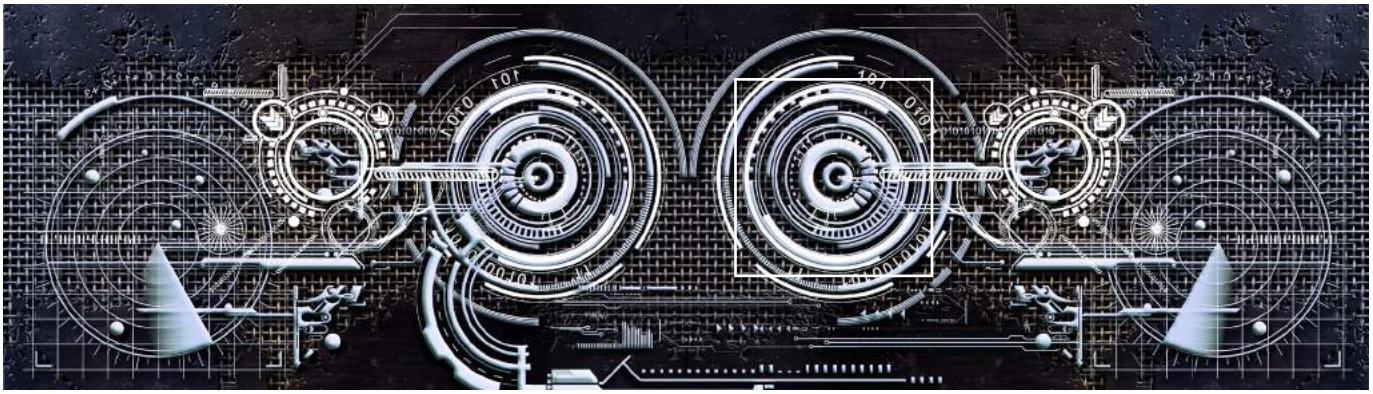
Arthur D Little

Viewpoint

AIM for Risk Management

Using Asset Information Data to Dramatically Transform Risk Management



Companies are now able to collect far greater quantities of information about both their physical and virtual assets and then track how these are changing over time. As asset knowledge increases (part of big data) it can be linked to business risks and opportunities in order to allow real-time tracking and anticipation of risk. We believe it is now time for companies to start to organize their risk and asset information so as to enable this dynamic risk control to become part of their day to day practices.

At present, most business risks tend to be managed in silos, either by risk teams or through risk systems that are not linked to the data available to the company about the risk drivers. This means that businesses cannot see how risk is evolving, or if a particular risk is becoming more significant. Yet the reality is that business risk is continually changing, often staying at levels the business wishes to tolerate but sometimes showing trends that mean action needs to be taken.

There will, in our opinion, be a significant change in risk management over the next few years; the integration of risk with other functions will result in better management of all types of risk, including: enterprise, project and safety risk. This will require companies to move risk management out of the risk silo and develop new approaches, so that risks will no longer be assessed by separate departments but instead be just another aspect of how each team in a business understands and improves its current and future performance.

One of the key drivers for this change will be the public's and politicians' ever-increasing focus on risk reduction – it will be increasingly unacceptable for things not to work correctly and as expected.

Increasing information on assets

The provision of information about a company's assets is steadily increasing. This data can be stored cheaply and rapidly analyzed. As a result of this steady increase in data, businesses now have the ability to understand the history and current status of both their tangible and intangible assets and are therefore able to take a more integrated view with improved decision-making and risk management. This ability to connect everything up is often termed the Internet of Things and the information created big data.

Sensors are becoming dramatically cheaper and are now able to communicate what they are learning – not just what they are monitoring. Tangible assets can be fitted with such sensors and then linked together to allow a better understanding of how they are performing and of any concerns about their future conditions. Linked items include a wide range of assets – for example, heart-monitoring implants, smart thermostats to allow for better control of heating/air conditioning, and real-time tracking of train position such as DB's Zugradar (http://www.bahn.de/zugradar).

With regard to intangible assets, developments in both sensors and data analysis mean that we can track many aspects of how people use systems or work within them. We can identify and track flows of clients and through social media we can understand their behavior and how it is changing. The ability to track how people are behaving and what they are doing gives companies further understanding of the factors that affect business risks. For example, tram operators are now monitoring the number of passengers approaching their stations, so that they can adjust the interval between trams and thus manage crowding.

As this data is being gathered companies are able to create representations of the data in multiple dimensions – not just in the four dimensions of space and time, but also including other aspects of the system such as historical and projected

whole-life costs. Representations of the data can, if wished, be very accurate – for example, through building information management systems (BIM – a type of asset information management system that includes all the data on the asset/building) – or it can be somewhat less accurate but still incredibly useful.

The systems to exploit the combination of multidimensional data over time are still developing and as a result there is much discussion about big data and how we will use it. Generally, though, it is agreed that there is enormous potential to be unlocked in terms of decision-making, production, and operational and cost efficiencies through combining these large data sets with the improved connectivity and the computational modeling capability that can be achieved with modern technology.

Building information management (BIM)

There is growing use of building information management systems in projects, not just for buildings but also for other forms of construction or development. BIM allows for millimeter-scale accuracy and far more comprehensive project planning than was available in the past on such projects. For example, BIM will be mandatory for use in UK government projects by 2016. BIM or, in general, asset information management (AIM), is being used for the new high-speed rail lines that are going to be built in the United Kingdom.

However, this raises the issue of the form of the data in the future. If the asset data comes from a recent project that has used BIM then an accurate model of the assets will be available at the end of the project and can form the basis for real-time asset tracking. But for older assets this will not be the case and the costs of developing BIM-quality data will be high. It is therefore likely that, to save cost, the data developed will be to a lower precision, but still sufficient to allow more effective asset information management.

Lower-accuracy systems are therefore being used, which are good enough for detailed knowledge of assets. Data can be collected through surveys of the existing assets, using technologies such as lidar (laser-radar). The resulting data can be used to visualize the assets in multiple dimensions and fed into gaming engines so that it can be used in simulations. It is thus possible for people to explore the tangible and intangible assets in space and time, as well as see both past and future events, conditions and risks.

Why link AIM with risk management?

We generally observe that risk is not linked to real-time data and that risk registers are separately maintained and require manual updates to reflect the links from the risk registers to the assumptions and asset data that are driving the risk levels.

Until now it has not always been possible to monitor the assumptions that drive risk levels – in the future it will be possible to deliver real-time monitoring and prediction of risk based on changing assumptions. We believe it now makes sense for businesses to change their approaches to both asset information management and risk management in order to deliver this.

There is also a need to link AIM with risk management from a standards point of view. Standard ISO 31010, on enterprise risk management – risk assessment techniques, states: "*As part of the risk management process, risks and controls should be monitored and reviewed on a regular basis to verify that assumptions on which the risk assessment is based remain valid…"*

Further detail is provided by safety standards, which, in our experience, tend to lead general risk standards. For example, guidance produced by railway companies to improve safety risk management says: *"Where safety depends on assumptions and you have access to data that you could use to confirm these assumptions, then you should collect and analyze these data."*

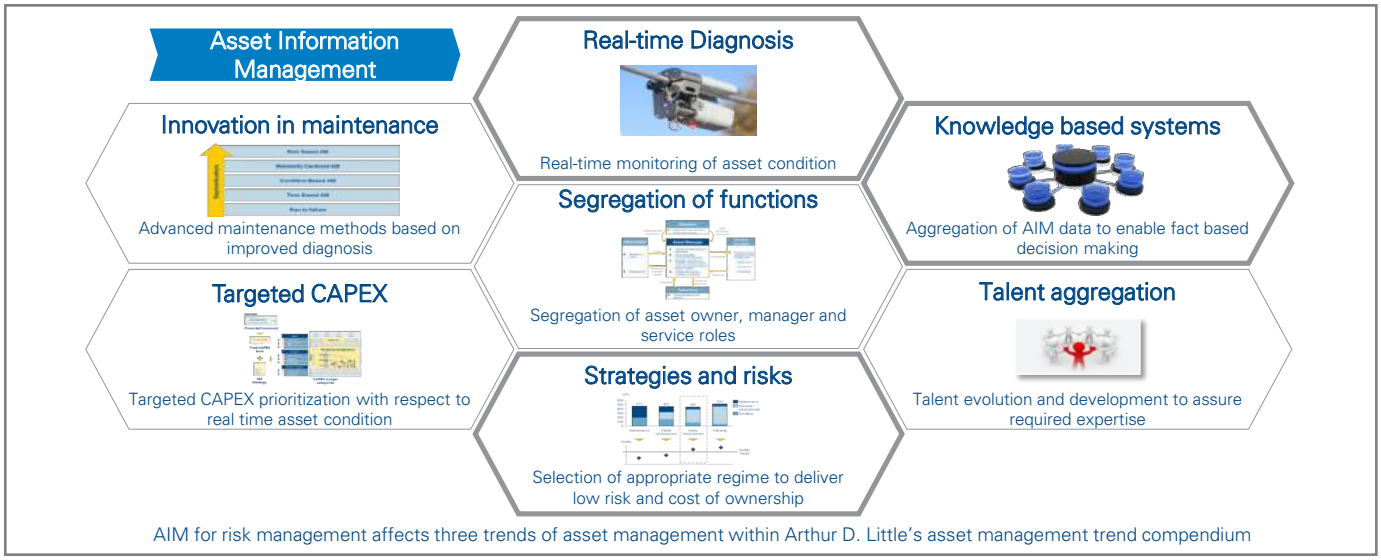
If we want to see the future, we can take as an example the way travel timetables have evolved. In the beginning there were printed timetables. Then there were CD-ROMs with static timetable information – benefit: faster searching. Then there was web-based timetable information – benefit: customer access to data. Now there are real-time timetable apps – benefit: real-time data available to all users when needed. The same cycle is almost inevitably going to happen to risk management because of data availability, decreased costs and user expectations.

A similar example of the benefits that can be gained through linking different types of data is shown, in our experience, in the automotive sector. Here, reconciling economic data – based on accounting rules – and technical asset data, often split by asset and location, has led to the realization of significant benefits.

So we believe that users will soon require that companies link their available data on tangible and intangible assets to their risk management systems and thus provide real-time tracking and prediction of the business' risk level.

What needs to change in risk management?

There are significant advantages to making improvements in the linking of attributes such as risk controls, assumptions and asset information. This provides a platform for a company to develop, over time, a more flexible and powerful means of analyzing risk at system level, by asset, cause or risk owner. Some of the key advantages would be:



AIM for risk management affects three trends of asset management within Arthur D. Little's asset management trend compendium

- It will be easier to integrate risks into business-case calculations and develop exit strategies for assets. Hence, capturing risks also provides insight for management into decision-making on assets.
- As risks become more difficult to mitigate, the ability to focus down into higher levels of detail (e.g. by asset, etc.) will become more important.
- As the company develops an improved structure of data this will allow risks to be added in a more controlled way (for example, beneath a parent risk).
- The ability to view risk profiles by risk type, asset owner, or degree of change in the risk.
- The ability to link key assumptions for all types of assets that impact business objectives to each risk. This means that when those key assumptions about assets change (for example, the number of customers at peak periods), risk levels and risk controls can more easily be reviewed.
- The ability to develop links between assets and risk (for example, to link asset condition to risk ratings).
- If all versions of all records are maintained, with details of who made what changes (including when the item was last reviewed and by which person/committee), the history of risks and their assessment and mitigation will be far easier to understand and build on.

Risk silos

As said above, this will require rethinking of the risk management processes – a change in the structure of risk data will be required. It will also require far greater clarity on what the drivers of risk are and the way risk is linked to information on assets of all types. This clarity will, in turn, show linkages between what may seem to be unrelated risks – for example, showing that the number of users on a metro system during the morning peak affects a large number of business risks.

Once this information on how assumptions on assets is linked to risk management it will be possible to track risks in real time and both predict and simulate future risk levels.

The link with the asset management data will take time, but has the potential to produce powerful results, showing how risks are changing and predicting future risks, and allowing appropriate resource allocation.

What will happen?

The principles are already being used for infrastructure design and construction, and spreading into other sectors – as the combination of 4D data-processing algorithms is potentially very powerful. For example:

- A company used analysis of Twitter posts to identify trends early, in one example predicting that a share price would drop before it occurred.
- A search engine predicted the outcome of the referendum on Scottish independence within 3% of the final result, based on analysis of the search terms people were using and trends in social media.
- The retail sector is tracking customers in shopping centers, analyzing behavior and shopping patterns to assist with planning and optimization of space.

In the future this combination of asset knowledge/data analysis and risk information will become more sophisticated and its use will, we believe, be widespread across many sectors – the assets involved do not need to be just equipment, but could also include users and employees.

Conclusion

Linking asset information with risk management is already happening and will become far more common in the future, especially in businesses that have significant enterprise risks. Some sectors and companies are already far down this path, but others have yet to start, so are still managing risks in silos and not tracking and using all the tangible and intangible asset-related assumptions that drive risk.

We believe that companies now need to actively plan how asset information and knowledge will be linked to risk management and to start the process of migrating both their asset information and risk management systems to get ready for the 'risk web'.

Imagine a risk management system in which the asset-related assumptions are clearly identified and their current status is well known. This would include information on the design, its current condition, and user behavior (in a highways example we worked on, this included features of the highway design and how the highway was being used, such as the proportion of cars exceeding the speed limit, number of vehicles stopping beside the highway, and proportion of different types of vehicles.

The data structure being used to manage risk allows the links to assumptions to be seen, and changes can be processed (we do not recommend automation) so updates on asset information can be used to show how the risk profile is changing and to predict future business risk levels. Games engines are used so it is possible to explore the business and visualize changing risk levels.

For some types of real-time asset data, information has to be collected manually, but generally this process has been automated.

The key to making this work easily is for the risk data to be structured in such a way as to allow easy links to assumptions. Once the links are clear, rules can be built into the data so that the thresholds or conditions that trigger action are known – when assumptions reach defined levels action can be taken (so in the highways example, the proportion of vehicles exceeding the speed limit was linked to a clear, predefined risk mitigation action plan involving the information displayed to drivers and speed enforcement).

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Arthur D. Little

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