

A Tale of Two KTPs – An Academic Perspective

Chris Walshaw, University of Greenwich

September 2019 saw the end of one University of Greenwich Knowledge Transfer Partnership (KTP), with Transforming Systems, a Greenwich-based SME, and the start of a new one with Argos, one of the UK's leading online retailers and part of the Sainsbury's group.

This short article compares and contrasts the two projects.

The projects ... similarities

For both KTPs I am/was both Academic Supervisor (or Knowledge Base Supervisor in KTP parlance) and Lead Academic. Typically these can be two different roles filled by two people, but here it made sense for me to take on both – the day-to-day supervision as well as the overall lead.

That said, in both cases we assembled small teams of 2–3 academics, to help run the KTP. This helps share out the experience as well as bringing a more diverse set of skills and views into the supervision and knowledge exchange.

Apart from that, however, ostensibly the two KTPs have little in common. Not only are the companies completely different in scale – Transforming Systems (TS) with ~25 employees at the start of the project and Argos with over 25 000 – but also their focus seems almost unrelated: TS provides data analytics and software to the NHS whilst Argos is 'one of the UK's leading digital

retailers, offering more than 60 000 products online and in-store' (www.about.sainsburys.co.uk/great-products-and-services/argos).

However, it turns out that the underlying data and the aims of the projects in each case have considerable similarities.

Without delving into too many details the project titles give a flavour:

- KTP010507 with Transforming Systems (2016–2019): To design, develop and implement a software application which predicts the growth in pressure in public health systems.
- KTP11709 with Argos Limited (2019–2022): For the innovation of an optimal assortment multi-echelon inventory plan which adjusts for store space and stock budget constraints with the aim of increasing sales and customer satisfaction.

At the heart of its business, TS's vision is 'to enable the National Health Service and social services to use real time information to make data-driven decisions about health and social care at a price that is accessible to all health and social care commissioners' (www.transformingsystems.co.uk/about-ts/).

For example this might involve decisions about how best to allocate precious resources, be they staff (doctors, nurses and consultants), equipment (including ambulances) and facilities (including beds) to meet current and predicted pressure.



KTPs with Sainsbury's–Argos and a Greenwich-based SME providing data analytics to the NHS have a surprising amount in common

Meanwhile for Argos an inventory plan is essentially a detailed set of decisions about how much stock to put in store and warehouse locations to satisfy customer demand as rapidly as possible. The problem is complicated by having a (multi-echelon) hierarchy of different types of store, from small display areas within Sainsbury's to regional distribution centres, not all of which are accessible to customers, and also by having to predict, for example, what choices customers might make if the kettle they want is not available in red, or if the only wide-screen TV in the nearby store is not quite the same model as the one they wanted.

However, in both cases, as the reader may have guessed, the underlying problem is to predict future demand, based on time-series data analysis/prediction, and to allocate resources to meet that demand in as optimal a way as possible, taking into account a host of constraints including budgets, space and even the time taken to compute a good solution. These are in fact two closely related problems with time-series at their heart.

... and differences

But that's not the whole story. In the case of TS, the final resourcing decisions are made by NHS managers, guided by TS data analysis and visualisation, whereas for Argos the aim is for the calculated solution to be implemented by the company's distribution network.

Perhaps that points up the biggest difference between the projects – Argos wholly manages the data under investigation and in principle is able to deploy project outcomes within a centralised system. In contrast TS is providing solutions for a disparate range of NHS trusts with different approaches to data management and storage. This has meant a much bigger focus on data cleansing and wrangling than for the Argos KTP (this is certainly not to argue for more centralisation in the NHS, but universally agreed data management and storage protocols would have been a definite advantage for the TS KTP).

However that was the biggest difference and there were many more similarities. For example, in both cases the project management approach has been very similar: the teams I am working with are smallish (8–10 people in the team as a whole with 2–3 main contacts), highly focused and well-versed in agile project management. Meetings have almost always been relatively informal, creative and above all productive, with easy communications and free-thinking discussion.

From our side, the main difference in approach has been in the spill-over to other projects. Essentially TS was spun out of some work initially started at the University of Greenwich by Phil Clipsham, joint founder and now Chief Technical Officer,

and as a consequence the company has always had a very close relationship with the University: several of its staff are graduates or PhD students and TS has always had a very positive attitude to bringing in students to work on side projects, either done as part of their studies or in part-time paid positions. Consequently this was not formally done as part of the KTP project.

In contrast, the Argos KTP was the first formal contact between the University and the company. Partly as a result, and also due to my previous positive experiences with TS, for the first time this year we have set up more formal channels for adding value to the KTP exchange and at the time of writing 7 MSc data science-based projects are just about to get underway using synthetic (and later, possibly, real) Argos data and with a team of 5 academics in support as supervisors. I am hoping that this will be repeated for the duration of the KTP.

Conclusions

It is too early to draw any conclusions about the Argos KTP although the process of pulling it together has been very stimulating and the initial work done by the KTP associate, Dr Laszlo Torjai, very encouraging.

Meanwhile the TS KTP was a wholly positive experience and was awarded an 'outstanding' grade by the InnovateUK independent assessors. Furthermore Diego Duarte, the KTP associate, has gone on to a full-time post at Transforming Systems as Head of Digital Services and AI Lead.

Finally, although the main aim of a KTP is not publication per se, for those who want to know more of the technical details of the TS project, Diego has recently published a conference paper [1].

Acknowledgements

Thanks are due to Phil Clipsham, CTO at Transforming Systems, Nic Hauduc, Head of the Advanced Analytics Team at Argos, and Dr Linda Hyder, KTP Manager at the University of Greenwich, for all the help and support. Thanks also to Dr Noel-Ann Bradshaw, now Head of the School of Computing and Digital Media at London Metropolitan University, for her help in putting the Argos KTP together.

REFERENCES

- Duarte, D. and Faerman, J. (2019) Comparison of Time Series Prediction of Healthcare Emergency Department Indicators with ARIMA and Prophet, *4th International Conference on Intelligent Information Processing*.