

Data Modelling

Data modelling for decision making

What Data Modelling do we provide?

Hartley McMaster provides data analytics and data science modelling and tools to improve public services.

Whether you are using cloud technology to deliver services or leveraging the cloud to improve the management of services, we have the tools and skills to help you.

We use data analytics and data science to inform and support decision makers.

Our consultants combine their mathematical skills to develop analytical models with the data engineering and management skills to put them into production. We don't just advise; we help you deliver.

Analysis for success

With the option to run analytical models in the cloud, we can:

- Crunch numbers faster and on a larger scale than ever before.
- Package models in a way that is easy to use, increasing the potential for automation and integration with existing systems.
- Rapidly scale model use up or down, paying for computing power only when needed.

Enabling us to support you to make better decisions through:

- Exploring your data to identify key measures and understand trends, seasonality and causal relationships.
- Building tools to let you visualise your data in new and innovative ways.
- Identifying measures which improve performance monitoring and benefits tracking.
- Building models to make predictions, identify optimal solutions and answer 'What-if...?' questions.

Our Approach

With over 30 years' experience in helping organisations design and implement analytical solutions to improve their business, our consultants have the skills and tools to help.

We use a wide variety of analytical tools and mathematical techniques to explore, visualise and model your data

- Our tools can be as simple as an Excel spreadsheet or as complex as a custom R shiny web app or API.
- Our mathematical techniques are drawn from statistics, e.g. regression analysis, data science, e.g. machine learning algorithms, and operational research, e.g. simulation, linear programming (LP).

In establishing requirements, we consider:

- What is the objective: what are we attempting to measure, model or optimize?
- What data is required? What data is available?
- What technology does the client use and support? Do solutions need to integrate with existing systems?
- How accurate does the solution need to be? Do we need to quantify uncertainty?
- Does the solution need to support regular or one-off decisions?

USE CASE: STRESS-TESTING WORKFORCE PLANS

THE CHALLENGE

A public organisation has a ten-year workforce plan based on its best estimate of future demand. But there is considerable uncertainty about this future demand and indeed in their ability to recruit and retain staff at the planned-for levels. We want to:

- Quantify the risks
- Explore variations of the plan which mitigate these risks

USE CASE: STRESS-TESTING WORKFORCE PLANS

OUR SOLUTION

Where the challenge is to test how optimal a decision is in the face of uncertain environmental factors, we often recommend building a computer-based simulation model. Whilst there are different types of simulation, they have the common ability to simulate a realistic range of outcomes and see how likely each of these outcomes is.

In building a simulation model of supply and demand we would reflect:

- Different possible underlying growth rates in demand
- Downside and upside estimates of recruitment and retention
- Less likely, but possible, step-change impacts (E.g. arising from legislative changes)
- Random year-to-year variation

Simulation can allow us to answer questions like: what percent confidence have we in having sufficient resources to meet performance targets with this workforce plan?

OUR PROCESS

1. Define the problem
2. Gather information on the variation in demand and other parameters
3. Build and test the simulation model (an iterative process)
4. Run the model and perform sensitivity analyses
5. Report & present findings

Why choose Hartley McMaster?

SERVICE FEATURES

- Automate data collection, processing and reporting
- Tailor measures to the purpose (KPIs, Benefits Realisation, high value decisions)
- User interface & data visualisation tailored to uses and purpose
- Predictive modelling optimised to support the organisation's needs
- Models fitted to business objectives and constraints
- Proper consideration of uncertainty in business decisions
- Solutions integrated with existing systems and business processes
- Maximise use of available data (cloud, legacy systems, expert knowledge)
- Built with ongoing quality control & assurance in mind
- Technical handover, documentation, ongoing support & training

Why choose Hartley McMaster?

BENEFITS

- Benefit from our 30 years' experience building analytical models
- More effective planning through the best use of data available
- Metrics with a clear view, not just a rear view
- Integrated and automated modelling reduces errors and frees up time
- Models which can be readily extended or adapted if required
- Richer understanding of how plans fair in an uncertain world
- Optimised business decisions reflecting organisational priorities & constraints
- Knowledge transfer to in-house analytical team (if required)
- Incidental benefits: E.g. an assessment of data quality
- Solutions built to leverage your existing cloud and legacy infrastructure

Additional Service Details

PLANNING

We plan and run our projects using a combination of agile and waterfall approaches, with the balance depending upon the nature of the project. Projects in which we are developing analytical models suit a more agile approach. Projects in which tasks are more predictable at the outset or have significant interdependencies – E.g. designing metrics, setting up data collections and implementing performance reporting – suit the waterfall approach.

In common, all projects will involve:

- Agreeing the scope and requirements
- Formulating a list of activities and identifying software, tool and data access requirements
- Establishing and maintaining a log of project risks & issues
- Scheduling the work as a sequence of work packages, activities and tasks
- Undertaking the work
- Reporting the findings and results

Additional Service Details

QUALITY ASSURANCE & TESTING

Quality assurance (QA) is built into all our project plans. QA checks are carried out by a senior consultant not otherwise involved in the project. A typical plan would include QA checkpoints at each stage, e.g.

1. Solution design. Validating the design will meet requirements with minimal risk.
2. Implementation. Verifying the design is being effectively implemented.
3. Testing. Confirming the test plan is effective.
4. Final review / lessons learned.

Additionally, we are happy to comply with our customer's internal quality assurance procedures.

PRICING

For full pricing information please refer to Hartley McMaster's Pricing and Terms and Conditions documents.

Additional Service Details

TRAINING

Where training is required, we tailor courses to stakeholder requirements, users' skill sets and the IT/development environment. This may include any combination of:

- 1:1 or classroom training (virtual or in-person)
- Handover presentation
- Written report
- User documentation
- Technical documentation

ONGOING SUPPORT

Where required we can offer a package of extended maintenance and support tailored to the client's needs.