlight on the critical role science plays in daily lives and encourage government leaders to make science a part of their platforms." Science can provide important evidence, but some scientific evidence is equivocal and hence open to more than one interpretation. Hence, scientists must continually evaluate the meaning of research findings.

If one searches the Internet for rules of evidence, websites like the Legal Information Institute (LII) and Rules of Evidence (www.rulesofevidence.org) provide access to the Federal Rules of Evidence. These rules "govern" the introduction of evidence at civil and criminal trials in the United States. The rules may seem straightforward, but the notes and interpretation are often complex. For example, Rule 401 defines the "Test for Relevant Evidence". Evidence is relevant if: (a) it has any tendency to make a fact more or less probable than it would be without the evidence; and (b) the fact is of consequence in determining the action. The accompanying note is 849 words in 41 sentences. The interpretive note is hard for a non-lawyer to understand, but there appear to be ample reasons to argue about and challenge the relevance of an item of evidence.

Also, the Latin phrase, *Res Ipsa Loquitur*, “the thing speaks for itself”, summarizes another judicial rule of evidence. In the common law related to civil wrongs, this rule means that "in a particular circumstance or circumstances, the mere occurrence of an incident raises an inference of negligence that establishes a prima facie case of that negligence (cf., CPH & Associates)." The legal rules of evidence are foreign to the practice of management. We do not have a codified set of rules and legal principles that govern the proof of facts in business decision making.

In recent years, managers have invested in improved data storage to provide better evidence. Inmon (2004) notes "One of the great appeals of the data warehousing concept is that with a properly installed warehouse, there is a single version of the truth." Single version of the truth (SVOT) is supposedly a major advantage of building a data warehouse. In this data environment, all reports and analyses are created using the same data stored in a consistent and non-redundant form. The idea of SVOT is appealing, but one must wonder about how differences between data sources were reconciled. King (2003) notes getting to a single version of the truth is "more than sophisticated business intelligence software. It takes data quality and political battles, too." Truth in a data warehouse is not necessarily reliable evidence for managerial decision making. Managers

must be ever skeptical about the facts.

Evidence should be the foundation of decision making. Sorting out the facts, evaluating credibility, relevance, and impact upon alternatives is not a simple task. The first step to incorporating evidence into decision making processes is to understand what is meant by evidence.

Claimed facts are not always facts and evidence is not always relevant in a decision situation. The term evidence-based refers to taking actions that are supported by "objective", concrete, physical and verifiable facts. Opinions of experts and other subjective evidence also influence business decision making. A manager must sort out the relevant facts and opinions, and then make or delay a decision. Often a group of managers discuss the facts, the evidence, and the decision, but not always. Consensus about the truth is not the norm in all decision situations.

Managers should be pursuing the "truth" and "seeking evidence", but many business decisions are of necessity based upon assumptions, forecasts, and expert opinions. A business decision is based upon more than evidence as that term is narrowly defined. What can be done? Roman Emperor Marcus Aurelius wrote in his Meditations: "If anyone can refute me — show me I’m making a mistake or looking at things from the wrong perspective — I’ll gladly change. It’s the truth I’m after, and the truth never harmed anyone. What harms us is to persist in self-deceit and ignorance (Meditations, Number 21, Book 6)." Managers should follow Aurelius's guidance when evaluating evidence, offering an opinion, or making a decision. In general, find a devil's advocate (Schwenk and Thomas, 1983), listen and reflect.

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