BPTrends COLUMN

June 4, 2019

DIGITAL TRANSFORMATION MIKE ROSEN

Turning Data Into Value

While there are lots of different ways to look at digital transformation, the key is the data. It's all about the data – how you collect it, how you combine it, how you analyze it, how you use it. It's often quoted that "Data is the new oil" which was said by British Mathematician Clive Humbly in 2006. More recently, the Economist magazine published a report in 2017 titled "The world's most valuable resource is no longer oil, but data". Meanwhile, Harvard Business Review reported in 2018 that "Data may be the new oil but having lots of it may not make you rich". In fact, IBM reports that over 1 tb of production data is being created daily, but less than 1% of the data is actually being used. It seems that having lots of data is not the key to value, rather it is what you do with it that counts. So, what is the key to turning data into value?

Digital Transformation Paradigm

When thinking about any digital business scenario, I like to frame it in terms of what I call the essential paradigm of digital transformation – **sense, compute, act**. How the organization senses the environment and manages the data, how it analyzes and learns from it, and then how it acts on it to affect outcomes. What differentiates the winners of data value creation is how they leverage these aspects to deliver meaningful value-added actions that engage their ecosystem, optimize their operations, and create new revenue streams and optimizations.

- ***Sens****e - continuously collect data from multiple sources in real time*. That data may come from customers, connected products and services, IoT devices, or from other data providers. The key is not just collecting a lot of data but collecting relevant data.
- ***Compute*** *– aggregate and discover, analyze, learn, to gain insight and knowledge*. This is the transformation of raw data into information, knowledge and insight, the first steps in value development.
- ***Act*** *– to create a comprehensive awareness of the state of the platform business, to augment human decision making, and to automate internal and external business and operational processes*. This is the step where actions are taken to transform the information into value.

DIKW Model

The DIKW Model (Pyramid) – Data, Information, Knowledge, Wisdom – is a common model for thinking about data transformation and value creation. Although the exact origins of the model may date back to the 70's or even 50's, the modern version is often attributed to Russel Acklof, organizational theorist and system thinker, in 1988. Although Acklof identified the states of data, he did not visualize it as a pyramid. The version shown in Figure 1 below comes from Soloviev's 2016 article about big data.

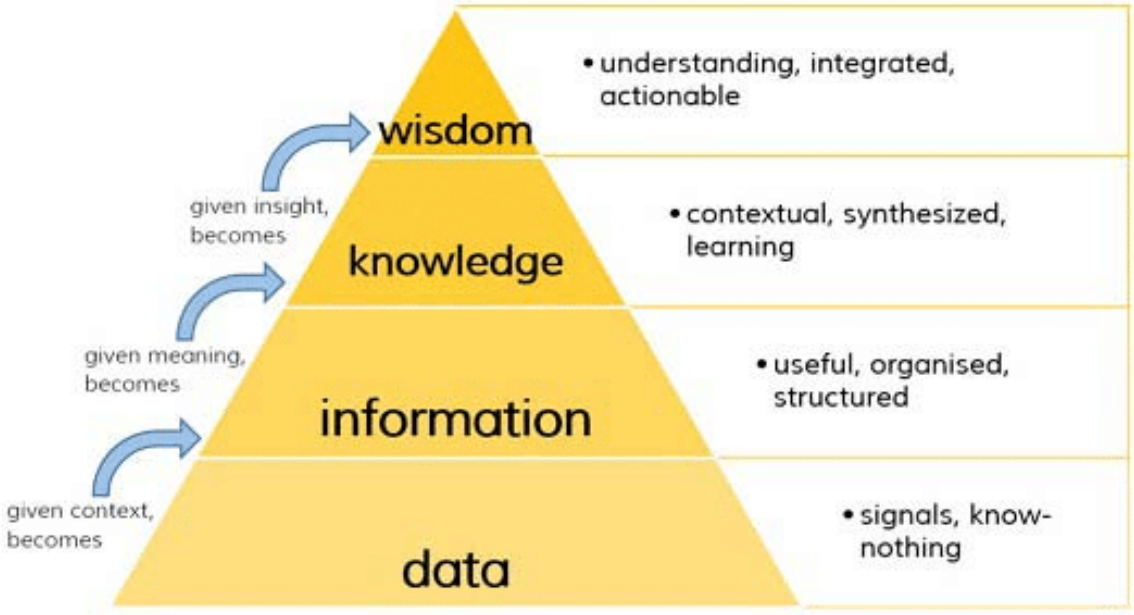

Figure 1 - DIKW Pyramid

- **Data** - characterized by Rowley and Hartley "as being discrete, objective facts or observations, which are unorganized and unprocessed and therefore have no meaning or value because of lack of context and interpretation." Data can also be "signal readings" from sensors, such as IoT devices.
- **Information** – Again, Rowley describes information as "organized or structured data, which has been processed in such a way that the information now has relevance for a specific purpose or context, and is therefore meaningful, valuable, useful and relevant." Information is contained in descriptions and is differentiated from data in that it is "useful". Information is inferred from data in the process of answering interrogative questions (*e.g.* who, what, where, how many, when).
- **Knowledge -** Knowledge is defined with reference to information having been processed, organized or structured in some way, or as being applied or put

into action. Knowledge has also been described as the "synthesis of multiple sources of information over time, and the organization and processing to convey understanding".

- **Wisdom - Wisdom** is the ability to increase effectiveness and "do the right thing".

DIKW is not always represented as a pyramid. Figure 2 shows it represented as a flow (of value).

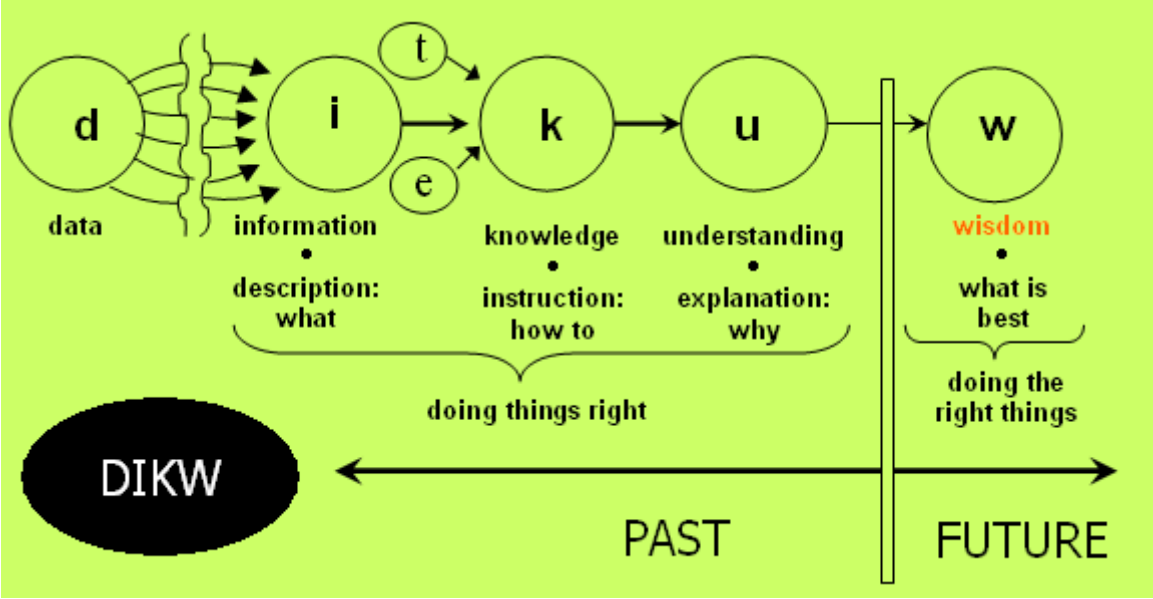

Figure 2 - DIKW Flow

In either case, there is a transformation from one state to the next:

- Data put into context to have meaning becomes useful information, or a description of "what" – allowing us to interpret things.
- Information, given meaning with understanding, becomes contextualized to be knowledge, or a description of "how to" – allowing us to model things.
- When we further add explanation, or "why" to knowledge, we gain understanding. Acklof includes understanding as an explicit state in his model, but it is not part of the more common DIKW model.
- Knowledge (and understanding), given insight or judgement, becomes actionable as wisdom, or a description of "what is best" – enabling us to make better decisions.

Figure 3 illustrates an example of the pyramid in terms of three aspects that are relevant to digital transformation:

- **Data Enrichment** – the transformation of data to information, knowledge, and wisdom (the traditional pyramid).

- **Value Development** – how an organization develops the opportunity for value by applying those transformations.
- **Value Realization** – the realization of the value development in terms of outputs, products, services, and outcomes.

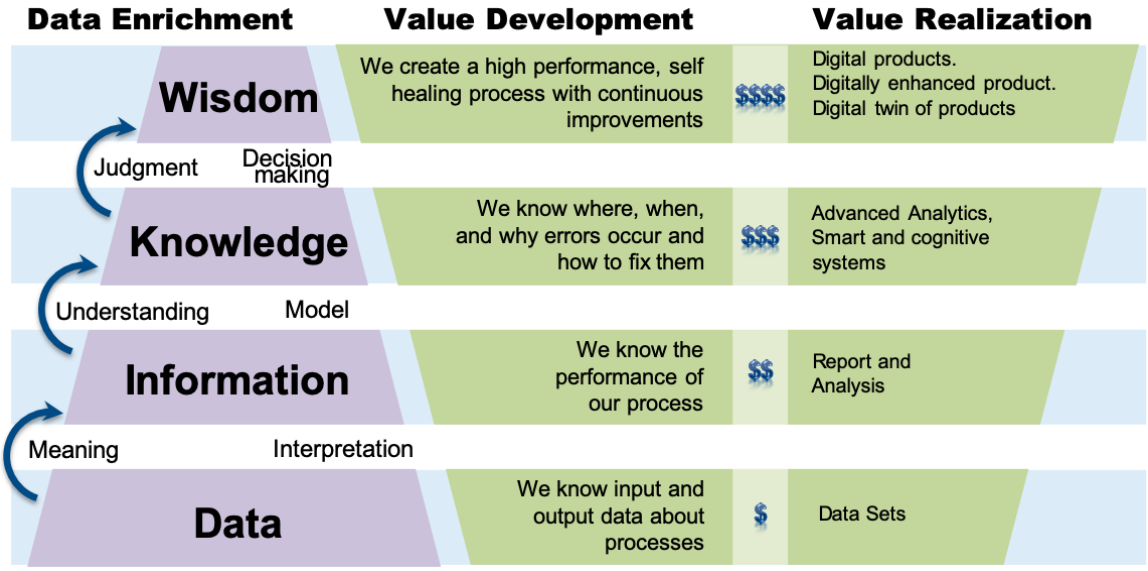

Figure 3 - Value Realization

Information and Knowledge. Of What?

Figure 3 illustrates a simple example of value realization for one type of information (or knowledge). But, for digital transformation, there is much more opportunity by combining different specific information in new and innovative ways. IDC identifies the following types:

Type of Knowledge	Function
Data	Identify and understand all information at our disposal and its value to the business
Behavior	Uncover actors' behaviors, such as customer journeys, robots used to fake news, or ratings
Domain	Improve knowledge in a specific business domain
Network	Analyze business networks and ecosystems, connectivity, partners, influence, and opportunities
Organization	Understand organizational goals, roles, structures, governance

Type of Knowledge	Function
Social	Understand social interactions, impressions, sentiments, trends, influencing mechanisms, consensus building, and group decision making
Security	Identify risks, threats, trends; correlate events and activity across ecosystems
Environment	Understand the overall data world immersing enterprise data systems; present contextual factors and evolving interactions between this context and the enterprise for adaptive engagement and context-aware automation

Table 1 - Types of Knowledge

While each of the types or "subjects" of knowledge are interesting on their own, a comprehensive approach which combines the different subjects is important because that creates the opportunity to generate significantly more value – the whole is greater than the sum of the parts.

So, what is the secret to turning data into value?

1. Collect data from multiple different sources. But don't just collect data, collect valuable data that you actually use.
2. Understand the concepts and usage of the DIKW model. Learn how to use cognitive technologies (automation, machine learning, etc.) to transform data into information and into knowledge. That is what most organizations can expect to achieve. Some leading organizations will get to the wisdom phase.
3. Combine multiple types of information together to discover new and different insights.
4. Act on the insights and knowledge to produce better engagement with stakeholders, better products and services, and new revenue streams.
5. Think "sense, compute, act"

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