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Task 1

Question: According to the DIKW hierarchy, it is implicitly assumed that data can be used to create information, information can be used to create knowledge, and knowledge can be used to create wisdom. There is no wisdom without knowledge, there is no knowledge without information, and there is no information without data.
Do you agree or disagree with this view? Justify your stand.

My Stand: I agree with the view.

Justification: It was in his treatise, *Discourse of Methods,* where Rene Descartes wrote, *"je pense, donc je suis"* (I think, therefore I am) (Descartes, 1637). We can all agree that it is probably the wisest thing any Frenchman has ever written. But, where does such wisdom come from? Surely, it can't exist in a vacuum by itself. Monsieur Descartes was, at the time, working his way through an existential crisis and was probably unaware of the general wisdom he was divulging. Where did his wisdom originated from? Surely, it came from his thoughts, which was based on his knowledge of life, which he gained through experiences. All his experiences were stored as information in his mind by billions of neurons and synapses.

With that view of Rene's mind, let's start at the top of the DIKW hierarchy and ask the question - can wisdom exist without knowledge? Personally, I battle to fathom such a situation. How can one make wise decisions without knowing anything? I don't believe we can. The same goes for knowledge – can we be knowledgeable about something without holding any information on the subject? Again, I don't think this is possible.

The DIKW hierarchy succeeds in explaining the idea that there exists a natural order to the flow of knowledge. The structure of the hierarchy, presented as a pyramid, unashamedly spells out the concept that there is a progression from data to information to knowledge and eventually to wisdom (Rowley, 2007).

The pyramid structure also suggests that there is a natural ratio that exists between each of the layers of the pyramid and that the further we traverse up the hierarchy the scarcer the next entity of the hierarchy becomes. This resonates well with the well-known "Maslow's hierarchy of needs" ("Maslow's hierarchy of needs," 2019). Although, I'm sure the French would argue that *la petite mort* and a few good baguettes are way more important than data.

(**Word count: 319)**

Task 2

Question: According to the DIKW hierarchy, it is estimated that on average about 40 per cent of the human mind consists of data, 30 per cent information, 20 per cent knowledge, 10 per cent understanding, and very minimal wisdom. That is, there is less information than data, less knowledge than information, and less wisdom than knowledge. This is why the hierarchy is also called the knowledge pyramid.
Do you agree or disagree with this view? Can we have more information than data or more knowledge than information? Justify your stand.

My Stand: I partially agree with the view

Justification: At best, I would argue, that we can only *assume* the human mind holds data, information, knowledge and wisdom in the proportions as suggested. I say this because, we still don't know exactly how the human mind works (Gorman, 2018). The initially mentioned assumption stems from our observation from the natural world around us. For instance, we witness enormous amounts of data being stored in databases. We can measure the volume of data that is stored and the rate at which it flows in and out of our storage devices. This ability makes data a very tangible object and therefore we accept it as the base layer of the pyramid structure; and not necessarily because it is the absolute truth but, rather because it is a comfortable proposition.

The next layer, information, is measurable as suggested by information theory. Information theory utilises *entropy* to quantify the amount of uncertainty involved in the value of a random variable (Shannon, 1948), which suggests the *shannon (symbol:Sh)* measure. Highly organised data, such as found in databases, contains low entropy and therefore a high level of information.

The next two levels of the hierarchy, knowledge and wisdom, have no quantifiable dimensions by which they can be measured. For instance, we can only refer to the amount of knowledge as a general quantity, e.g. little, average or vast amounts of knowledge. The same goes for wisdom. I think it is due to this human inability to parameterize knowledge and wisdom vs. the quantifiable *gigabyte* and s*hannon* that makes us naturally assume that wisdom is less than knowledge, which in turn is less than information, which in turn is less than data. The DIKW hierarchy, with its pyramid shape, enforces this idea and makes it very easy to accept.

(Word count: 293)

Task 3

Question: Even though there are some debates on the hierarchy, it is a 'taken-for-granted' notion in data science and information science. What are possible criticisms and potential drawbacks of the hierarchy (including both your own opinion and an analysis of what you find in research literature)?
Investigate and research criticism and potential drawbacks of the hierarchy, and list three to five (3-5) of them with justification.

My Stand: I agree, it is "taken-for-granted" and I do have my own criticism about the hierarchy.
Justification: To state it blandly, the DIKW wisdom hierarchy is just not comprehensive enough. Some authors criticize the pyramid structure of the DIKW and state that it is too simplistic. They argue that a more complex structure, such as a *tetradian*, could better describe the hierarchy (Graves, 2012). It might sound a bit *avant*-garde but, by suggesting a more complex geometrical structure, some authors create additional dimensional space wherein they can introduce new augmented ideas to the DIKW hierarchy. For instance, *context,* which frames information; *connections*, which links data items and context; *purpose,* which serves as a structure to give guidance towards wisdom (Graves, 2012).
At best, I would agree that the DIKW hierarchy is a *general* portrayal of knowledge flow and serves well as a blanket theory that places data, information, knowledge and wisdom in an acceptable and easily consumable human context. In other words, the DIKW hierarchy resonates well with humans because it is easily consumable in its current, simplistic portrayal.
The DIKW concept also facilitates and creates awareness about the ideas that flows around and from the concept. For instance, it entices us to look deeper into ideas such as meaning, insight, informativeness, principles, believes and intent. The latter mentioned ideas can be grouped into even higher abstract ideas such as strategy, game theory and eventually wisdom itself. Hence, the frustration of contemporary thought leaders with the current restrictive pyramid structure.
Finally, I think that the DIKW hierarchy lends itself well to form an elegant synergy with the bi-directional, temporal flow of the chronological order of the individual concepts

in the hierarchy, i.e. data facilitates information, which facilitates knowledge, which facilitates wisdom, which flows back into knowledge, which creates information and eventually is stores as data. Maybe a new geometrical shape is required to incorporate many of the additional, well-intended ideas into a new DIKW hierarchy - DIKW Mk II? **(Word count: 312)**

Task 4

Question: There are several types of data/information systems: transaction processing systems, management information systems, data warehouses, decision support systems, and expert systems.
Map the DIWK hierarchy to these types of information systems and justify your mapping. For instance, you might start your response with 'Data warehouses are mapped to the information level in the hierarchy, because they are…', or 'Data warehouses are mapped to the knowledge level in the hierarchy due to…'.

My Stand: I agree that 3 of the 4 DIKW levels can be mapped to various real-world systems.
Justification: At the most fundamental level we can map any system, which has the capability to store, process and move data, to the data layer in the DIKW hierarchy. Transaction processing systems facilitate the movement of highly organized and structured data and can therefore be mapped to the information level in the DIKW hierarchy.
With the idea that information can be gathered from data once data is ordered and contextualise (Shannon, 1948), we can assume that databases and data warehouses are mapped to both the data and information layers in the DIKW hierarchy. However, data warehouses are designed around subjects (Inmon, 2000), which means that the information they contain offers a knowledge base to its users ("KMS-Techopedia," 2019). Although one can argue that *subject orientated* information constitutes explicit knowledge (e.g. business intelligence), one can also argue that *contextualized* information carries implied knowledge. Knowledge management systems should encompass both explicit and implied knowledge and therefore, we can also map data warehouses to the knowledge level of the DIKW hierarchy.
Decision support systems are information systems that support businesses in decision-making activities ("Decision support system," 2019). This means that highly

focussed knowledge is presented and suggested to decision makers by decision support systems. Therefore, we can say that decision support systems can be mapped to the knowledge level of the DIKW Hierarchy.

Expert systems is said to utilises artificial intelligence to mimic human intelligence ("Expert system," 2019). Expert systems function on two subsystems, inference engine and a knowledge base ("Expert system," 2019). It is stated that expert systems solve problems by "reasoning" through bodies of knowledge. I'm still a sceptic of this idea and I would, at most, agree that these expert systems could only mimic the process of reasoning, Non-the-less, besides humans, expert systems are probably the closest entity which we can map to the wisdom level of the DIKW hierarchy.

(Word count: 309)

Task 5

Question: Ackoff stated that "From all this I infer that although we are able to develop computerized information-, knowledge- and understanding-generating systems, we will never be able to generate wisdom by such systems."

Do you agree or disagree with Ackoff's statement? Justify your stand.

My Stand: I agree with Mr. Ackoff's statement.

Justification: In order to understand why wisdom cannot be generated by machines, we need to understand what wisdom is. Wisdom is an abstract concept, which is non-quantifiable. At best we can categorize wisdom as either good or bad. By portraying something as good or bad we inevitably drag morality into the equation, which in turn is driven by principles and believes.

According to the DIKW hierarchy we reach wisdom once we transcend knowledge. In my view an intermediary step is needed to complete this jump from knowledge to wisdom; and that step is *opinion*. Once a certain level and amount of knowledge has been attained regarding a *gestalt*, an opinion can be formed. Although the opinion of a *corpus* arises from knowledge it is tempered by the overarching principles and believes of the *corpus*. Once an opinion has been formed, it inevitably leads to intent. Without an opinion there could be no intent, and intent is what drives strategy. Although opinion is not *fact* ("Opinion," 2019), it is the intermediary step required to get to wisdom, which is influenced by believe, which is also not *fact.* Once we leave

the realm of *fact* (data, information, knowledge), we enter a sphere of abstract thought in which wisdom resides.

All the above concepts, ideas and entities form the inner workings of wisdom. Going from knowledge to wisdom is an entirely human endeavour. Machines, I doubt, will ever have the capability to foster wisdom as based on the elements suggested above. I want to go further and state that wisdom is based on life experience, the ability to reflect, to project and to interpolate. No machine will ever possess the ability to reflect upon its life events. To a machine those events are only raw bits of data.

(Word count: 294)

Table 1 - Final Word Count

Task	Word count
1	319
2	293
3	312
4	309
5	294
Total	**1527**

References

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