



# THE GOVERNANCE OF THINGS – The Challenges of Information Governance in a Cyber-Physical World

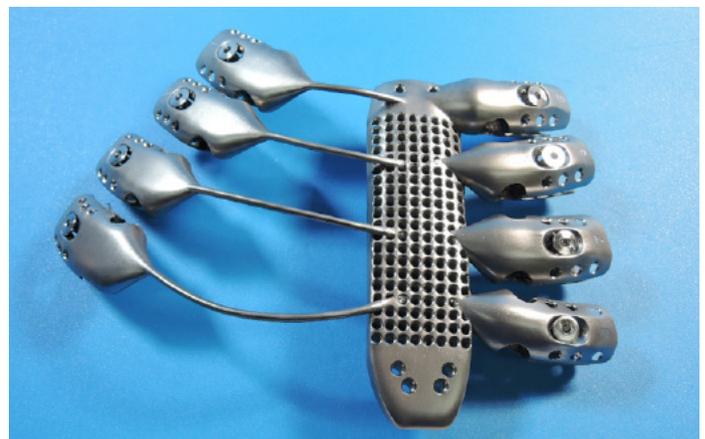
When people think about information and information governance, they may think about information in a purely digital or online sense. And, they tend to think that governance centres on addressing privacy and broader legal compliance requirements and, perhaps, consider information from a business risk perspective. However, in a world where digital information and the physical environment around us are increasingly connected, information governance takes on a broader view.

## INFORMATION GOVERNANCE GOES BEYOND CYBER

This growing cyber-physical world of additive manufacturing (commonly known as 3-D printing), customised healthcare based on genetic makeup, driverless and connected personal vehicles, and fully automated mass transportation systems optimised using complex data analytics, promises to bring great benefits to humanity. But, it also carries myriad risks, many of them relating to information governance.

For example, if all types of components, from car spare parts to human body replacement parts, are created using additive manufacturing, how can one ensure that the right part is made and the part is actually fit for that purpose? Both outcomes depend on the information that has been used to design and produce the part. A vehicle fitted with an incorrect or wrongly made part is potentially dangerous,

while incorrect or wrongly made human body replacement parts are much more problematic. Figure 1, which provides an example of a titanium replacement partial rib cage made by the Commonwealth Scientific Industrial Research Organisation (CSIRO) in Australia, demonstrates the importance of properly governed design information.



Additively manufactured replacement partial rib cage for cancer patient<sup>1</sup>

Managing healthcare records has always been challenging, but moving them to digital form in recent years even more so, with significant problems commonly experienced. An increased understanding of the human body through genetics and other research and much more sophisticated and information intensive treatments are expected to bring very significant growth (orders of magnitude) in the volume and complexity of healthcare records.



This information will likely be used to develop customised courses of treatment and replacement body parts. How well people govern this information will, to a large extent, determine whether medical technologies deliver true benefit to a wider society at affordable costs instead of just to a privileged few.

Similarly, poor information governance could have serious consequences for the transportation systems in the near future. Beyond the obvious risks to human life of any resulting accidents, a more insidious consequence would be the failure to realise the full benefits of transportation automation.

For example, driverless and connected personal vehicles are supposed to be able to travel more closely together and more quickly than human driven vehicles, leading to less congestion, reduced demand for roads and thus less urban area allocated to roads, and reduced commuting times and/or comfortable commuting distances leading to changes in how urban environments are designed.

Similar arguments apply to automated mass transportation systems, which allow much increased passenger capacity over human operated systems. Given that more than half of humanity now lives in urban areas, potentially increasing to two-thirds by 2050<sup>2</sup>, ensuring that the benefits of improved transportation technology are not compromised through poor information governance is, without exaggeration, important to most of humanity.

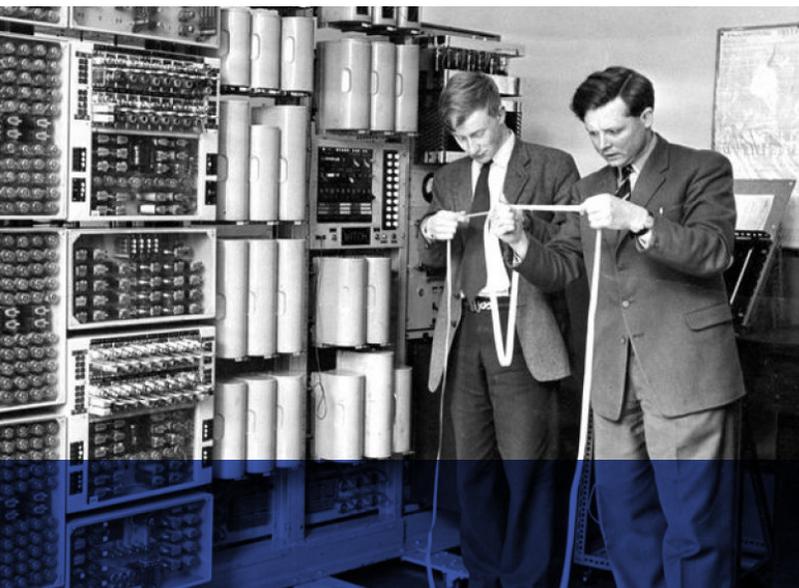
## INFORMATION GOVERNANCE IN A CYBER -PHYSICAL WORLD

So, what does adequate information governance in a cyber-physical world look like? It starts with getting the technology design aspects right to prevent information exchange incompatibilities, data corruption and data loss. This is well understood and commonly done, however, experience shows that failing to go much beyond this is where problems arise.

Design too often focuses more on the exchange and processing of data as an end in itself rather than on the result of this, which is whether or not information flows in the right form to the right place and at the right time to enable appropriate machine and human operational decision-making while supporting regulatory, legal, risk, environmental and other requirements.

To achieve the potential that the cyber-physical world offers us, we need to ensure that design extends to consideration of context, including appropriate information governance. This is more than just meeting technical, regulatory or other requirements; instead, there must be a focus on how the technology will be employed to deliver benefit while managing the associated risks.

For example, the 'system' needed for widespread adoption of additively manufactured body parts such as the partial rib cage replacement shown above must adequately



govern all relevant information including, obviously, characteristics of the part itself and the physiological characteristics of each recipient because each part is unique to that recipient. Additionally it must also govern information about the methods of manufacture and the environments in which it is made and implanted given that the part will likely remain implanted for the rest of the recipient's life as well including privacy by design to protect the recipient.

Similarly, the necessary governance of information about transportation systems extends beyond the design of the physical cars, trains, roads, tunnels, etc., to the environment in which the systems are employed and the usage patterns of the people using them. Given that most of these systems are intended for use over many years or

decades and usage patterns may change, governance of historical operational information is needed to ensure that transportation systems can evolve to meet changes in society.

As the physical and virtual worlds of society become ever more integrated, expect to see a much greater collaboration between the technical professionals who develop technology-based products and systems and information governance professionals.

This collaboration is essential in ensuring that the potential benefits of the growing cyber-physical world are realised.

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<sup>1</sup>[www.csiro.au/en/News/News-releases/2015/Cancer-patient-receives-3D-printed-ribs-in-world-first-surgery](http://www.csiro.au/en/News/News-releases/2015/Cancer-patient-receives-3D-printed-ribs-in-world-first-surgery)

<sup>2</sup>[www.un.org/en/development/desa/news/population/world-urbanization-prospects-2014.html](http://www.un.org/en/development/desa/news/population/world-urbanization-prospects-2014.html)

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