

# Cameron Hume

Fixed Income Specialist

## A Vision for Investment Analysis: Do Analysts Dream of Electric Sheep?

### Executive Summary

We believe that we will produce better results for clients if we can make it easier for human and artificial intelligence to work together.

Creating the environment required for this happen is extremely challenging. The historical centralisation of IT functions in a single department was suited to a particular way of analysing data, but the expectations of users has changed. A critical failing was the inability of the centralised function to be responsive on short time scales. As a result, organisations often experience the proliferation of highly flexible spreadsheet applications that are widely distributed, poorly controlled and undocumented. In our view this approach is unlikely to succeed.

At Cameron Hume, we believe we have found a way to permit our investment team to work with IT in an effective and collaborative way through an integrated model for IT. This is based on our considerable experience of managing IT departments and investment analysis teams elsewhere, and we present our experience as a case study.

### What is Augmented Intelligence?

As a science fiction writer who produced his major work in the 1960s and 70s, Philip K Dick exhibited unusual prescience. His seminal 1968 novel (it was the starting text for the film Blade Runner) "Do Androids Dream of Electric Sheep" envisages a dystopian future where androids, created for off-Earth exploration, return to Earth and are terminated by bounty hunters ("blade runners"). The bounty hunters distinguish androids from humans by means of an empathy test. In the book, unlike the film, the androids turn this on its head and exploit the human surfeit of empathy to exact revenge.

The aspect of Dick's novel that is prescient is that neither man nor machine is superior. The machine has superior logic but makes mistakes the human could avoid. The relevance can be seen in the current debate around self-driving vehicles: can a self-driving vehicle make either an irrational decision (ignore the rules of the road to avoid an accident) or a moral decision (if faced with one of two unavoidable accidents, choose the right one)?

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Writing in the Harvard Business review, Erik Brynjofsson and Andrew McAfee say "machine learning systems hardly ever replace the entire job, process, or business model. Most often they complement human activities, which can make their work ever more valuable"<sup>1</sup>. The article makes the point that computers are devices for answering questions, not for posing them (Pablo Picasso made the same point more pithily: "they are useless. They can only give you answers.")

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<sup>1</sup> *The Business of Artificial Intelligence*, Harvard Business Review 2017, <https://hbr.org/cover-story/2017/07/the-business-of-artificial-intelligence>



Evidence in support of this last claim was presented in a study by researchers from Harvard University who compared the ability of expert doctors and AI software to diagnose cancer<sup>2</sup>. They found that doctors perform significantly better than the software when both are working independently, but doctors together with software were better still.

All of this suggests that in order to make the most out of the relationship between man and machine, the essential challenge is for humans to pose the question in a way that the computers can answer. We describe this collaborative approach between man and machine as “augmented intelligence”.

The phrase “augmented intelligence” was first used by in the 1950s by cybernetics and early computer pioneers. It is not to be confused with artificial intelligence, in which machines attempt to emulate human-like intelligence independently. Rob Stanich, global wealth management offering manager with IBM Watson Financial Services in New York City uses the phrase “augmented intelligence” to describe the combination of human and machine intelligence<sup>3</sup>.

However, creating an environment that allows such a symbiotic relationship between man and machine to flourish is difficult. In a recent survey, Deloitte asked insurers what difficulties they encountered in getting the right data, analysing the data and then integrating the results into their decision making<sup>4</sup>. More than 90% of respondents identified “the analysis strategy does not align with the business strategy” as a key difficulty and over 60% of insurers said that the results were not embedded into the strategic decision making process.

#### Why is it so difficult to get man and machine to work together?

A critical factor in the failure of organisations to create this symbiosis between man and machine is the way in which corporate IT has been organised. In our experience, requirements have historically been expressed by “the business” to the IT department who, in a linear and “waterfall” fashion create code that may or may not match these requirements. This is widely recognised. Writing in CIO<sup>5</sup> magazine in 2015, Richard Pastore said: “waterfall methodologies and three-year projects still have a place – in the National Museum of American History’s Computing Relics department”<sup>6</sup>.

Compromises have been sought: Gartner have suggested a “bimodal” model of IT that allows a focus on both digital innovation and more traditional activities but, as Pastore observes: “Bimodal IT is like a CIO owning acres of swampland. Even if the CIO builds one or two digital smart homes on the swamp, it’s still a bad, bad neighbourhood”. None of this is new. A study by Harris Interactive commissioned by A.T. Kearney in 2004, concluded “Today’s IT organizations are not responding effectively to the demands of their business. Executives are eager to adopt new technologies, however they say the best ideas are not coming from IT, but from the business side.”<sup>7</sup>

**“The essential challenge is for humans to pose the question in a way that the computers can answer.”**

<sup>2</sup> *Better Together; Artificial Intelligence Approach Improves Accuracy in Breast Cancer Diagnosis*, Harvard Medical School 2017, <https://hms.harvard.edu/news/better-together>

<sup>3</sup> *“Augmented Intelligence”: Combining Human Intelligence and Technology*, CFA Institute 2017, <https://blogs.cfainstitute.org/investor/2017/10/18/augmented-intelligence-combining-human-intelligence-and-technology/>

<sup>4</sup> *EMEA Insurance data analytics study: A little less conversation, a lot more action – tactics to get satisfaction from data analytics*, Deloitte 2017 [https://www2.deloitte.com/content/dam/Deloitte/hr/Documents/financial-services/hr\\_emea-insurance-report-2017.pdf](https://www2.deloitte.com/content/dam/Deloitte/hr/Documents/financial-services/hr_emea-insurance-report-2017.pdf)

<sup>5</sup> In this article, the acronym CIO refers to Chief Information Officer. This is very confusing for investors, for whom the acronym almost always stands for Chief Investment Officer!

<sup>6</sup> *For a future-ready IT organization, think multithreaded, not bimodal*, CIO 2015, <https://www.cio.com/article/3008563/cio-role/for-a-future-ready-it-organization-think-multithreaded-not-bimodal.html>

<sup>7</sup> *Why Today’s IT Organization Won’t Work Tomorrow*, A.T. Kearney 2005, [http://www.atkearney.co.uk/documents/10192/663262/IT\\_Tomorrow\\_S.pdf/60bfe012-19cc-4a4a-b424-9b0c55305bb5](http://www.atkearney.co.uk/documents/10192/663262/IT_Tomorrow_S.pdf/60bfe012-19cc-4a4a-b424-9b0c55305bb5)

IT skills have historically been gathered in one place in the organisation. The advent of technologies that allow fast and agile development of IT, and the native skills of millennials are to the old school IT department what the invention of email was to the typing pool. In the same way that we would no longer pass a hand-written document to a typist to be typed, corrected and eventually despatched, new digital capabilities mean that we no longer need to pass our requirements to an IT department to be built; we can just build them ourselves. Deloitte calls someone who can bridge the gap between technical analysis and the business a “purple person”.

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In its yearly IT Trends survey, CIONET asked 579 CIOs about their vision on the future of their organisation. 21% thought that companies will not have IT divisions in the future and only 25% thought that application development would be centralised, rather than networked or federated<sup>8</sup>. If even CIOs are losing faith in the future of their function, then the eventual transition from the IT department to an integrated or at least federated model of IT seems inevitable.

Mark Blanke writing in CIO talks about the need to move to outsourced operations and cloud-based infrastructures and notes that smaller organisations are pioneering this shift: they have relatively simple environments and need to build structures that are efficient and easy to manage<sup>9</sup>. Having both a flexible infrastructure and an entrepreneurial culture that allow a focus on business value are also important. Writing in Forbes on the 14 principles of the future organisation, Jacob Morgan identifies operating “like a small company” and running “in the cloud” as essential principles to allow teams to collaborate effectively. He also notes a requirement to be intrapreneurial: “Employees should be able to test out ideas, run experiments, pitch new projects and run with the ones that have potential”. This suggests an analytics sandbox, which Deloitte define as “an environment which provides a core set of analytical tools and access to business data to enable exploration through various analytical techniques to identify new insights”.

### Case Study – Cameron Hume

At Cameron Hume we are firm believers in the value that good quality data and appropriate analysis can add to our investment process. We are also very aware of the hurdles to integrating data analytics into the investment process, but we are in the enviable position of being able to set up an environment that we think will allow this powerful combination of humans and machines to achieve its potential. Reflecting on the comments by Morgan and Blanke (above), we are small, entrepreneurial and make extensive use of outsourced and cloud-based IT. We also active seek to recruit “purple people” who have (or can quickly learn) programming skills or have hybrid backgrounds in both IT and finance. Finally, we allow prototyping in “sandbox” environments prior to integrating successful prototypes into our core IT.

The three components of the robust and scalable framework we have developed are:

1. Data is fed automatically into a data warehouse, merged, cleaned and validated and finally analysed.
2. Models are prototyped in a tool of choice (Excel, R, Python etc.). Successful models are then integrated into our core analytic library and shared across the team.
3. An open architecture suite of tools is used by the investment team to chart the data and the results of the analysis.

<sup>8</sup> *The future of the IT organisation*, CIONET 2016,  
<http://blog.cionet.com/2016/04/26/the-future-of-the-it-organisation/>

<sup>9</sup> *A glimpse into the future of the IT organization*, CIO 2017,  
<https://www.cio.com/article/3192753/leadership-management/a-glimpse-into-the-future-of-the-it-organization.html>

Importantly for the effective working of our framework, the entire process is driven by the investment team. This ensures the data and analysis are aligned with the investment team's requirements, and allows a fast and flexible response to a rapidly changing market.

Individuals can experiment with new data and ways to analyse it. This process drives both the integration of new data into the data warehouse and the models we develop. We can develop ideas quickly and flexibly using the best tools for the jobs. This requires an appropriate toolset for the investment team. Most investors can use Excel, and many have extended this to include use of more advanced features such as macros. However, we also have a new generation of tech savvy graduates that want to take advantage of the powerful features offered by languages like R and Python that combine easy to learn scripting languages with a fanatical cross-discipline community, discussing and enhancing the shared libraries. We do not consider programming to be a separate skill for geeks – it is a powerful additional to the armoury of any investor, and should be considered of similar import to communication skills

For man and machine to work together we need to learn how to communicate our ideas to machines, and programming allows us to do this. For models that prove successful it is then important that these are built into a more robust and scalable framework so they can be documented, tested and shared around the team. Our investors can develop prototypes in, for example, Excel. The prototype captures a very detailed specification of the model and provides a basis against which the full model can be tested.

Finally, we also have a set of tools for visualising and exploring the results and integrating them into our investment process. It is important that we have the ability to view and analyse data and results of the analysis in a flexible but user friendly manner. To achieve this, we have created a set of reports that can be used to explore data and analysis dynamically as part of the investment process. The tool is built around a powerful language for exploring data which also allows users the flexibility to modify existing reports or set up new ones. Many front end tools can be reduced to a set of queries with the user choosing the parameters – we have developed an open architecture, which allows users to essentially create their own front end tools.

## Conclusion

Brynjofsson and McAfee note that “over the next decade, AI won't replace managers, but managers who use AI will replace those who don't.” It is the symbiotic relationship between man and machine that provides a winning combination and requires both the right structure and skills to be brought to fruition.

Philip K Dick wrote about man and machine locked in destructive conflict over their differences. Our desire is to achieve the opposite: harnessing the unique strengths of man and machine to create effective collaboration and true augmented intelligence.

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