INSIDE O.R.

JUNE 2013 NO 510
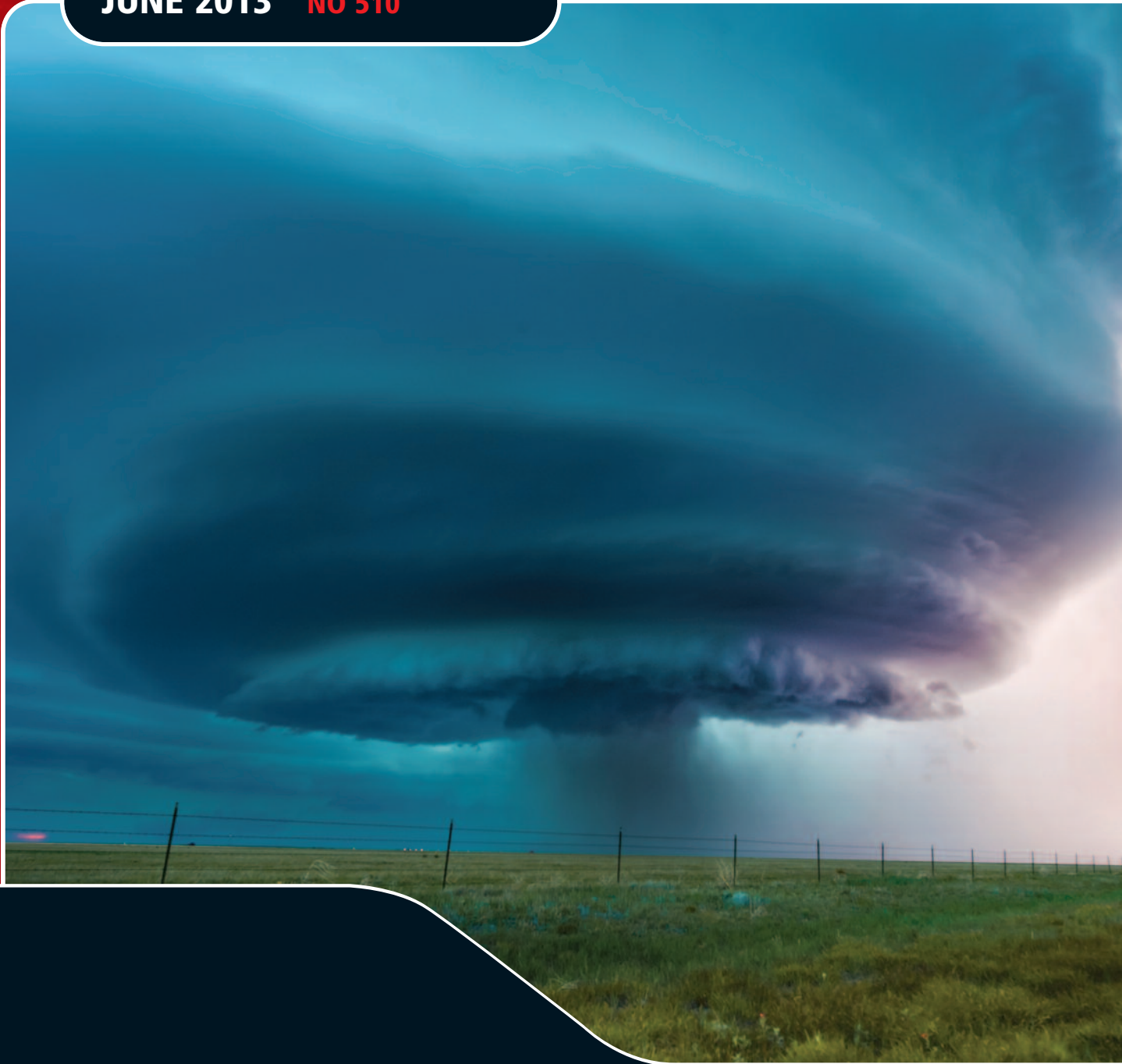
CAN MATHS PREDICT FREAK WEATHER?

: : INSIDE THIS MONTH : : : :

THE OR SOCIETY

www.theorsociety.com
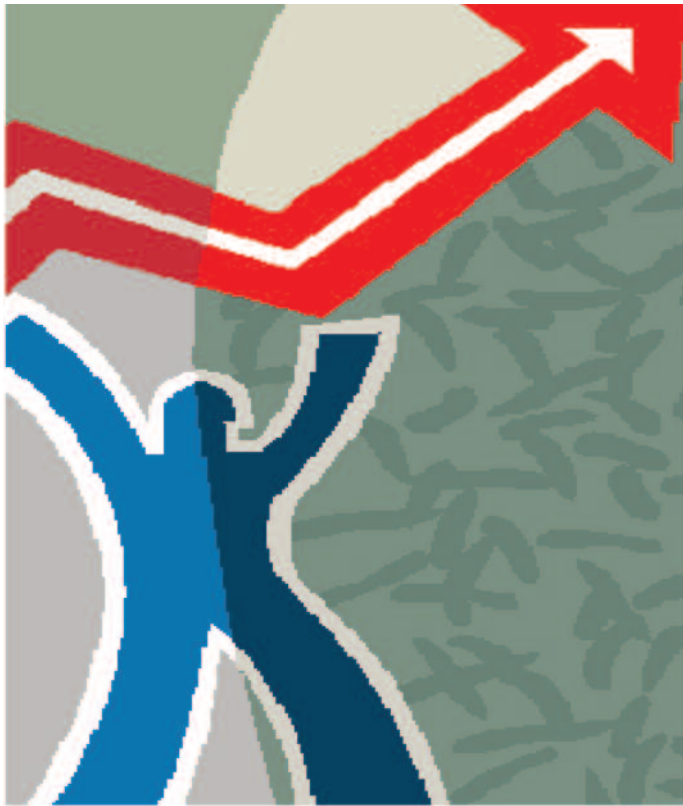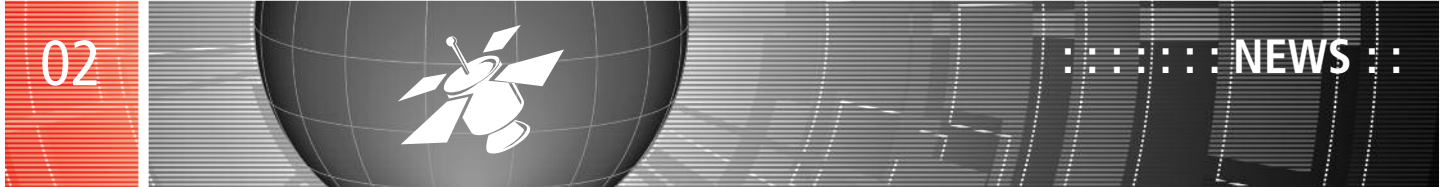
ADVANCE YOUR CAREER PROSPECTS

Accreditation: What it is and why you should apply

The OR Society's accreditation scheme enables members to enhance their career prospects by providing credible certification of their achievements in the field of Operational Research.

There are three categories of accredited membership:

Fellow (FORS) - for high achievers with at least ten years' experience
Associate Fellow (AFORS) - for those with a successful track record over at least five years
Associate (AORS) - for suitably qualified recent entrants
Candidate Associate (CandORS) - for those either completing a degree with a substantial O.R. content or starting their first employment in O.R. Candidate Associates are appointed a mentor to help guide them through the first couple of years in their O.R. career.
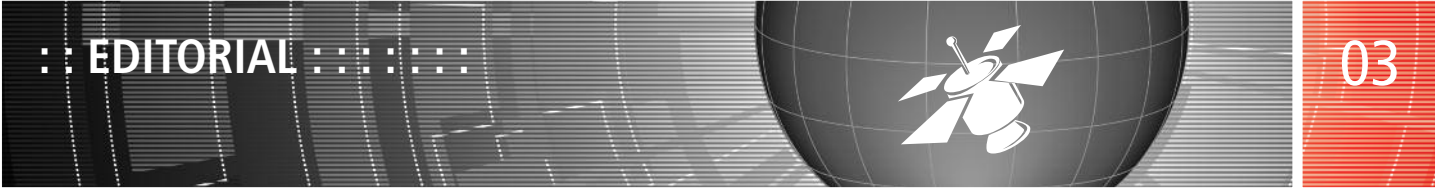
The substantial benefits of this recognised professional achievement include:

- an enhanced CV and post-nominal letters
- help in securing a job by demonstrating experience
- career progression through category upgrades

For full details of the Accreditation scheme, including criteria for each category and procedures, visit
www.theorsociety.com

EDITORIAL

JOHN CROCKER

There seems to be a great deal of activity going on inside the OR Society at present.

Articles this month include reports from O.R. in Schools (ORiS), O.R. in the Third Sector O.R. (ORiTS), East Midlands, Yorkshire and Humberside, YOR18 and a progress report from one our charitable research projects. There is an old adage that says that 'success breeds success' – let us hope that that is what we are seeing here.

President Dr Royston has produced yet another highly thought-provoking leader. You can also read about what he had to say to our newer members in one of Nigel's reports from YOR18 plus, a similar theme runs through his paper of his inaugural presentation at OR54 which appears in the June issue of JORS. Is this an example of taking Lewis Carroll literally?[1] I, and I am sure Geoff, would be very interested to hear your views and, given they are printable, who knows you might even get to see your name in print!

Will 'analytics' be the saviour of the OR Society – the general consensus at senior level is in the affirmative. If you are not sure about this or what is meant by analytics then you can find out much more about it on the website www.whatisanalytics.co.uk put together by one of the teams undertaking research funded by the Society. They are particularly interested in your views and your support so please visit if you get a few moments to spare.

The Tizard trilogy in ten parts ended last month but, if space has permitted, you can read a letter that Sir Henry wrote just after WWII in which he sets out his agenda for the role of science and scientists in post-war Britain. Can anyone tell me if the late Baroness Thatcher was the only Prime Minister of the 20th Century who had a scientific education or, how many of the current government can claim to be scientists. Whilst on a historical note, going back even further to around the 15th Century, there was a priest in a remote area of Devon who appears to have solved the Travelling Salesman Problem for 48 nodes. Again, if space has permitted, you can read a précis of David Smith's paper, the full version of which can be found in the latest *OR Insight.*

It has been suggested that *Inside O.R.* should have a page or section dedicated to younger members and readers. If it means that we will reach a wider audience or get more people interested then I, for one, am all for it but, alas, as a not-so-young/new member, I do not feel qualified to run this section so if there is anyone who would like to have a go at getting into journalism please get in contact. If for no other reason, it will look good on your CV.

[1] 'What I tell you three times is true'. The Hunting of the Snark by Lewis Carroll.

<OR>

CONFERENCE NEWS

EVENT:		DATE:		VENUE:	
	KIM2013 Conference		4 – 5 June 2013		Forest of Arden Hotel, Meriden
	Advanced Analytics + Big Data		12 June 2013		IET, London
	IMSIO5 2013		3 - 4 July 2013		University of Salford
	OR55 Annual Conference		3 – 5 September 2013		University of Exeter
	Blackett Lecture		28 November 2013		Royal Society, London
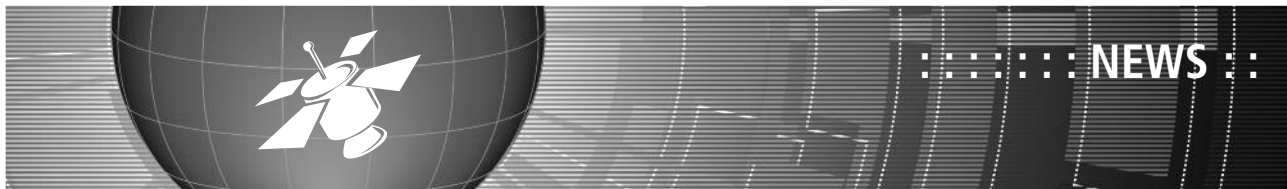
KIM2013 KNOWLEDGE AND INFORMATION MANAGEMENT CONFERENCE

STILL TIME TO BOOK *AND* TO PRESENT!   4 - 5 JUNE 2013

HILARY WILKES

There is still time to book online and attend our KIM2013 Conference at the Forest of Arden Hotel, Meriden, UK. (www.theorsociety.com/KIM2O13)

There is also time to submit a Title and Abstract to present at the KIM2013 Conference.

If your title and abstract are accepted, subject to receipt of your booking and payment, a presentation slot will be found for you.
A full paper submission is not required. Entries in the Conference Handbook, full paper submissions to the Conference Proceedings and submissions to the KMRP Special Issue are now closed.

Not presenting? Why not just come along and listen and learn!

A bar quiz will be available for those of you who will arrive on Monday 3 June (pre-conference evening), and there will be a range of prizes. You will be stunned when you see them!

Forest of Arden Hotel, Meriden, UK

The first day will be opened by Geoff Royston (OR Society President) and Brian Lehaney (Conference Chair). This brief opening will be followed by Speed Networking, a great way to interact very early in the conference. Bring plenty of business cards!

The gala dinner is at the venue, which is the wonderful Marriott Forest of Arden Hotel in Meriden. As its name suggest, Meriden is 'in the middle' of England. If you have the time, take the opportunity to look around this truly historic area, with the Heart of England Way long-distance path that brings the Staffordshire Heathlands together with the Cotswolds and Forest of Arden. For those of you who are prepared to travel a little further, Birmingham provides a host of international restaurants and entertainment. The venue is home to the Championship Arden Golf Course, which has played host to a succession of international tournaments, including the British Masters and the English Open.

Our Plenary speakers are (in no particular order):-

Dr. Jay Liebowitz is the Orkand Endowed Chair of Management and Technology in the Graduate School of Management & Technology at the University of Maryland University College (UMUC). He previously served as a Professor in the Carey Business School at Johns Hopkins University. He was ranked one of the top ten knowledge management researchers/practitioners out of 11,000 worldwide, and was ranked No2 in KM Strategy worldwide according to the January 2010 *Journal of Knowledge Management*.

Trevor Howes is an international authority on realising benefits from change and getting diverse groups to collaborate, work differently and produce significant and sustainable results. He is the co-author of *Knowledge Management - A blueprint for delivery* which is on knowledge management and benefits-led change.

Trevor recently led communities in Fujitsu UK and also was the lead for Requirements Management, Business Cases and Portfolio Management areas as well and being on the business consulting group's management team for five years. He now works with diverse organisations such as IBM in Australia, Network Rail and the Cabinet Office as well as small and medium organisations

John S Edwards is Professor of Operational Research and Systems at Aston Business School, Birmingham, and is currently Executive Dean. He has a BA with First Class Honours in mathematics and a PhD in Operational Research, both from Cambridge University.

His main interest in research has always been in how people can and do (or do not) use models and systems to help them do things. He has conducted major research projects with Corus, the Thomas Cook Group, and in the National Health Service. Since the 1990s, he has been researching into knowledge management.

Sponsors

We are also pleased to acknowledge Palgrave Macmillan, publishers of the OR Society and who are sponsoring the KIM2013 drinks reception where we are celebrating the first decade of publication of *KMRP* .

I look forward to seeing you at KIM2013. Book now at **www.theorsociety.com/KIM2013!**

<OR>

Arden Course

BEYOND KNOWLEDGE MANAGEMENT: WHAT EVERY LEADER SHOULD KNOW

JAY LIEBOWITZ - KIM2013 PLENARY SPEAKER 4-5 JUNE 2013

Today's business environment is tumultuous. We have financial meltdowns, global competition tsunamis, and leadership earthquakes.

Making proper strategic decisions for the enterprise is a challenge for senior leadership. Organisations are trying to be adaptive, agile, and innovative in order to compete in tomorrow's marketplace, but it is becoming harder to do so, given all the internal and external constraints on the enterprise.

To help senior leaders better adjust to the changing times and to improve their strategic decision making process, there are ten components that can help their organisations gain a competitive edge: knowledge management; strategic intelligence; globalisation; e-learning; social networking; virtual worlds; technology; human capital; relationships; and innovation. Let's highlight each one briefly:

Knowledge management is being used by organisations to increase innovation, build community and institutional memory, increase adaptability and agility, and improve organisational internal and external effectiveness. Applying systems-oriented 'collection' knowledge management approaches (e.g., lessons learned systems, expertise locator systems, web-based online searchable video repositories, document management systems, etc.) and personalisation 'connection' approaches (e.g., mentoring programmes, job rotation, lunch & learns, job shadowing, online communities, cross-functional teaming, etc.) can help organisations better collaborate and share knowledge to create new ideas, products, or services.

Strategic intelligence is the intersection of knowledge management, business intelligence, and competitive intelligence. Knowledge management and business intelligence have an internal focus to help the organisation apply and generate knowledge through knowledge sharing and advanced analytics (e.g., data/text mining, etc.). Competitive intelligence has an external focus to look at your competition in order to factor these issues into your decision making. Strategic intelligence then rests at the intersection of these three areas in order to improve the organisation's strategic decision making.

Globalisation is pervasive in today's environment. Whether it's off-shoring, outsourcing, and other techniques used abroad, most organisations need to compete in the global marketplace. Global partnerships also need to be created to ensure competitive pricing, and the educational systems worldwide must be able to adjust to the new educational demands in the global marketplace.

E-Learning is closely aligned with some of the training and educational demands created worldwide. Through e-learning, training and development of the organisation's human capital can be further leveraged globally. Many corporations already have internal 'corporate' universities for their training and education of their employees. As these organisations extend their reaches both domestically and abroad, e-learning (and more so, m-learning (mobile learning) through PDA devices), continues to grow as the delivery mechanism to facilitate the employee's learning.

Social networking also continues to be an important factor in improving the 'informal organisation', as well as making connections outside the enterprise. Through techniques like social/organisational network analysis, the mapping of knowledge flows and knowledge gaps in the organisation can be made, as well as identifying brokering roles of employees for then improving communication, collaboration, and knowledge sharing. Externally, social networking provides creative ways to reach to customers and other stakeholders.

Virtual worlds are being applied by organisations in their training and professional development needs for their employees, as well as for marketing and sales of their products and services. Having interactive 3D virtual environments will see continued use in medical, social, entertainment, business, manufacturing, educational, military, and other domains. Medical training, emergency preparedness training, marketing, and other applications are being used in virtual worlds technology.

Going beyond virtual worlds, **technology** in general continues to help senior leaders in their decision making process. Cloud computing, mobile computing, social computing, search technologies, cybersecurity, and decision technologies all have an impact on organisations in the future.

Human capital and an appropriate human capital strategy for the organisation are critical components for the enterprise. CEOs typically tell you that their human capital is their competitive edge. Looking ahead towards the organisation's workforce of the future, a human capital strategy should be built to take into account competency management, performance management, knowledge management and change management. A formal knowledge retention strategy should also be included as part of the overarching human capital strategy.

Related to human capital, **relationships** are another key component for organisational success. Developing and maintaining critical relationships will affect the future success of the organisation.

From these relationships, **innovation** can be fostered either through developing new connections internally outside of one's own department or through the connections created externally with partners and others. Innovation must fuel the organisation and act as a catalyst in order for the organisation to thrive in the 'survival of the fittest' global environment.

These ten areas will help future leaders in meeting tomorrow's challenges. By applying elements of these areas, improved strategic decision making should result and senior leadership will be better prepared for the times ahead.

This article originally appeared in IT Performance Improvement (http://itperformanceimprovement.com/) and is reprinted with permission.

Dr. Jay Liebowitz is the Orkand Endowed Chair of Management and Technology in the Graduate School of Management & Technology at the University of Maryland University College (UMUC). He previously served as a Professor in the Carey Business School at Johns Hopkins University. He was ranked one of the top ten knowledge management researchers/ practitioners out of 11,000 worldwide, and was ranked No2 in KM Strategy worldwide according to the January 2010 *Journal of Knowledge Management*.

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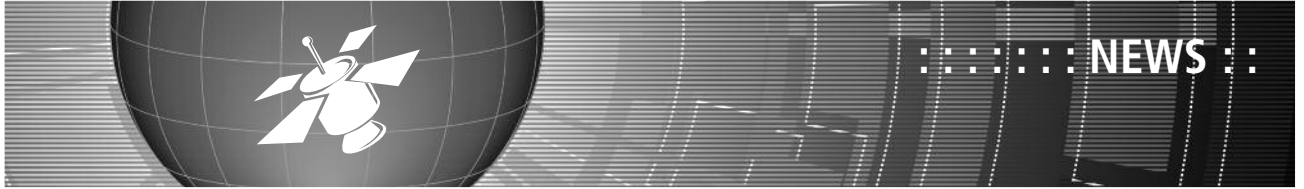
INTRO TO O.R. COURSE

ROSE DRUMMOND OFFICE FOR NATIONAL STATISTICS

Having been working as an Operational Researcher for 6 months, but having no formal qualifications in O.R. and still being a little hazy as to what O.R. actually is, I decided it was about time I went on the 5 day OR Society course 'An Introduction to O.R.'

Rose Drummond

The best thing about the course was that every day, we were set a different problem requiring a different technique, and a different Operational Researcher with expertise in that area guided us through their thought process when tackling the problem. What was important to me was that each time, their emphasis was on tackling the problem as a whole and in context, rather than just teaching us to apply complex mathematical methods.

The week started off with an introduction to O.R., with a focus on the modelling process and making simplifications of the real world.

This led to my favourite quote of the week: 'All models are wrong, but some models are useful!' As someone new to operational research, I found the warnings about common mistakes people make particularly helpful!

During the rest of the week, we learned how to apply techniques such as sampling and regression, forecasting, simulation and optimisation. We each had our own course books to help us get up to speed on each topic quickly so that we could make the most out of the teaching time, and access to a laptop each so that we could practice applying each technique using suitable software as you would in the workplace.

It was strange being away from the office and back in the classroom again, but there was a really good mix of lecture slides, examples, group work and hands-on exercises to keep us on our toes! And with just 7 of us on the course, it was really easy to ask questions if ever we were unsure!

All in all, I found the course really enjoyable and useful. I now have a better understanding of how hard and soft O.R. techniques can be used as decision aids, and have learned the importance of knowing their limitations. This is something that I will remember from now on, even if I will have to brush up on the details of some of the techniques in a few months time!

<OR>

WHERE ARE THEY NOW?

The following members on the Society's mailing list have recently had their mail returned to the Membership section, presumably because they have changed their address.

Would any member who is currently in touch with them please ask them to email Carol.Smith@theorsociety.com advising us of their current whereabouts so that we can update our database and return to a speedy and efficient service.

Gowtham Bharatwaj Srinivasan   Kent

<OR>

HOME OR AWAY

JOHN CROCKER

When Yahoo!'s Marissa Mayer recently sent a memo to employees announcing that flexible working practices would be stopped and all home workers were due to report back to the office it created much furor.

A supposedly progressive company – and a tech one at that – banning remote workers? Not surprisingly, this has promoted a great deal of discussion.

Richard Branson was one of the first high profile figures to wade in on the debate. He suggested that in this day and age, mandatory office hours for all workers was a sign of 'old school thinking'. In an age when remote working is easier and more effective than ever, he said the decision seemed like a backwards step.

Vodafone publicly declared a 'fight back' against Yahoo!'s home working ban. Vodafone says that the practice encourages smarter, more cost-effective ways of working and they have figures to back it up. According to a recent study undertaken by Vodafone, British business can save up to £34bn a year by freeing up desk space and reducing overhead costs when workers are not present in the office.

According to Mayer the ban at Yahoo! was taken to foster greater 'communication and collaboration' between employees. The idea being that important conversations and creative thinking occurred around the water cooler and during casual conversation over lunch or informal meetings when staff are together. If staff are not in the same place, it becomes more tricky to create the kind of environment where this can happen easily.

There does however appear to be an alternative reason for this action. Following a downturn in business, Yahoo! needed to reduce numbers quickly and at minimum cost. Mayer's decision has apparently created a mass Exodus so if this was the ulterior motive, it would appear to have been successful. Given all staff are of equal merit and capability one could argue this is a highly efficient way of reducing numbers without having to pay redundancy or go through lengthy dismissal procedures. As to what it does for the morale of those who stay, only time will tell. It will be interesting to see how soon Ms Mayer announces a u-turn.

Generally the move to more flexible, work at home scenarios is on the increase. With the promise of substantial cost savings and greater employee satisfaction, especially in those markets where attracting and retaining talent is difficult, remote working has its definite advantages. However, for others it may not be such a great fit. Ultimately, success will be dependent on how a business goes about managing its team environment to create a productive workforce that will make the difference between success and failure.

What happened at Yahoo! was, as far as one can determine not illegal but was it ethical?

(Inspired by an article by Charles Mayes, DAV Management)

<OR>

:: :: :: :: NOTICEBOARD ::

BACK ISSUES AVAILABLE

Essentially complete set of journals:

Computers & Operations Research 2002 to 2010

Journal of the Operational Research Society 1978 to 2012

Management Science 1982 to 2008

Operations Research 1982 to 2008

No longer required. If anyone has a use for these please contact me. I am reluctant to consign them to recycling before offering them to others. No charge but you would have to arrange collection/shipment.

Please email John Beasley john.beasley@brunel.ac.uk

<OR>

EAST MIDLANDS OPERATIONAL RESEARCH GROUP NETWORKING & PROJECT SHOWCASE EVENT

ANTUELA TAKO LOUGHBOROUGH UNIVERSITY AND **GILLIAN GROOM** SOUTHAMPTON UNIVERSITY

The East Midlands Operational Research Group held a highly successful 'Networking & Project Showcase' event on 1 May 2013 at the School of Business & Economics at Loughborough University.

The event was attended by members of the regional EMORG group, Loughborough and Nottingham University staff as well as practitioners from local businesses and local authorities. The main theme of the event was the showcase of research in Operational Research and Analytics as it is being undertaken in the East Midlands region. Seven participants, representing Loughborough University, Nottingham University and Nottingham North NHS Clinical Commissioning Group entered the competition who presented work on a range of topics, including workforce scheduling and routing problems, resilience in medium sized organisations, simulation in NHS, insightful thinking, conceptual modelling and analytics. Light refreshments and drinks were provided throughout the evening, while attendants had the chance to discuss the work presented and give feedback to presenters.

Winner Prize presented to Rupa Jagannathan by Chris Teale

The event was well attended and attendees found it stimulating. Many commented on the quality of the presentations and the benefits of the event in providing an opportunity to hear about the use of O.R. skills and a forum for exchange of knowledge and networking opportunities.

Poster displays throughout the evening

High quality posters were presented, which were assessed based on three criteria: technical, content and oral presentation. The evaluation panel made up of two academics, Ashley Carreras, De Montfort University and Rupal Rana (Loughborough University) and two practitioners, Gillian Groom (Southampton University) and Chris Teale (Health GFK) gave their final verdict choosing one winner and one runner up. Certificates and a small cash prize were presented to the winners. The winner was Rupa Jagannathan from Nottingham University who presented a poster entitled: 'A case-based reasoning system to predict the likelihood of accidents' and the runner up was the team from the Nottingham North NHS Clinical Commissioning Group lead by Janet Baker entitled: 'Modelling Health and Social Care in Nottinghamshire'.

2nd Winner prize presented to Janet Baker and her team by Chris Teale

<OR>

CAREERS OPEN DAY 2013

LOUISE ORPIN EDUCATION OFFICER

The Careers Open Day will be held in a new location back in Birmingham for 2013.

The Open Day will be held at the Thinktank at Millennium Point in Birmingham on Wednesday 20 November 2013, from 10:00 to 16:00.

This fantastic venue is located in Birmingham's city centre with great transport links and parking on site, and will provide a great setting for our Careers Open Day.

Located on the 3rd floor, the exhibition area has views out across the city while the theatre that the programme of talks will take place in is located next door.

Visit the venue's website for further information, www.thinktank.ac

The talks in this year's programme will be repeated and the students split into two groups to ensure a constant flow of students around the exhibition while also allowing the students to benefit from the talks on offer. Exhibitors will have the opportunity to present either a case study or give a career information related talk (e.g. why O.R. is a good career choice, employer perspective on entry into O.R., recent graduate experience, career progression opportunities).

Exhibitors will be included in a monthly feature in Inside O.R. up to the event and a follow up article, a profile on our website and will be promoted to students prior to the event.
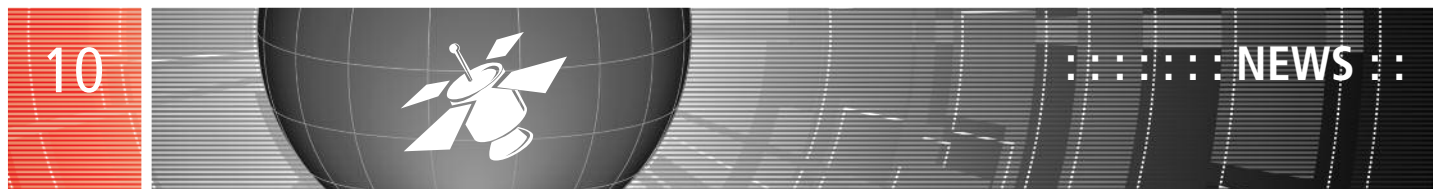
We're well on our way to filling the stands, make sure you don't miss out. Confirmed exhibitors so far are…

<OR>

THIRD SECTOR O.R. IN DEVELOPING COUNTRIES

KATHERINE BYRNE AND ANDREW DOBSON

On 27 March a select group of distinguished O.R. practitioners gathered to hear about O.R. projects in developing countries.

Speakers gave an overview of the challenges of doing O.R. in developing countries (which are in many ways the same challenges faced by O.R. practitioners the world over), presented a number of case studies and challenged the audience to think about how to cultivate O.R. capabilities in developing countries as well as providing skills and expertise more directly.

As an introduction to the SIG session, Andrew Dobson presented an analysis of the different types of third sector organisation working in, or with, developing countries, both UK- and developing country-based. He highlighted that the set of such organisations is very diverse, and that they are often working in a complicated environment of relationships with other third sector organisations and with governments and international governmental agencies. Leading on from this he highlighted the many different places within the overall 'system' where there were potential opportunities for O.R. to contribute.

He then described briefly the different challenges faced by two local 'front-line' third sector organisations he is currently working with in Africa. The first is a community-based Ugandan organisation providing health services to a remote rural population of 100,000. The second is an organisation founded by Rwandan men that is working to reduce gender-based violence in Rwanda by engaging with Rwandan men. He highlighted that one significant source of challenge for them was the location of these organisations within the complicated network of relationships he had described earlier.

A case study from Ivor Langley of the Liverpool School of Tropical Medicine followed, showing how O.R. methods (DES and Transmission modelling) had been used to facilitate decision making on the type and location of TB diagnostic tools in Tanzania. While Honora Smith from the University of Southampton and Jon Smith from Selective Analytics showed how optimisation techniques had been used to advise on the location of HIV/AIDS clinics in South Africa (see Red text).

Paul Randall who has worked with the Namibian Government for a number of years then challenged us to think about how O.R. skills within developing countries should be used and developed. Anthony Harries showed one way that this could be achieved. His organisation, the International Union Against Tuberculosis and Lung Disease, has developed an accelerated O.R. postgraduate level training programme to encourage an O.R. based approach to health questions in developing counties (see Blue text) – an approach which could easily be rolled out to wider O.R. applications.

Locating laboratories for HIV/AIDS testing in South Africa

Locational analysis has been applied to the siting of HIV/AIDS testing equipment in laboratories across South Africa. Classical location analytical techniques were customised to ensure that equipment is sited as close as possible to major centres of demand from hospitals and clinics. A particular advantage of the methodology chosen was that choices between laboratory sites for hosting the test instruments were made in a transparent manner.

Four scenarios based on maximum travel distance from medical facility to laboratory testing site were developed. Geographic visualisation was then used to communicate these results to decision makers with charts showing trade-offs between sample quality and running costs. The results obtained compared closely with pilot review projects already undertaken in four regions of South Africa. Implementation of recommendations has subsequently been rolled out nationwide, with some local variation.

Capacity Building in Operational Research in Low and Middle Income Countries

In March 2009, the International Union Against Tuberculosis and Lung Disease (The Union) and Medecins Sans Frontieres- Brussels (MSF) joined forces to come up with a modular operational research training course aimed at health care workers in the public sector in low and middle income countries. The course runs over ten months and consists of three modules – the first on developing an operational research protocol, the second focusing on an electronic data capture instrument and the third on writing up the paper. There is strict selection of participants and milestones that have to be achieved to remain in the course. In the first four years, over 150 participants from 50 different countries have been enrolled into thirteen courses. Eight of these courses have been completed, resulting in 92 scientific papers submitted to peer-reviewed journals of which three quarters have been published or are in press. Many of these projects have resulted in changes in policy and practice.

A number of the presentations from this session can be found on the Third Sector O.R. page of the OR Society website.

<OR>

THE OR SOCIETY
PRESIDENT'S MEDAL
WINNER 2013

SUBMIT <u>YOUR</u> PRESIDENT'S MEDAL ENTRY AND RAISE YOUR PROFILE!

The President's Medal is one of The OR Society's most prestigious awards and we're inviting entries for the 2013 competition.

The President's Medal is awarded for the best **practical application of O.R.** submitted to the competition (a wide definition of O.R. is used). Entries are welcomed from both industry based O.R. workers and consultants as well as from academics. One of the main qualifications for entry is that the work has been implemented before submission. If you're thinking of giving a **case study based paper at OR55**, why not consider aiming a bit higher and going for the President's Medal?

Criteria for judging include: The level of demonstrable benefit, the intellectual and novel content of the solution, the likely longevity of the solution, the excellence of the O.R. process.

Entry couldn't be simpler! You need only to provide a short summary of the work, concentrating on the criteria listed above and listing the team members. It is important that you submit with your entry an endorsement by the client of your work. Entries will be short listed and those selected will be invited to present their work at the OR55 conference in September 2013 which will be held at the University of Exeter.

In addition to receiving the medal, winners will be entitled to use a special **'medal winners' graphic** (above) on their stationery and promotional materials. All the short listed entries will receive the support of The Society's 'house' journalist to develop and publish an article based on the project.

RECENT PRESIDENT'S MEDAL WINNERS

2006 – A Swain, A Ross, British Airways: Improving British Airways' short haul punctuality performance
2007 – T Lewins, M Sykes PA Consulting; A Moon Nissan UK: Developing a production-schedule tool
2008 – I Wright, DWP: Optimising the Department of Works and Pensions' estate
2010 – Panos Frangos, Simon Hughes, Sellafield Limited: A model future for the UK's nuclear legacy
2011 – Stephen Hammond, Keith Slater, NATS: Air Traffic Control, Business Regular and CO2 Emissions
2012 – Colin Marston, Patrick Rose, Dstl: Shaping the NATO Plan for Afghanistan

Entries by e-mail to the Secretary and General Manager,
The OR Society, gavin.blackett@theorsociety.com *by 30 June 2013*

Informal enquiries can be made to Geoff Hook, Lanner Group 01527 551315, email: ghook@lanner.co.uk

REMEMBER…sell your entry and obtain your client's permission!

Senior Principal Analyst (Strategic Projects – Process and Outcomes)
Cheltenham
Starting salary between £38,000 and £48,000 depending on skills and experience (more for exceptional candidates)

Permanent Principal Analyst (Strategic Projects – Process and Outcomes)
Cheltenham Starting salary between £30,000 and £37,000 depending on skills and experience Permanent

The Strategic Projects area of the Analysis and Research team is responsible for answering the most substantial and difficult questions at the heart of connecting people to higher education such as: *Why do people to apply to higher education? How do applicants choose courses, and how do institutions choose applicants? Are these the right choices?*

Over the past year, analysis from this section has enabled us to answer key questions around the recent changes in higher education, including what effect recent changes in tuition fees and student number controls have had. These two new roles are to further strengthen this area with a particular focus on the workings of the admission process itself and its outcomes for both applicants and institutions.

As the Senior Principal Analyst in this area you will be a senior experienced professional with outstanding technical skills and a record of designing and executing major new analysis that directly addresses customer needs. You will play a major part in furthering the team's reputation for excellence through high quality, relevant and influential analysis, and take responsibility for improving the depth and reach of analytical work across the team.

As Principal Analyst you have high level of technical expertise and will work closely with colleagues in executing demanding analytical projects to achieve clear outcomes. You will guide other analysts and be active in sharing data, methods and insights across the team.

Both role holders will be known for their ability to write and present persuasively about their analysis. Full details of responsibilities and skills required are in the role profiles.

http://www.ucas.com/documents/jobvacancies/senior_principal_analyst_process_and_outcomes.pdf

http://www.ucas.com/documents/jobvacancies/principal_analyst_process_and_outcomes.pdf

Closing date for applications to all positions: 0900 Monday 3 June 2013.

If you would like apply for these posts then please send us a CV and brief covering letter (no more than 500 words) to jobs@ucas.ac.uk indicating which posts you are interested in, your salary expectations, what you would bring to our team and why you want to join us. If you would like to talk about the roles then please contact us on jobs@ucas.ac.uk.

An assessment centre will be held on Saturday 08 June or Saturday 15 June. Interviews will be held between 17 June and 28 June and you will be required to produce evidence of qualifications material to your application. You will be contacted by email in the first instance.

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SIMCITY'S COMING OF AGE

NIGEL CUMMINGS

SimCity, the video game has been around for nearly a quarter of a century. The technology behind it is beginning to impact upon real lives…

It is hard to believe, but SimCity was launched as a video game in 1989. Its popularity has spawned a whole series of games, all designed by developer Will Wright and published by Maxis (now a part of the global games company Electronic Arts).

The on-going success of SimCity sparked the release of many other spin-off 'Sim' titles, including 2000's The Sims, one of the world's best-selling computer games, SimCity 2000 one of the first simulations to feature isometric perspective and terrain layers, and SimCity 3000 which allowed players to negotiate rudimentary business deals with other players and trade in utilities like water, electricity, or waste management services.

SimCity 3000 gameplay began to resemble the simulation scenarios we now generate in O.R. powered simulation applications. Although not strictly a city management simulation, it provided a capability for simulating the effect of land value on construction and the building of four business deal structures whose success largely depended on demographics. These structures may sound familiar to simulators in the O.R. world, as they are; prisons, casinos, waste conversion plants and shopping centres.

Over time layer upon layer of sophistication including artificial intelligence has been added into the overall gaming experience to keep players hooked. About ten years ago 'people' were added who can now be 'socially engineered'.

SimCity in its many forms is now available on virtually every platform including mobile phones and, of course, via the Facebook social environment. This has allowed users to develop 'cities' which interact with others.

SimCity also has its serious side from which the 'science of cities' has developed. This allows researchers to make predictions of what might happen in the real world using what has become known as
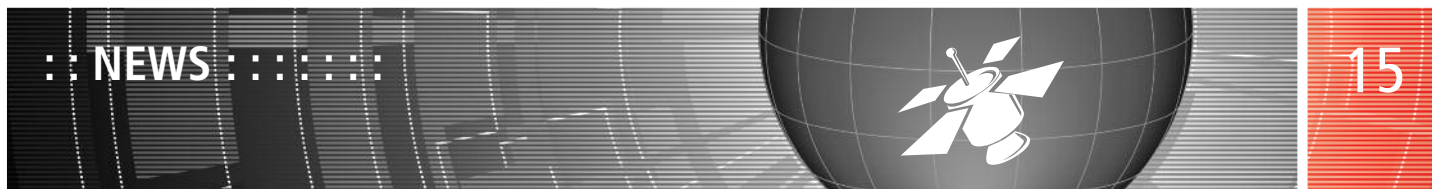
'smart city' technology. The goals are big gains in efficiency and quality of life; smart city technology can for example be applied for the better management of traffic. It can also help to curb the consumption of water and electricity - some estimates indicate that application of this new technology to water and electricity use can result in cuts of 30 to 50% over the course of a decade.

One of the main centres involved in this work is New York University's Centre for Urban Science and Progress whose director is Steven E. Koonin, a theoretical physicist and science policy expert. Usage is neither restricted to the US nor to academia. Cities from Stockholm to Singapore are deep into smart city projects and according to a report from IDC, a technology research firm, '[It] is emerging and growing as a significant force of innovation and investment at all levels of government.'

City governments, like other institutions, have collected data for years to try to become more efficient. The collected and sanitized data is being used to reduce electricity consumption, water usage, noise pollution, traffic flows and much, much more. 'People live in cities,' Jurij Paraszczak, director of smarter cities research at I.B.M. said, 'So much of the equation is not just the data but how you encourage people to change their behaviour.'

Mike Rose, a video game editor for Gamasutra UK, decided to test some theories he had about his hometown of Northenden, Manchester (population of roughly 15,000) using SimCity. Northenden is quite a small place that can be driven straight through in around five minutes. (Small towns work well in simulations). It consists mainly of residential housing, with a strip of shops at the centre of the town. Despite its small size, its main street gets very busy in rush-hour with hundreds of cars either making for the motorway or to Didsbury.

He has contemplated numerous times about the causes of pileups in Northenden, sometimes wondering whether it's simply that the town is laid out in an awful fashion. Recently he took the plunge of attempting to try and find out exactly why, by using SimCity to create his own model of Northenden. As he added in more realism and using data available he was able to determine the cause of this congestion and study other effects including the demise of the town's shops due apparently to the proximity of East Didsbury.

How long will it be before we can build a simulation of the planet to emulate the white mice's experiment to solve the meaning of life?

<OR>

TRAVELLING PRIEST PROBLEM

JOHN CROCKER

If you are a reader of this magazine then it is unlikely you have not heard of the travelling salesman problem (TSP) but David Smith has discovered amongst the archives at Exeter Cathedral a case of a travelling priest dating back to the 15th Century.

It would appear that this particular priest in south-west Devon had worked out a tour of his parish which took in every one of the 48 households within his parish over a period of 14 days. This would have made him very unusual, if not unique, because at the time, parishioners were expected to make their own ways to the local church for confessions. The explanation put forward was that this area was of considerable value to the church as it was probably the largest source of silver in Britain. It is suggested that the priest had calculated that if he visited his parishioners then this would maximise the time they were able to spend mining the galena ore. It was also recognised that silver miners were in the service of the crown so enjoyed a privileged status which may have allowed or encouraged the priest to make them a special case.

Although the route described is not optimal if all of the households could be joined by straight-line paths, the geography of the area is such that this would not be practical for someone travelling on foot or even by donkey. As David points out, there are no accurate maps of the area showing the course of the paths which existed at that time or indeed, of the bridges or fords which enabled one to cross the rivers and streams. It is however interesting to note that if one connects each of the households by straight-lines following the route described, each is visited once and only once and none of the lines cross any other.

It is not unreasonable to presume that the thirteen households that were the last to be visited on each day would have provided the priest with board and lodging for the night so it is quite possible the route was so planned to ensure that these were the ones which provided the best hospitality. As to whether this criterion took priority over distance travelled, we may never know.

I cannot guarantee that you will have time to follow this route if you visit Exeter for this year's Conference but I am sure that David will be on hand to talk to you about it.

For a fuller account of this fascinating example see David Smith's paper in OR Insight July 2013 **26**.2 pp 140-8. or on his blog orindevon.blogspot.co.uk

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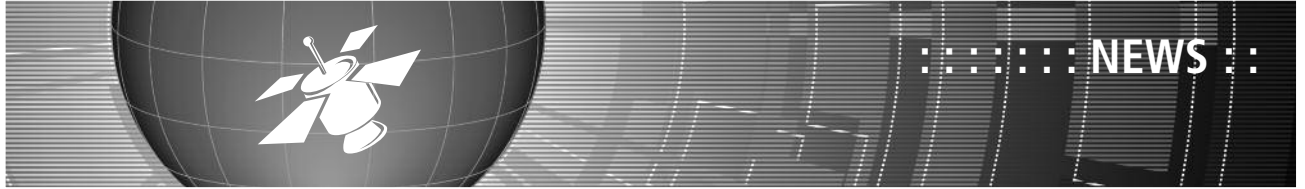
O.R. HELPS TO MAKE A DIFFERENCE IN A CHANGING NHS

JANE PARKIN

On 25 April the local Yorkshire and Humber O.R. Group (YHORG) met for a lively session with two fascinating talks from opposite ends of the NHS spectrum.

Stephen Lorrimer, who is Head of Analytical Services and Head of Profession for Operational Research in NHS England, explained the new structure of the NHS and the role of a world class analytical service within NHS England.

He outlined some aspects of the work currently being carried out which include:

- Analysis to inform policy on spreading innovation across the Health Service using scenario modelling, cost benefit analysis, logic models and theory of change models for evaluation;

- Informing the Cancer Strategy to reduce mortality using a Markov simulation model and a cost / benefit appraisal;

- An assessment of Proton beam therapy (an expensive radiotherapy which is recommended for a small number of otherwise hard to treat tumours). O.R. modelling was used to support the investment decision to build two machines in England;

- Use of text mining to analyse key priorities submitted by the new Clinical Commissioning Groups (CCGs); and

- Helping to develop a robust funding model for the new NHS structure.

The second speaker, David Gilding, Head of Public Health Intelligence at Nottinghamshire County spoke about his experiences of O.R. at the 'coal face' of the NHS. He started with examples of the type of questions he gets asked in his daily work:

- Where should a new health visiting service focus its work?

- If smoking falls by 5%, when will we see savings? How much?

- How many people with [insert disease] do we expect in this population?

- How will the prevalence of diabetes change over the next 10 years?

- How many people drink at harmful levels **and** use opiate drugs?

- What outcomes can we expect if everyone has an NHS health check?

He outlined the scale of the NHS in Nottinghamshire and the recent structural changes and then spoke about some of his recent projects:

Newark Healthcare strategy - a redesign of urgent care and other pathways with or without large population growth using simulation

Review of Walk-in Centres – an assessment of four options using simulation modelling but discovering that different stakeholder groups preferred different options.

Community hospital review – the effect of alternative pathways following a utilisation review

Mental health rehab – use of system dynamics to model patient flows (or not) through mental health rehab

Care for children with complex needs – use of soft system methods to help redesign of care pathways across health and social care

Scenario generator project - promote use of and mentor modelling projects

Scenario generator functional model
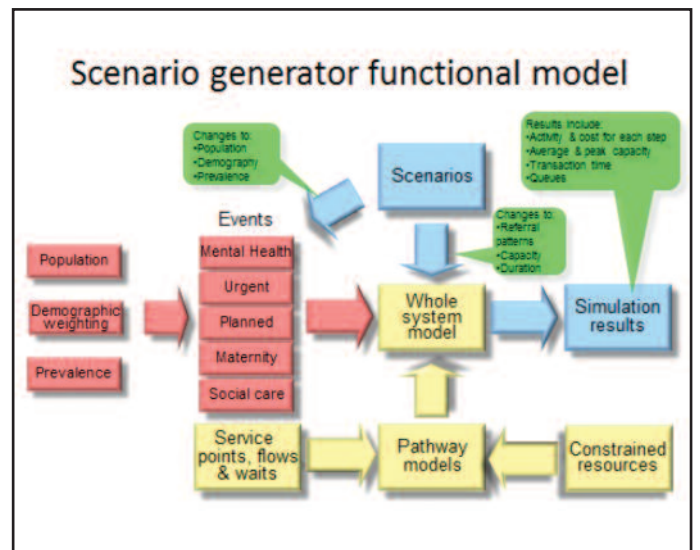
The talks were followed by a lively discussion which continued in the convivial atmosphere of the Wardrobe pub.

<OR>

EDUCATION & RESEARCH COMMITTEE: O.R. IN SCHOOLS (ORIS)

VINCE KNIGHT CARDIFF UNIVERSITY

My name is Vince and I am the current chair of ORiS. On joining the O.R. group at Cardiff I was invited by Paul Harper (the previous chair of ORiS) to join the taskforce.

ORiS has a wide range of aims and goals all of which are concerned with promoting O.R. to a younger generation whether or not they later take up a career in this area..

Prior to my involvement with ORiS, the taskforce had put in place two major foundations that ensure the sustainability and success of ORiS for years to come:

- Firstly a DVD entitled 'What is O.R.?' was put together showcasing the various applications of O.R. in a wide range of industries. The O.R. in Sport section includes an interview with Israel Vieira who at the time was a strategist for the Brawn Formula One team (he is currently with Red Bull!). The DVD was refreshed with some new case studies and was re-launched in October 2012.
- The second (and in my eyes) most important achievement of the taskforce was to put in a place a new position within the Society, that of Education Officer.

I cannot speak highly enough of our Education officer, Louise Orpin. Louise has an ever growing number of responsibilities and is ultimately the backbone and driving force behind ORiS.

We meet regularly at the OR Society where an excellent lunch is always on offer (and Louise once baked cakes, yet another of her talents). Recently we have been discussing issues such as strategies for reacting to the recent A-level review: is this an opportune moment to embed O.R. in to the A-level curriculum?

We also discuss various training events that Louise puts on for current and future mathematics teachers. These are particularly targeted at teachers aiming to expand their Decision Maths portfolio but also looking for applications of mathematics.

A further more recent development includes the growing social media presence held by ORiS which complements the

LearnAboutOR website (www.learnaboutor.co.uk). This website acts as an information point for students and teachers looking for information regarding mathematics and its applications, and O.R. in particular. A recent undergraduate project supervised by Noel Ann Bradshaw from University of Greenwich and Louise looked at optimising the search engine status of the website.

The website also serves as a repository for the growing set of outreach activity resources available to anyone who would like to volunteer their time to do a school visit (teachers can also request such a visit through the site). The types of visits that are undertaken include teaching students about linear programming using Lego.

Recently, Paul Harper, Noel-Ann Bradshaw and myself have obtained funding from The OR Society's Charitable Projects scheme to develop further resources. This will be done through a project entitled O.R. Ambassadors in Schools (ORAiS). This project will employ undergraduate students from Cardiff and Greenwich in partnership with local schools. If this scheme proves successful it will be rolled out at more universities throughout the UK.

Further specific activities being undertaken by ORiS include presentations given at SCOR 2012, OR54 and YoungOR 18 conferences to try and encourage more O.R. practitioners and academics to run outreach activities.

As mentioned previously ORiS has a growing social media presence with a growing following on Twitter and Google Plus as well as a YouTube channel (www.youtube.com/user/LearnAboutOR). The latter hosts various videos including excerpts from the previously described DVD as well as updated case studies.

I am sure to have forgotten some of the great things that we are doing, but hopefully you will appreciate that whilst the stretch target of ORiS that 'every school child knows what O.R. is' might not quite be reality yet, we are certainly working on it! Be sure to take a look at www.learnaboutor.co.uk where links to all the things mentioned can be found.

<OR>

A LITTLE LESS CONVERSATION, A LITTLE MORE ACTION

DR TOLGA BEKTAS SOUTHAMPTON MANAGEMENT SCHOOL

'A little more action' needed from those who speak out in plea for impact, and this is not just academics.

In his recent article in the December 2012 issue of Inside O.R., John Ranyard reports of the proceedings of a practitioner-academic session held at the OR Society Annual Conference in 2012, the purpose of which was to discuss possible ways of practitioner-academic collaboration to maximise research impact. While what is reported in the paper does not add much to what is already well known in academic circles (see, e.g. Bartunek, 2007; Rynes, 2007), it might still be seen as a potentially useful reminder of the issues, challenges and barriers surrounding such collaborations, particularly for O.R. practitioners and consultants. What is interesting, however, is one of the quotes that the article reports from this debate, which suggests, quite comfortably, and in a surprisingly didactic tone, that 'academics must communicate better if they wish to have an influence in the real world and this means talking more and writing less!'

Dissemination of research by way of writing (i.e. publishing) is generally expected, and mostly required, from academics in every academic institution. However, while it is highly desirable, although certainly not essential, that theory and practice, particularly for a discipline such as O.R., should go hand-in-hand, to suggest that influencing the real world should come at a sacrifice of reducing the written output of an academic is objectionable at best.

The abundance of research papers published in the O.R. literature is full of interesting ideas with potential benefits for practice. However, and notwithstanding the claim that some of these papers 'can be impenetrable', the question remains as to how much of this research output is actually read or taken to heart, by O.R. practitioners and consultants alike.

The O.R. world is blooming with many conferences, workshops and seminars held every year. These serve as the perfect opportunity for all parties involved to talk to one another. Academics attend primarily to 'talk' about their research. Academics teach, too, and in the majority of cases this is done through 'talking'. Through teaching, they educate next generations of managers. They talk of problems of social and economic relevance. This in its own right could be seen as impact.

I would suggest that, one way or another, academics do more than enough 'talking'. However, whether these conferences are attended by enough practitioners and consultants to 'talk to', is another question that begs an answer, and it is not clear whether there is any more that academics can do to help with this.

Generating new knowledge is not the same as actual implementation in the practical world, no matter what context. In some, if not in most cases, the two will be executed as two different projects in their own right. To expect academics (or practitioners) alone to take research ideas from scratch all the way through to putting them 'into action' is not reasonable unless there are additional mechanisms in place. For this purpose, mechanisms to facilitate the implementation of new ideas are needed, not only to serve as a gateway to generating, and possibly maximising impact, but also to reduce the burden on the academics and practitioners who are somehow expected to take on this role on. This is where Research Councils (should) come into play, particularly as they are the main drivers behind the expectation that research should have real impact. These mechanisms should also allow for engagement in such a way to be able to harness the academic output for efficient and effective use in practice, without compromising or sacrificing the intellectual capacity or efforts of academics.

It is therefore not just 'talking' more, and certainly not 'writing less', that will achieve the desired outcome of an impact, enough of which is already done by the academics. What will help is introduction of mechanisms that will help convert research ideas into reality, hence the need for 'a little more action' from those who speak out in plea for (more) impact.

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Bartunek, J. M. (2007). Academic-practitioner collaboration need not require joint or relevant research: Toward a relational scholarship of integration. *Academy of Management Journal*, 50(6), 1323–1333.

<OR>

NEVER THE TWAIN! RESPONSE TO DR BEKTAS

JOHN RANYARD

Dr Bektas makes a number of points concerning the relationship of practitioners to academics and different attitudes to research and publications.

Of course it is generally appreciated that academics do have to write – indeed they are under much pressure to publish in high quality journals so as to support the reputation of their department and secure research funding. Unfortunately, in the past they were not rewarded for disseminating their research findings outside academia, or for engaging with practitioners! O.R. is not a sterile branch of mathematics that can exist in an academic vacuum but a dynamic process that provides significant benefits in the real world. Thus the difficulty that practitioners have had in identifying and exploiting improved methods has long been an academic weakness, though with honourable individual exceptions. Now that 'impact' of research has become an explicit criterion in the Research Exercise Framework (the output of which dictates the allocation of research funding), the current focus will have to change.

I have personal experience of the academic-practitioner 'divide' via my career as a practitioner, as a former Editor of JORS and through working in an academic O.R. Department (Lancaster) for several years. This has led me to criticise both sides: I do not think that practitioners spend enough time searching the literature for research findings of relevance to their projects, nor do they (generally) let academics know where help is needed; and I do not think that academics make it easy for practitioners to seek out such findings, nor do they (in general) spend enough time to seek out collaborative opportunities. From a Lancaster perspective, it often appeared that organisations were only interested in engaging if they could see immediate benefits, thus neglecting the importance of long-standing arrangements.

To take existing 'writing' by academics, there is general agreement that much is impenetrable to practitioners but this is a requirement of the scientific rigour that is necessary. I have long believed that practitioners would benefit from a publication that addresses their needs directly, particularly as *OR Insight* has failed in this regard. I am therefore encouraged that such a publication is being actively pursued by a working group under the chairmanship of President-Elect Stewart Robinson. This publication could contain journal papers rewritten in a form that is more appealing to practitioners, in a way that 'Significance' is to statisticians.

My belief that there is potential for more collaborative work, which would benefit both sides (a win-win) has led me to organise practitioner - academic sessions at the last three national O.R. conferences, as part of the 'Making an Impact' stream, albeit with varying degrees of success. However a better understanding of the barriers has been obtained and there has been much goodwill on both sides with a desire to make progress. A new approach is being taken in a similar session at OR55 and this will be publicised in future issues of Inside O.R.

I agree with Dr Bektas' call for new mechanisms to facilitate collaboration, possibly involving the research councils. On a positive note, various discussions are in train aiming to help with the impact agenda through COPIOR (the Committee of Professors in O.R.) and HORF (the Heads of (practitioner) O.R. Groups Forum) But it does require a commitment from both sides and this is all too often lacking.

<OR>

ASSISTED PLACES: OR55, EXETER

GAVIN BLACKETT SECRETARY & GENERAL MANAGER

The OR Society's annual conference is an important event in delivering its charitable aims as it has the potential to reach a large number of both members and non-members.

Even though the Society aims only to break even in running the Conference, the price of registration and accommodation taken together with travel costs can soon mount up. Practitioners from larger organisations tend to get conference places paid for by their employers, whilst many academics have conference budgets to cover their attendance at events such as this. There are, however, a number of potential attendees for whom the conference costs can represent a significant barrier.

These potential attendees would not only benefit personally from attendance, but the conference itself and the wider O.R. community could gain value. This is where the Society's Assisted Places Scheme comes in.

So, the next step is up to you! Successful applicants will have their registration and accommodation charges fully funded*, thereby gaining the opportunity to present their work and network with experts in the field.

Applicants are invited to submit a proposal for funding via email to Gavin Blackett, (gavin.blackett@theorsociety.com) before the deadline of 28 June 2013. Successful candidates will be informed of the awards in July.

<OR>

O.R. IN THE THIRD SECTOR (ORiTS) - PRO BONO EXPERIENCES

DR HUW EVANS - INDEPENDENT MANAGEMENT CONSULTANT

EMAIL: HUWDEVANS@GMAIL.COM - TWITTER: @WILDKIPPERS

In this article I describe experiences of volunteer consultancy supporting Third Sector organisations initiated through ORiTS and via REACH[1] and The Cranfield Trust[2].

I sit firmly in the Community O.R. end of the spectrum of O.R. being interested in capacity building using participatory approaches to support organisations to develop themselves with interventions that add value for clients.

Of the four organisations involved, three are small charities trying to cope with reduced funding as the economic crisis developed. Two have a local agenda around community support and advocacy and another is a wildlife conservation agency. The fourth is a regional agency coping with amalgamation of three formerly independent organisations.

The referrals came with an outline specification and expectation of the type and length of the assignment. However, the detailed project planning was open to development. All the assignments involved developing strategic plans and it was essential to be clear that my intervention was not about writing plans on their behalf but helping them to produce their own. My role was to help them develop solutions following a broad participatory action research approach, thus bringing to bear the potential of the whole system, users, staff and stakeholders, to develop a wide and deep awareness of the issues inhibiting impact upon their desired outcomes.

Developing a definitive project plan for this type of work is difficult because as issues emerge and are explored other activities are dictated. It can be problematic for stakeholders who are keen to have some output by a particular date and to be fair sometimes the legal, governance and funding imperatives dictate a timetable. There is the ever-present issue of capacity in terms of time and expertise often of committed volunteers. The client must be committed and not simply doing this to get a tick in the box. If an organisation cannot plan then it's missing a fundamental building block to its sustainability. It's important that the activity is action orientated and time efficient.

The first organisation is a small charity supporting black and minority ethnic groups. Their funding had collapsed and they were laying off staff leaving the service manager as the only employee with few volunteers apart from the Trustees. Initial discussions revealed that there was little shared understanding or agreement about their priorities. A plan was agreed and I ran a small workshop at the end of a normal trustee board meeting using a time efficient and effective process to enable all present to be heard – a simple

board blast of 'What works well?' and 'What doesn't work so well?'. As issues emerged they were clustered by the group and finally scored to give them some order of priority. This simple exercise developed greater common understanding of the issues and impact upon outcomes and clarity about each others' thoughts, opinions and ideas to improve. It made more explicit what had been tacit.

An action plan emerged, agreed by the board to move the organisation forward. Add some risk analysis and a realignment of job descriptions and the organisation became clearer about what it was possible to achieve albeit with a narrower focus than previously.

The second organisation declared a worldwide remit in an area of conservancy with a UK and foreign based breeding programme to support repopulation of rare species within their remit along with providing a zoological attraction. Support was requested to develop a business plan. During discussions about the approach several issues emerged that were distracting people from developing the organisation, for example, low managerial capacity, discord between stakeholders, reducing income, etc.

We agreed an approach that brought together staff, managers and trustees to develop a timeline al la Future Search[3] (exploring the past, present and future set in the context of the organisation, the

individual and the world) in order to develop greater common understanding across the group. This was followed by a similar 'blast and prioritise' exercise as described earlier. Fundamental issues emerged, for example, a mismatch about people's views of the purpose of the organisation and their work and the need for a different managerial structure. Discussions and a further workshop with trustees followed where mindsets were further challenged.

The priority was to develop actions, using people's time and capacity efficiently and effectively whilst boosting their confidence so that they could move forward rather than produce a 'glossy' document.

The third case study was a small charity with aims to support local communities, providing services for parents, children and young people, health agenda etc. The organisation wanted to get its head around the business planning issues coping with partnership working involving another charity and developing opportunities offered by a refurbishment of their iconic premises. This involved mentoring, coaching and a 'critical friend' role as the manager developed a new draft plan. It also included, you guessed it, a workshop to involve users, staff and stakeholders. Publicity had been carried out to drum up interest in potential participants and an Open Space[4] was planned. The response was low and we reverted to the contingency of the 'blast and prioritise' process that provided information to help the development of a new plan along with actions to improve engagement with service users. The work was supplemented with a user survey. A new draft plan quickly emerged as new agendas and priorities became clearer.

My fourth assignment involved a regional cultural organisation that wanted to be more self sustaining rather than reliant upon a single funder. They had recently undergone amalgamation with two other organisations, an initiative led by the main funding agency with a view to introducing efficiencies. A draft business plan had been drawn up that tended towards listing projects rather than being a strategic document to develop a self-sustaining future.

Discussion focused on action-oriented, whole systems approaches but I had to accept that instead of a single workshop involving users, staff and stakeholders there would be one with staff and managers and another with a sub-set of trustees responsible for leading planning plus an online survey of stakeholders.

The staff and managers workshop worked well, following the Timeline and 'blast and prioritise' model along with ideas about improvement. It was the first time they had experienced a participative approach to planning. The approach to the trustee workshop was different in that I took the vision, mission, values, strategic goals and objectives from the draft plan and asked the trustees to score their satisfaction/confidence in them by use of 'smiley faces. The results were a demonstration as to how well they had 'bought into' the fundamental elements of the current plan.

We then moved on to the 'blast and prioritise' exercise as in the previous examples and also some work on organisational values.

A survey of stakeholders was set up via Survey Monkey[5], simply asking 'What worked well?', 'What didn't work so well?', and 'What should change/develop?' Out of the hundreds of stakeholders only

seven were involved of which four responded. The organisation failed to maximise the potential for developmental feedback from stakeholders and users.

The organisation feels it now has sufficient information to re-write its plan and says the intervention '… gave us clarity, and allowed us to think differently on our approach'.

How was it for the clients? The feedback suggests that it added value in making client organisations self-aware, more self-confident and exposing issues that have informed their decision-making.

How was it for me? The interventions demanded 'soft O.R.' approaches although I found that there were mixed attitudes to whole system approaches and participatory processes. I learned a lot about areas of the Third Sector I wouldn't normally have experienced, the assignments were interesting and fun, involving work I was happy to be involved in and provided experiences to quote in support of applications and bids, potentially enhancing my CV. The experience confirmed to me that if an organisation thinks it is too busy to plan properly and listen to its users, staff and stakeholders it is either in a very privileged position and immune from the realities of life or it will fail – what's the cliché, 'Failing to plan is planning to fail'?[6]

[1] http://www.reachskills.org.uk
[2] http://www.cranfieldtrust.org
[3] Weisbord, M. R. and S. Janoff (1995). Future Search - An Action Guide to Finding Common Ground in Organizations & Communities. San Francisco, Berrett-Koehler.
[4] Owen, H. (1997). Open Space Technology (A User's Guide). San Francisco, Berrett-Koehler.
[5] http://www.surveymonkey.com
[6] This, or variations, attributed to Benjamin Franklin, Winston Churchill et al

<OR>

SIR HENRY TIZARD, CONCLUSION

JOHN CROCKER

Over the past year I have done my best to produce an accurate summary of Ronald Clark's biography of Sir Henry Tizard up to the end of World War II.
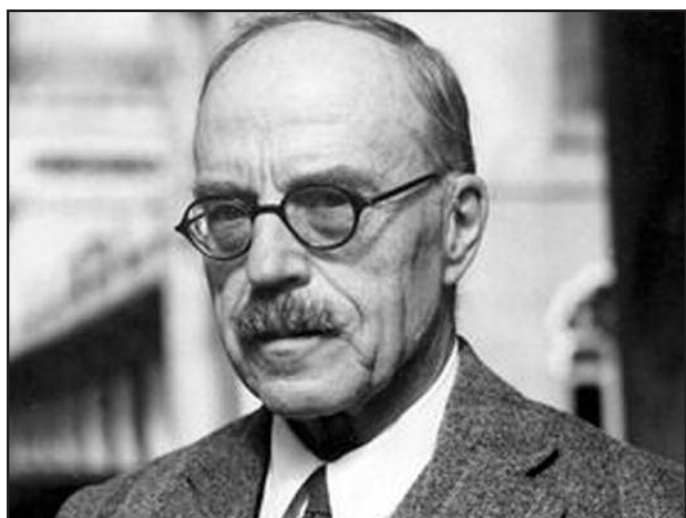
It is perhaps a rather strange place to stop for he continued to do a great deal in many areas from then until his death from a cerebral haemorrhage 9th October 1959 at the age of 74.

Like Churchill, Tizard was the right man in the right place at the right time. He was a man of great influence; not so much because of what he said or how he said it (he did not have the rhetoric of Churchill) but because what he said was what he believed to be right based on clear, scientific logic and as far as anyone can be, unbiased (other than that he was determined that the Axis powers should be defeated). It was said of him that he was perhaps not the best flautist in the orchestra but if it was a flautist you needed then he would know the best and be able to arrange a meeting. His lack of political motivation and ambition meant that he lost out to Frederick Alexander Lindemann (later Lord Cherwell) as scientific advisor to Sir Winston Churchill but he was a scientific advisor to many of the people that mattered both in Government and in the armed forces for which services he received no payment.

Throughout most of his life, his work could be described as operational research – indeed, it is quite possible he was the first to coin that term. He recognised the need to concentrate on what was possible, practical and which would have the greatest impact on bringing the war to a successful conclusion in the shortest time. His practical knowledge meant he was able to put himself in the position of the person who would have to use the weapon or equipment.

I would like to conclude this series of articles by reprinting in full a letter which Tizard wrote to Sir Alan Barlow of the Treasury, as far as I can determine, in 1947.

Dear Barlow

You have asked me to give you my views on the problem of fitting the scientists into the Government machine.

I have read a good many proposals, all of which in one way or another purport to give the scientists greater freedom, better status, better prospects, better salary and better conditions of service. All this sounds like a move in the right direction, but I do not believe that scientists will ever fit comfortably into the machine unless and until they feel that they are regarded as equal partners. All the proposals are palliatives which stand no real chance of providing a solution of the problem; I believe in fact that they will aggravate the position by putting the scientists at a level somewhere between the administrative and executive classes in the Civil Service.

Before the year 1936 the academic scientists lived in a little world of their own, with their own hierarchy, their own levels and even their own honours list, which took the form of elections to the Royal Society, medals and special lectures, and as a closed community the system worked pretty smoothly.

The scientists who were in the Government service were, with rare exception, second rate. The state of national emergency which culminated in the war brought practically every scientist who was any good into the Government service in one way or another. No-one I think will question the value of the contribution which these scientists have made to the war effort, but the time has now come when the Government must decide whether it is desirable to retain a fraction of the first-class men in the service of the State and, if so, what steps are necessary to achieve this result.

The semi-totalitarian conditions which have, during the war, reduced the scientist to a pawn which could be moved at will by politicians, civil servants, and the fighting services, will not be a principal proposition in time of peace, and I do not believe that it will be possible to exploit the patriotism of the scientists when the state of national emergency has passed.

I think that the root of the trouble lies in the fact that, with some exceptions, there is a tendency for the politicians, the civil servants and to some extent the Service chiefs, to dislike the scientists, and this dislike, again with exceptions, is reciprocated. Many of the civil servants regard the scientist as an uncultured barbarian who may perhaps, in a restricted field know 'more and more about less and less', but who is a man of affairs, who has little capacity for administration, who is constantly trying to interfere and who is nearly always difficult to deal with. There will always be people answering to this specification and I should be the last to maintain that they are in short supply amongst scientists, but if you take a man of over forty years of age who has been running a team of a
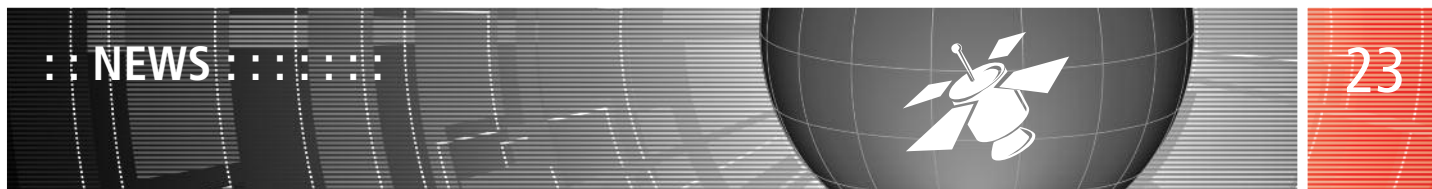
dozen or so researchers and expect him to show scientific originality and good judgment, but also to administer a large organisation efficiently, without friction and with an understanding of his fellow men which his previous experience and education have not provided, you are yourself making a serious administrative blunder – and you aggravate that blunder tenfold by not treating him as an equal. You give him a salary which bears no relation to the importance of his responsibilities and you add insult to injury by the kind of public recognition he is given. Such phrases as 'back-room-boys' are deplorable.

It is therefore, not surprising that many scientists feel that they are looked down on as belonging to a lower stratum – strange creatures who are fetched out at times of emergency (just as you go to a dentist when you have a hollow tooth, or a plumber when the pipes have burst) and cast back into the obscurity to which they properly belong when the emergency has passed. So long as this state of affairs obtains, I am convinced that the best of the scientists will prefer either the 'splendid isolation' of academic life or the material rewards which industry is prepared to offer.

I think that the experience of the war has shown that fundamental scientific research on the one hand and the applied science that is needed in the service of the State are very different.

If you take a first-class scientific researcher with originality and energy and turn him loose in a suitable environment, something will come out but you cannot say what. In fundamental science everything must be understood, nothing can be ignored, all knowledge is of value and every phenomenon must be pursued relentlessly and logically to the end. The researcher in fundamental science tends to confine himself to a restricted field and to know 'more and more about less and less', and the peculiar qualities which are needed to yield fruitful results in fundamental science have usually passed their zenith before a man has reached the age of 40. The laboratory which is devoted to fundamental research is no place for the production efficiency experts. Many acorns must fall to the ground for every oak which reaches maturity.

Most of the scientists who have made important contributions to the war effort have done so in fields far removed from their pre-war activities. It would be astonishing if in time of peace a biologist were to submit a paper on radio for publication by the Royal Society, but in war time we find, for example, a biologist working with outstanding success on radiolocation; a specialist on electron diffraction designing incendiary bombs, and so forth.

Applied science is different from fundamental research and is essentially not self-fertilizing. It is no good shutting a man up in a laboratory and telling him to find out something that will win the war. He must be constantly confronted with new problems, new needs and new projects, and in this field I think that there is no reason to suppose that his originality and versatility will decline at an early age, but rather that they will be fortified by the judgment which comes from experience. Applied science, which has a definite object in view, is more of the nature of an art and, like the art of painting a portrait, it is the recognition and isolation of the essential that really counts, though, of course, this art must be backed by sound scientific knowledge and understanding.

Fundamental research is the ultimate source of all applied science.

Scientific men with first-class judgment and originality, who are also good administrators and men of the world, with political wisdom and with a sympathetic understanding of their fellow men, are, if they exist at all, so rare that for practical purposes they may be ruled out of account. (Some of my scientific colleagues will no doubt think that I am unduly pessimistic, though their natural modesty would preclude them from suggesting the name of one such paragon.) It is unfortunate that whilst there are few who would fancy themselves as experts on, say, cosmic rays, there are certain human activities, which include administration (and chicken farming), which everyone thinks they can take up successfully at any time of their life. All this has led me to a series of conclusions which sound terribly like platitudes.

Scientific men are usually indifferent administrators and seldom men of the world. They should not be expected to undertake tasks for which their experience and training have not fitted them. It is wasteful to turn a first-class scientist into a second-class administrator.

Administration is a job for people who have been trained to administrate, but if they are to administrate scientific activities they must have had a broad general scientific education. I cannot see that this is impossible, though I admit that it is a long-term policy.

The function of the scientist is to give scientific advice and to guide the strategy and tactics of scientific research and development. He cannot do this effectively unless he sits with the planners.

The administrator and the scientist have complementary and equally important functions to fulfil. They must sit together at the same level. One must not be the master and the other the servant, but they must work together as partners and equals. (The relation between the Permanent Secretary and the Chief Executive of a Ministry is an example of such a partnership.)

There are many questions relating to the existing organization on which I have not touched in this letter, which is already too long, but I believe that these questions are relatively unimportant in comparison with what I regard as the fundamental principles.

I have written this letter with some misgiving, since there is something for everyone to disagree with. Indeed, I should not have done so were it not that, after more than two and a half years as a chartered privateer, following some four years as a privateer without marque, I feel that I can, with a clear conscience, retire from a task which nothing but the national emergency would have induced me to endure for so long.

Yours sincerely.

<OR>

ARE YOUR STUDENTS ON COURSE FOR WASHINGTON DC?

DAVID BUXTON

There's still time for entries into the Spring tour of the AnyLogic Student Competition in Modelling and Simulation. Regional winners will receive an iPad and a shot at the grand prize of an expenses paid trip to the AnyLogic Conference in Washington DC this December.

Promoting knowledge sharing

AnyLogic's competition is designed to encourage your simulation students to share their achievements with the wider AnyLogic community.

The competition requires students to describe a topical problem in any field and address the issues they have identified by building an original model in AnyLogic and uploading it at RunTheModel.com.

Each model must include visual effects and animation, be easy to understand, simple to operate and provide clear results.

Well connected winners

Visitors to RunTheModel.com, are invited to rate and vote for the best model. Students can add value to their entry by publishing papers on their work and sharing their model on Linked-In to generate discussion and likes.

A panel of expert AnyLogic judges, including Chris Sweeney, Senior Marketing Manager at Tesco plc and Stewart Robinson, Professor of Management Science at Loughborough University, will shortlist those models with the highest rankings based on a combination of RunTheModel.com votes, Linked-In activity and published papers.

From this shortlist, the panel will select regional winners for the UK, France, Germany, Japan, China.

Employment benefits

As well as an iPad or cash equivalent, regional winners will receive letters of recommendation for potential employers and have their details published in the AnyLogic newsletter, which is read by consultants, analysts and engineers in commercial and research organisations around the world. Inside O.R. might be persuaded to give them a mention too.

Free publicity for your faculty

Faculty advisors must register their university and faculty before students can submit their models. Should one of your students be selected as a regional winner, your university and faculty details will be published, raising the profile of your course with your target audience.

Free AnyLogic licence

AnyLogic will provide a free one-year educational licence to enable all simulation students to take part and students who have built an original model using another tool could perhaps demonstrate their marketable skills by converting it to AnyLogic before entering the competition.

Rush hour Russia

Last year's overall grand prize winner posed the problem: To what extent is it possible to increase the average speed on Dimitrovgradsky Avenue in Ulyanovsk, Russia by optimising urban traffic light signal timings? You can discover the answer at www.runthemodel.com/models/831/

2012 Grand Prize Winner: Traffic light signals optimisation

The closing date for this Spring's tour of AnyLogic's competition is 24 June 2013 and the sooner your students enter, the longer they will have to increase their chances of winning by writing papers and leveraging their Linked In connections. Regional winners will be announced on 30 June.

For full details, terms and conditions visit
www.anylogic.com/simulation-modeling-student-competition

David Buxton is the UK's leading practitioner of Agent-Based Modelling and Simulation. He applies his expertise in model development through dseConsulting and in his consultancy work with decisionLab. dseConsulting is the UK distributor of AnyLogic software. Visit www.dseconsulting.co.uk

<OR>

IS THE PACE OF INNOVATION SLOWING DOWN?

CHARLIE MAYES MANAGING DIRECTOR, DAV MANAGEMENT

The recent demise of HMV, that much loved (but insufficiently well patronised) high street icon, made me think again about innovation and what it takes to keep abreast of change in today's dynamic world.

The last 12 months have been particularly volatile for the UK economy and retailers especially have been on a rollercoaster ride. Unfortunately, HMV is just one example of many established brands that were unable to survive. A victim of the new online world order, HMV failed to adapt as the retail landscape shifted and right now, I am sure there are many speculating about how things could have been done differently as well as many wondering what they can do to avoid going the same way.

Faced with a seemingly unrelenting pace of market, economic and technological change we tend to think of our age as incredibly innovative. Indeed, today we have a seemingly endless array of technological innovations such as smartphones and supercomputers, big data and nanotechnologies, gene therapy and stem-cell transplants. However, we also read many articles that talk about the continued imperative for organisations to innovate or die.

What can this mean when we appear to be awash with new technology? After all, governments, universities and firms together spend around $14 trillion a year on R&D, more than at any other point in history. Innovation, however, is more than bringing out new technologies or the money spent on R&D; crucially, it's also about the ability to create the culture that allows ideas to flourish and develop, as well as an organisation's ability to anticipate and adapt effectively to market change.

It is interesting to look back at the pace of innovation in comparison to today. Purely in terms of numbers, the number of UK granted patents peaked in 1967 at 44,300 having fairly steadily risen from approximately 2400 in 1852/3 and now stands at around 10,000 per annum. From 1980 when the numbers started to fall, there was a dramatic increase in the number of US patents from under 70,000 to over 270,000 today with those of foreign origin accounting for less than 40% rising to a fairly steady 50% today.

The industrial revolution was seen as our most innovative time ever although this was probably more due to the quality or impact of each new idea rather than to the quantity. So what are the implications for the future well-being of our economy? Is innovation in fact slowing down? And how important is our ability to keep up the pace of innovation?

The answers to these questions are very important because economies generate growth through innovation. Innovation creates jobs, investment and education opportunities. For a sustained increase in economic output, which is necessary to raise incomes and welfare, we must leverage our know-how, assets and raw materials in better ways, and this requires us to continually innovate. There is very much a case of 'Red Queen' syndrome: you have to keep running faster and faster to stay still.

This is easier to achieve in smaller, more nimble companies but harder to achieve in larger or public sector organisations. To overcome this, large corporate and public sector organisations must try to be more entrepreneurial. Bigger companies will have processes that need to be adhered to but there are still ways to create an entrepreneurial culture such as creating smaller teams, smaller projects and fast paced challenges.

I also think it is also important to be externally focused. Organisations must spend time out in the community to really understand what is driving change. They must also be a voice for the future. For example, we should look to promote our own Thames Valley Silicon Valley and London's Tech City to the world at large more vocally. There are some really exciting things happening in the UK and I am concerned that not enough is being done to raise the profile of our home grown talent. British ingenuity has shaped our world and we shouldn't lose sight of this.

But how do you develop a culture for innovation? Well, to fully embrace innovation, I believe that businesses must become true learning organisations where individuals are allowed to experiment and where it is okay for ideas to fail – providing there are fast feedback loops on the reasons for failure and that lessons learned are embraced in order to seek success in other initiatives. In other words, organisations need to become resilient to change (rather than robust, which implies breakable) and create an atmosphere that accepts failure as part of the learning process and path to success, rather than a finger pointing or blame culture. Such a process will help management to identify and back the winning ideas that will enable us to differentiate and compete in the new world order, maintaining the UK as a hotbed of innovation. As Woody Allen once said, 'If you are not failing every now and again, it's a sign you're not doing anything very innovative.'

<OR>
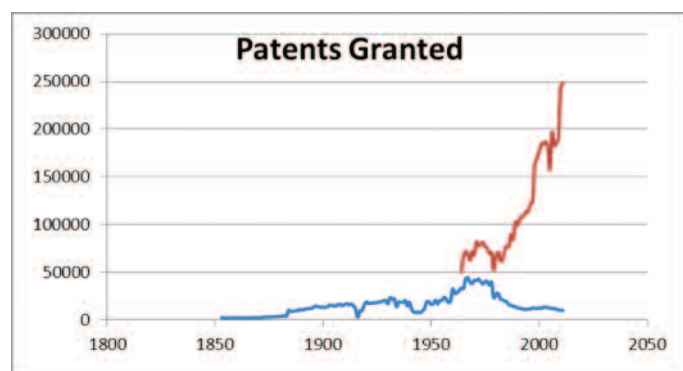
SYSTEMS IMPROVEMENT SCIENCE

GEOFF ROYSTON

'Although there will always be elements of uncertainty and unavoidable failure, as in any research, a serious science of improvement will - by definition - want to investigate and reduce such failure, and thus help to increase future impact. '

We have a tagline for O.R. - 'the science of better'. Some like it, others do not. It does attempt to say quite a lot in a very few words - that O.R. is a disciplined approach to improving things.

But, of course, it does not say anything more about the science, or about what is better, or in which way.   Which rather begs the question: what would the corresponding 'ology' be - what would constitute an articulated 'science of better'?

We could say that the '*science'* part implies a rigorous – analytical, pattern-seeking, evidence-based - approach to investigating issues. We could also say that it implies that there is a body of relevant knowledge and skills. Straightforward enough, perhaps! However, it is the other part of the tagline that crucially differentiates O.R. from any pure academic discipline with a focus on knowledge for its own sake: the word 'better'.

Clearly that is about *improving* something! But many people are in the business of seeking to improve things, and quite a few of them seek to do this using a disciplined approach – clinicians to improve peoples' health, mechanics to improve the running of machines, and so on. What's special about O.R.? A key feature is that the targets for improvement in O.R. are generally at a higher level of organization than those of specialists such as those just mentioned. We are typically concerned with improving the performance of complex enterprises – organized, active, purposeful *systems* of people, material and non-material resources - requiring a holistic view[1]. This suggests that a helpful characterization of O.R. is as *systems improvement science*:

With that more specific concept of a 'science of better', we can now usefully ask a more specific question about its content. What would be the characteristics of a science which was concerned with these types of systems and had their *improvement* as its primary focus? (Statisticians might point out that, in the field of process quality, this is exactly the perspective Deming took, system engineers might say that this *is* their science, when the domain is that of physical systems. So we are here just generalizing the concept).

A primary focus on systems improvement (which of course includes radical innovation as well as more gradual evolutionary change) – taking it as the fundamental object for rigorous enquiry - would require giving *centre stage* in O.R. to addressing issues such as:

- How well is this system performing?
- Why is it behaving like this?
- What would count as an improvement and for whom?
- What changes might bring about improvements?
- How could we test the likely consequences of such changes?
- How do we present clearly and compellingly our findings about change?
- How can desired changes be implemented?
- How can we assess the actual impact of changes?

Several other consequences follow from seeing O.R. as something primarily focused on finding out how to improve things – consequences for our *image*, our *impact* and our *education and training*.

Projecting an image of O.R. as 'systems improvement science' could help provide a clearer perception by the outside world of what we are about, not least because each of the three words provides a handy launch pad for explaining the sort of systems with which we are concerned, the types of improvement we are looking for and the science behind it all.

It certainly demands paying full attention to implementation and impact issues – something which the literature worryingly suggests can be a weak spot for O.R. Although there will always be elements of uncertainty and unavoidable failure, as in any research, a serious science of improvement will - by definition - want to investigate and reduce such failure, and thus help to increase future impact.

Perhaps the biggest potential consequence would be for education and training in O.R., so it was grounded in the theory and practice of improving systems. This would need to take a broader perspective than that obtained by focusing largely on techniques of analysis and modelling. Indeed to do otherwise would seem somewhat akin to having medical training cover biochemistry, physiology and anatomy in depth but skim over consultation, diagnosis, prescription and treatment.

A modular framework for education and training in such an approach might be provided by structuring it according to the stages that a typical O.R. project follows – as illustrated in my article in 'Inside O.R.' of last September – based on a 'D^5IME' cycle of discovery, diagnosis, desires, design, decision, implementation, monitoring and evaluation.

Modules would then address issues such as those as noted below:

Discovery:
characterising and understanding the nature of relevant systems
exploring data
scanning the horizon and investigating trends

Diagnosis:
knowing the sorts of problems that the systems of concern can exhibit
investigating and identifying these problems

Desires
defining goals and objectives
taking stakeholders' values and perspectives into account

Design:
understanding forms of improvement– optimisation, satisficing etc.
identifying potential interventions
developing options for new system structures and processes

Decision:
assessing likely or possible effects of system changes
deciding between different possible changes
presenting and communicating assessments

Implementation
gaining commitment to change
delivering change

Monitoring
identifying progress
assessing the need for 'course adjustments'

Evaluation
establishing the impact of interventions
learning lessons for the future

The main structural elements of this framework are key *issues and tasks* that arise in system improvement, not *tools and techniques* used in addressing these. Of course, the latter would by no means be ignored. Modelling of all sorts would remain a core methodology, with specific mathematical, statistical and computational techniques being covered as necessary – but set in context within the D^5IME framework. Note incidentally that the framework makes no separation into 'hard' and 'soft' O.R. – the issue based focus makes the choice of approach a purely practical one and both would feature throughout, as pragmatically appropriate.

The framework highlights how O.R. practice and theory is of necessity multidisciplinary – needing to draw upon a wide variety of domains, such as decision science and design thinking, as well as mathematics, statistics and computing – yet has a trans-disciplinary coherence, because threads of knowledge and methods from all these domains are being interwoven to produce something none of them can provide on their own – the fabric of a science of improvement.

How far do our existing training programmes – e.g. postgraduate courses – take an 'improvement science' perspective? How well do they cover the above ground? How effectively do they prepare people for tackling 'real world' systems?

If the answers are 'not far or well enough', how do we go about improving matters? If only there was some disciplined way to approach this sort of problem………….

[1] Those seeking an 'ology' word for the 'science of better systems' could perhaps try *holomeliorology*!

<OR>

THE PROS AND CONS OF HEATHROW EXPANSION

CHARLES MAYES

Plans for the expansion of Heathrow, the largest of the airports serving the London and South East region of England, were approved in 2009 only for the incoming Coalition Government to overturn this decision in 2010.

The favoured alternative policy would be to reduce the size/capacity of Heathrow in favour of developing a new airport to the east of London.

The shortage of capacity at Heathrow is said to be costing the UK £14bn a year in lost trade according to a recent report commissioned by the airport. That figure could rise to £26bn a year by 2030 if the problem is not resolved. Based on these figures one could therefore assume that expansion will ensure that businesses in the South East region, and ultimately the UK, continue to thrive and that inaction will jeopardise economic growth.

I certainly believe that if the UK is to increase inward investment it needs to demonstrate leadership in transportation infrastructure. That includes the ability to serve new and growing global markets. The Thames Valley is a major growth region and has a positive impact on UK GDP, making it one of the three top performing economies in the UK. With £19.5bn worth of exports in London and the South East dependant on air travel, the UK cannot afford to lose market share.

The original Heathrow expansion plan was extremely well supported by businesses, the aviation industry, the British Chambers of Commerce, the Confederation of British Industry, the Trades Union Congress and the then Labour government. The project was subsequently heavily opposed by the coalition government when it came into power, the Mayor of London, Boris Johnson, as well as by many environmental and local advocacy groups and a number of prominent individuals. As a result, the expansion project was cancelled in 2010 although Sir Howard Davies has been asked to chair a commission to advise on future UK airport capacity needs. The Davies Commission is expected to present an interim report to the government by the end of 2013, with a full report due in the summer of 2015 - after the next general election.

From my perspective, having worked on multiple projects in the aviation industry over the years, whether Heathrow is expanded or a new airport is built in East London, both will be enormous undertakings; although I do agree that we need to expand UK airport capacity. These are complex infrastructure programmes with huge implications for residents, the environment, surrounding road and rail networks and the overall economy. Analysing this from a project management viewpoint, it will be difficult to expand Heathrow as the airport is already located in a heavily built-up area. And whilst it might be good for business, it will not necessarily be good for local residents. I imagine that there will be continued

fervent opposition especially from those in the surrounding areas who would be affected by the noise.

Even if the Davies Commission supports the Heathrow bid and this is ratified by the next government Heathrow's owners say it will then take at least eight years to get planning permission and finally build the runway. That said a brand new airport will take 30 years to build. Given the impact this is likely to have on our global economic standing, it seems to me that we cannot afford to wait too long for a decision on a clear way forward.

Clearly, this is not a debate that we are going to solve overnight. We should certainly however look at the infrastructure of all existing airports in the UK, which I hope the Davies Commission will review. We should also look at successful airport new build and expansion projects elsewhere in the world; for instance Hong Kong International airport, as I think we can learn a lot from how Hong Kong approached rebuilding on land reclaimed from the harbour.

I for one will be very interested to see Sir Howard Davies' recommendations when the report is finally published. In the meantime the debate is certain to rage on from all quarters.

<OR>

> 'The original Heathrow expansion plan was extremely well supported by businesses, the aviation industry, the British Chambers of Commerce, the Confederation of British Industry, the Trades Union Congress and the then Labour government.'

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HOW DOES CANCER SPREAD WITHIN THE BODY?

NIGEL CUMMINGS

According to a new study published in the journal *Cancer Research*, the same type of mathematical model used to predict which websites people are apt to visit is showing promise in mapping how lung cancer spreads in the human body.
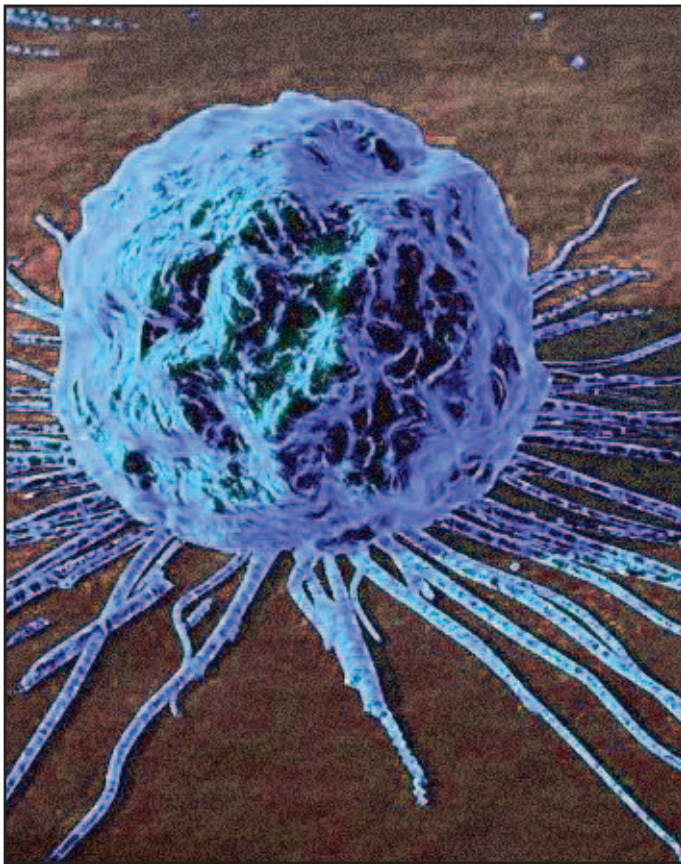
The algorithm used to analyse lung cancer patterns and how it spreads for the cancer study was similar to the Google PageRank and to the Viterbi Algorithm for digital communication. The research demonstrates how similar living organisms are to the Internet as the model which was originally designed to show the passage of data throughout the web can help us understand the spread of cancers throughout the human body.

The research involved the use of Markov chains and appears to go against traditionally held views. It had long been believed that cancers spread out in one direction from the source (primary tumour) but the analysis carried out by the research team - guided by USC applied mathematicians – found that it is much more likely to move in more than one direction at a time.

Results indicated that the first site the cancer is found in is crucial to understanding how it will progress. The research also showed

that some parts of the body, such as the adrenal gland and kidney are more likely to spread the disease. Lymph nodes, liver and bone are however less likely to spread the cancer to other parts of the body.

According to USC Viterbi School of Engineering Professor Paul Newton, 'The final goal is to have a model that is tailored to every specific patient because every patient's genome is different, every patient's situation is different, so the goal of all medicine will be to have very, very precise tailored and modelled simulations and treatments.'

The mathematical model was applied to data from human autopsy reports based on 163 lung cancer patients in the New England area, from 1914-1943. This time period was targeted because it predated the use of radiation and chemotherapy, thus it provided the researchers with a clear view of how cancer progresses if left untreated. Among the 163 patients, researchers charted the advancement patterns of 619 different metastases to 27 distinct body sites.

Predicting cancer's movement in the body is vital to patient care. While a primary cancer tumour (confined to a single location) is often not fatal, a patient's prognosis can worsen if the cancer metastasises – that is, particles flake off and travel to other parts of the body to form new tumours. Knowing which routes cancers are likely to take will help find better ways to slow or even halt such movements. It may also help provide a better understanding of the processes involved which, again, may lead to improved treatments and, hopefully, better prognoses.

The study is part of a relatively new movement to involve physical sciences in oncology research. Mathematical probability models that interpret data from specific patient populations offer a new alternative to the established approach of relying on broader clinical trends to predict where, when, and how fast, cancer will spread.

<OR>

Professional development opportunities for 2013
Approved courses in O.R. and Analytics

DECISION AND RISK ANALYSIS

29 May, Birmingham
£590 + VAT for OR Society members
Hands on course

Course provider:
Jian-bo Yang and Dong Ling Xu

The course will teach you how to model, analyse and manage the effects of various types of uncertainty that co-exist in decision problems. We introduce a new and advanced approach to Multiple Criteria Decision Analysis (MCDA) under uncertainty and provide hands-on experience of the latest MCDA software tools.

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Mike Moir

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Understand the generic pattern that underpins a successful consultancy engagement; Learn the factors that contribute to a successful and sustainable change programme and how to manage each stage of the consulting life cycle; Find out how to challenge and educate clients without appearing confrontational

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Course provider:
Bart Baesens and David Martens

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Learn more about the data you already have in your organisation and improve the management of your information; Improve your business processes; Create better decision models and learn new applications of data mining

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Course provider:
Ian Seath

Discover how benchmarks and benchmarking differ and when you should and should not use benchmarking. Understand how to decide which of the four types of benchmarking is most appropriate and how to plan and manage a benchmarking project using step-by-step processes. Learn how to ensure that benchmarking solutions are 'best in class'.

See why organisations need to go beyond 'metrics' benchmarking to drive step changes; A practical approach for planning and managing benchmark projects; Practise planning for key stages in a benchmarking project; Identify how 'process' and 'organisational' factors can be used to identify best practice

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NEW FOR 2013

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Introducing risk techniques and a single point project model; limitations; data tables and multiple answers; scenarios; Further risk techniques: standard deviation; coefficient of variation; project deviation; certainty equivalents; options approach and probabilities; Simulation and decision tree models: Setting up the model; Optimisation and targeting: adding goal seek and solver to the risk model

COMING THIS AUTUMN!

INTRODUCTION TO CREDIT SCORING – 11 September
INTRODUCTION TO O.R. II – 16-20 September
INTRODUCTION TO O.R. FOR NON-O.R. PROFESSIONALS – 1 October
FUNDAMENTALS OF PRICING STRATEGY AND REVENUE MANAGEMENT – 8 October
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: : : : : : ANALYTICS: :

THE ROLE OF ANALYTICS IN DEFENCE ANALYSIS

SARAH ESLER DSTL

The Defence Special Interest Group held a workshop to explore how the Defence O.R. community could exploit any opportunities provided by the categories of Analytics: Descriptive, Predictive, Prescriptive.

The emergence of Analytics has drawn interest from the Defence O.R. community which, for seventy years, has evolved to support changing military requirements. The OR Society's Defence Special Interest Group met on April 10th 2013 at the BAE Systems campus, Farnborough, to discuss what Analytics and Big Data means for Defence O.R. Discussion was primed by two keynote speakers. Jonathan Batson (UK Advanced Analytics and Optimisation Leader, IBM Business Consulting) spoke on IBM's use of Analytics in several industries and Tom McCutcheon (Dstl Fellow) presented on Analytics in open source research. While many factors associated with Big Data are common to O.R., some may apply specifically to Defence O.R. The meeting generally acknowledged overlaps between Big Data, Analytics and O.R., with most commonality between Advanced Analytics and O.R. Several issues emerged in syndicate sessions.

In addition to the '4 Vs' of Volume, Variety, Velocity and Veracity often associated with Big Data, 'Validity' may be a 'V' worth consideration. Validity highlights the need for valid application of models and techniques to a dataset, but also prompts consideration of how valid a dataset is if used to answer specific questions. Validity demonstrates co-dependence between O.R. and Big Data Analytics. O.R. can benefit from Analytics and visualisation techniques to examine datasets in new ways, but Analytics requires O.R.'s problem structuring methods to ensure appropriate questions are asked of data.

Human understanding of context is vital in decision-making. Big Data approaches could be used for areas of routine Defence decision-making, such as automated re-ordering of spare parts by computers monitoring usage of spares from a stockpile. It is hard to imagine automated decision-making applied to combat decisions. There are parallels to medical decision-making, for example routine re-ordering of supplies versus professionals who diagnose and treat patients. The participants felt that causality is determined by human understanding. Analytics and O.R. demonstrate effects; human interpretation is needed to understand causes of observed trends.

In Defence, data availability is an issue. Some datasets are sensitive and protected; some can be small; analysts may not know that some exist. Defence has many data sources, but these are often in locations geographically and organisationally separate from analysts. This can limit data exploitation.

Businesses often deal with Big Data from sources including loyalty cards and social media which continuously update. Companies who react to such data immediately measure effects and dynamically review their strategies. Effects of Defence decisions may not appear for years - too late to reverse any negative aspects.

As in the early days of Defence O.R., Analytics illustrates the need for multidisciplinary teams to address Big Data questions. Defence employs O.R. professionals, experienced in decision-support, who increasingly work closely with technologists, social scientists and psychologists to gain full understanding of problems. Here lie similarities to systems engineering approaches.

The meeting concluded that the Defence community should start with identifying small case studies to demonstrate where Analytics approaches have proved useful before implementing these approaches. Lessons from successes and failures can improve understanding of Big Data and future exploitation studies.

<OR>

: : ANALYTICS : : : : : : :

DEVELOPMENT'S IN ANALYTICS AND BIG DATA: ADDING VALUE, JUNE 12 2013

JOHN RANYARD

The programme for the second one-day Analytics meeting is now complete with eight confirmed speakers.

John Lord

Once again there is a strong focus on the real impact of analytics, with presentations from both in-house analysts and external consultants. **Detlef Nauck**, Chief Research Scientist, BT, will describe how BT has used predictive analytics to improve service performance and to pre-empt service failure, whilst **Aaron Sugarman,** Head of Commercial Analytics, TUI (brand names Thomsons, First Choice) will cover the use of analytics to attract and manage their 5 million holidaymakers. **John Lord** is head of Analytics at HMRC and will focus on the development and use of predictive analytics in tax collection – a topic of interest to all of us!

Staying with case studies, **Gearóid Madden,** Accenture Analytics Innovation Centre, Dublin, will talk about the use of analytics to detect fraud in the insurance sector, whilst OR Society Vice President **John Hopes** will give case examples from Ernst & Young's practice. John, who chairs the Society's Analytics Working Group, will also summarise the OR Society drive into the analytics community, including the recently launched Analytics Network.

Some of the key challenges in the field are how to best exploit the cloud, the semantic web and the huge quantities of unstructured data now available. In a previous article I explained that **Colin Shearer,** SPSS, will focus on how the cloud can help businesses of all sizes overcome infrastructure constraints, so that advanced analytics can be the key to better decision making in virtually any area of business.

Fintan Galvin is the CEO of iO1, a leading open source consultancy, which he formed having spent 20 years delivering systems into some of the largest organisations in the world (including, Home Office, Cabinet office - Data.gov, NBC, Nike and TUI). He comments 'Analytics and search engines are natural bedfellows as shown by the changing way in which search engines are using user action based Analytics to drive their algorithms in order to get the best answers delivered back to the users. The focus will be on combining three key areas, Search Engines, Analytics and Semantics using open source tools. The session will look at a case focusing on how to put these areas together to best effect, so as to gain a competitive advantage and provide insights into the tools that can be used to achieve this.'

On a lighter note **Sanjit Atwal**, CEO, Squawka, will demonstrate how analytics is being used by his company to improve the performance of Premiership football clubs, which is very big business these days.

You can see the latest version of the programme at: http://www.theorsociety.com/Pages/SpecialInterest/AnalyticsNetwork.aspx

<OR>

'... advanced analytics can be the key to better decision making in virtually any area of business.'

FORD WINS 2013 INFORMS PRIZE

NIGEL CUMMINGS

The Ford Motor Company has been awarded the 2013 INFORMS prize for its long-running, company-wide effort to use data science and predictive analytics to improve overall operations and performance.

Bob Shanks, Executive V.P. and the Ford Team at INFORMS award ceremony

Ford has been using business analytics and data-driven decision making for more than 60 years. The company received its most recent INFORMS award because of its application of rigorous analytics, including machine learning, O.R., data mining and big data throughout the business and throughout its history.

Such techniques have been key to the resurgence of Ford in the past seven years. When CEO Alan Mulally came to Ford in 2006, he helped to expand and institutionalise data-driven decision making throughout all aspects of the company.

O.R. and statistical control have a long history at Ford though. Just after World War II Henry Ford II hired 10 veterans of the U.S. Army Air Force's Statistical Control Command. The team brought the lessons of organising wartime logistics for the United States military to the problems of running a huge manufacturing enterprise. In time the group became known as the 'Whiz Kids'.

Ford's use of statistical processing proved particularly beneficial to the company during the early 1980s, as one of the first U.S. companies to implement statistical process control methods.

Today analytics is used widely in diverse applications at Ford, including research, product development, manufacturing, supply chain, marketing and sales, finance, purchasing, information technology, and human resources. Ford Motor Credit Company, the financing subsidiary of Ford, houses a major centre of excellence in analytics. The Ford Global Analytics team, is remarkably long standing too, it was founded over 20 years ago, when it originally developed proprietary scorecards to facilitate consumer and dealer lending and effective account management, and provide analysis to support other areas of the business.

Additionally the Ford Marketing, Sales and Service Global Lifecycle Analytics team developed a range of models that help determine how to distribute cars to dealers and fleets, and establish pricing and project residual values. Additionally, the Systems Analytics and Environmental Sciences group within Ford Research and Advanced Engineering were amongst the first to utilise the power of super-computing and advanced mathematics to mine big data, model marketing trends and optimise decision processes.

For the U.S. market more than 90% of vehicle sales come from dealer stock which results in high inventory costs so it is particularly important to maintain the right mix of vehicles to maximise sales. Ford's Smart Inventory Management System, (SIMS), analyses historical sales and inventory data to generate and recommend orders for dealers based on projected future inventory levels and targets.

Ford also developed a 'just-in-time' execution and distribution Information system, or JEDI, to help schedule the production and delivery of body panels from stamping plants to assembly facilities when they are needed. JEDI is used to minimise premium shipping and overtime expenses when there is a mismatch between supply and demand for parts.

The company has an active 'Blueprint for Sustainability', an overarching framework that guides Ford's product, operational and social sustainability planning. Its CO_2 stabilisation target glide path is calculated to meet future CO_2 emissions targets and project the costs for various technologies which include; diesel, hybrid and plug-in electric and hydrogen fuel powered vehicles.

At the INFORMS Conference on Business Analytics and Operations Research at the Grand Hyatt San Antonio, Ford Executive V.P. Bob Shanks said. 'Analytics and O.R. was a major enabler of our turnaround and our on-going success as a data-driven company. Receiving the INFORMS prize is recognition of the significant role and impact of analytics at Ford. I am delighted to receive the award on behalf of Ford and our talented and hard-working analytics team.'

In bestowing the award, the INFORMS Prize Committee wrote that 'Ford not only perfected the moving assembly line but also brought O.R., management science, and financial discipline to the company early on, helping to transform it into a data-driven and successful modern organization.'

<OR>

AND THE WINNER IS…

NIGEL CUMMINGS

News from INFORMS across the pond, is that the Dutch Delta Program Commissioner has won the 2013 INFORMS Edelman Award.

Director of science Jaap Kwadijk of Deltares (photo above) received the award on behalf of the whole team, from INFORMS president Anne Robinson

The Dutch Delta Program Commissioner, worked to cost efficiently prevent flooding in the Netherlands in the wake of Hurricane Sandy.

Around 55% of the Netherlands is vulnerable to flooding, and the objective of the Dutch Delta approach was 'not to respond' to a flood disaster but to avoid it. Thus its expertise in dealing with potential floods in the Netherlands equipped it with the skills necessary to contribute significantly to improved flood protection in the Netherlands and elsewhere.

Protection against flooding is a vital issue in the Netherlands due to the countries' susceptibility to flood risk. Each year the Dutch government spends roughly €1 billion on protection by dikes and dunes. In total there are 3,500 kilometres of primary dikes in the Netherlands

The Delta Commissioner of Holland collaborated with CPB Netherlands Bureau for Economic Policy Analysis; Delft University of Technology; Deltares; HKV Consultants; Ministry of Infrastructure and the Environment, The Hague; and Tilburg University, on the winning submission, entitled 'Economically Efficient Flood Standards to Protect the Netherlands against Flooding.'

The country's Delta Committee recommended increasing all protection standards by at least a factor of ten, a highly costly step given limited funds. Using O.R. techniques, the team determined that it was efficient to limit increased standards to only three critical regions. The results of the research, illustrated to the minister of Infrastructure and Environment how such savings could be made without compromising safety.

Deltares conducted the analysis and wrote the final report, 'Social cost-benefit analysis 21st Century', which was completed in 2011. The theory, the mathematical model and the software were developed in conjunction with, and in accordance with instructions from, Deltares, by the Dutch Central Planning Office, the country's Ministry of Infrastructure and the Environment, Tilburg University, Delft University of Technology and HKV consultants.

The proposals were adopted and led to €7.8 billion less investment costs while strengthening the country's defence against the type of impact that caused enormous devastation in the United States during Hurricane Sandy and resulted in thousands of deaths in Holland during a major storm in the early 1950s.

The Dutch consortium won the Edelman 2013 award due to its work concerned with a new method developed to calculate economic and optimal dike heights for the protection of the Netherlands against flooding. Application of the method led to greater efficiency. The computational method is by no means limited to the Netherlands, it has impact around our world and the Delta Committee has amply demonstrated that it can be deployed worldwide in determining optimal dike heights against flooding.

The Franz Edelman competition, now celebrating its 41st year, expresses the contribution of O.R. and analytics in the profit and non-profit sectors. Since its inception in 1972, cumulative dollar benefits from Edelman finalist projects have reached $190 billion. First prize is accompanied by a $10,000 honorarium.

The six finalists competing in the 2013 Franz Edelman Award Competition included teams from Baosteel, Chevron, Dell, Kroger, and McKesson.

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CAN MATHS PREDICT FREAK WEATHER?

NIGEL CUMMINGS

Freak weather seems to be an almost weekly occurrence around our world; meteorologists regularly attribute blame to such anomalies on changes in the 'jet stream'.
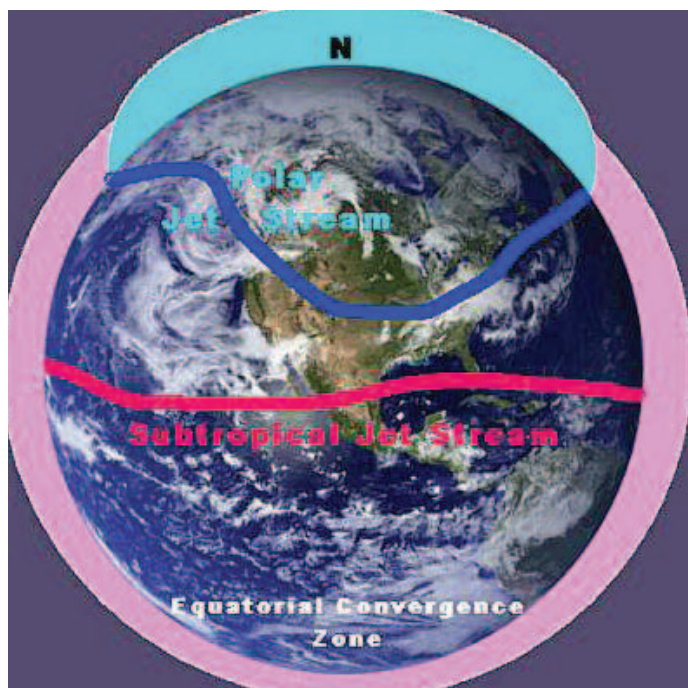
Much of the weather experienced in the temperate zone of the northern hemisphere is heavily influenced by the [northern] polar jet stream which is usually a strong westerly wind located in the tropopause – the region between the troposphere and the stratosphere, 7-12 km (23,000 – 39,000 ft) - typically the altitude at which most jet airliners fly (hence its name).

Research carried out by British Antarctic Survey scientist Dr Christian Franzke has revealed a relationship between maths and science that could lead to more accurate forecasts of upcoming storms. This seems to indicate that extreme storms across Europe tend to cluster together and hence are not as random as was once thought.

In his paper, **Persistent Regimes and Extreme Events of the North Atlantic Atmospheric Circulation**, Dr Franzke draws on the widespread flooding across the UK in 2007 as an example, and explains that because these floods were caused by a series of storms across the country, it is possible they were caused by a shift in the location of the Atlantic jet stream, an air current moving from the sea.

Predicting the location of the current should enable scientists to work out when extreme storms will happen. The research that formed the data backbone of his most recent paper is based on analysis of European weather forecasts, weather station and satellite data from between 1958 and 2001.

Dr Franzke's analysis of the data from this period for the North Atlantic and European region leads him to conclude that the jet stream exerts an influence on wind speeds and that the clustering of storms in time is not just down to coincidence. According to Dr Franzke, 'Many of these hazard events are not independent, for instance severe storms can occur in trains of storms.'

Accordingly he says. 'The point was to see if the bunching together of extreme storms is more than just due to chance like a roll of the dice - to see if there is a systematic process leading to clustering. I wanted to find out what might be considered to be the 'normal' pattern and see if there was a connection between storms and the jet stream. The data show that storm clusters often follow the track of the jet stream. This is a new step forward in our understanding of this complex and complicated process. This research will help forecasting future storm events and is particularly important because we expect to see an increase in the intensity of storms due to climate change'.

Dr Franzke's paper also explains how coming up with an efficient method of being able to guess when these storms are about to strike could prevent economic damage. European wind storms can cause economic damage and insurance losses equivalent to more than one billion Euro per year. Such storms rank as the second highest cause of global natural catastrophe insurance loss.

Dr Franzke's paper is published in Philosophical Transactions of the Royal Society A, Mathematics applied to the climate system. 15 April 2013

For further information on the Royal Society please visit http://royalsociety.org or contact assistant press officer Natasha Little - Tel: +44 20 7451 2510.

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IS OPERATIONAL RESEARCH IN UK UNIVERSITIES FIT-FOR-PURPOSE FOR THE DEVELOPING FIELD OF ANALYTICS?

PROJECT UPDATE AND FINDINGS: APRIL 2013

MICHAEL MORTENSON, NEIL DOHERTY, STEWART ROBINSON

SCHOOL OF BUSINESS AND ECONOMICS, LOUGHBOROUGH UNIVERSITY

This report provides an update on the progress of the Operational Research & Analytics Training, Education and Research (ORATER) project. ORATER is a two year OR Society charitable project looking into the role of O.R. education and research in the field of analytics. The project started in October last year. Further details can be found at the project website www.whatisanalytics.co.uk

Achievements

1. Website (www.whatisanalytics.co.uk) completed and launched.
2. Literature review completed and disseminated through website.
3. Presentation created and delivered at the YoungOR conference.

4. First draft completed of an article into the definition of analytics and its relationship with O.R. Article to be submitted for possible journal publication.
5. Empirical research designed. New methods included such as text mining job adverts and degree course syllabuses.

Demand for Analytics Courses in Universities

According to a report from McKinsey Global Institute there is likely to be a demand for 140,000-190,000 'deep analytical talent positions' and 1.5million 'data-savvy managers' by 2018 in the US alone. There is little explanation as to how the figures were reached but there does seem to be a growing interest in big data, analytics and data science. More information about this can be found on the website..

Definitions of Business Analytics

Whilst there are a variety of definitions in the literature most recognise four key elements: *technologies*; *quantitative methods* (e.g. O.R.); *resources to support decision making and decision makers* (such as graphical user interfaces (GUIs), behavioural science and data visualisation) and; of course, *data*. These components were used to create a working definition and also a taxonomy of the disciplines involved in the practice of analytics. Another possibility is: 'analytics is a combination of *descriptive*, *predictive* and *prescriptive* methods'. There are however some issues with this definition.

The History of Analytics and Comparisons with Related Fields

Analytics has close ties with the fields of management information systems (MIS), decision support systems (DSS), business intelligence (BI) and, of course, O.R. Although analytics and O.R. are closely related, the two are distinct but there is a strong belief that both can benefit from each other. It would seem that 'Data Science' is synonymous with analytics.

Summary

In summary the literature has provided evidence that demand for analytically-trained graduates is likely to increase. This provides obvious opportunity for OR/MS as a discipline to grow its student-base, and to influence the future development of analytics and the use of quantitative methods in business decision-making. However, the literature would also suggest that the OR/MS discipline as it is currently taught will not include *all* of the aspects of analytics, the implications of which will be focused upon in the course of this research.

'According to a report from McKinsey Global Institute there is likely to be a demand for 140,000-190,000 'deep analytical talent positions' and 1.5million 'data-savvy managers' by 2018 in the US alone. '

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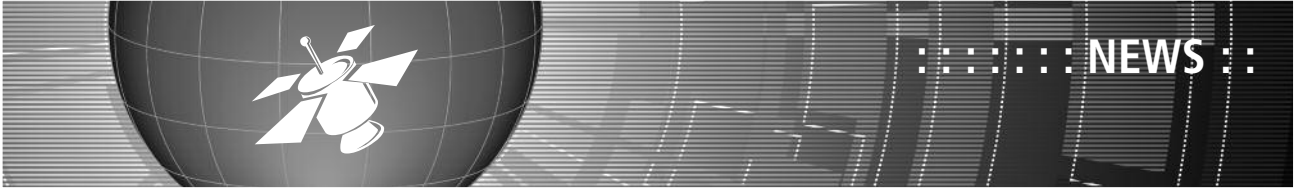
YOR18 – O.R. – A TWENTY TWENTY VISION?

NIGEL CUMMINGS

YOR18 – the 18th Young [to] OR Conference – got off to a great start with the plenary session given by the President of the OR Society, Dr Geoff Royston.

Antuela Tako at YOR 18

Antuela Tako, the chair of the organising committee, began the proceedings by telling the audience what had been planned for them and how to find out more about streams and events before introducing Geoff Royston, President of the OR Society, whose talk was entitled O.R – A Twenty Twenty Vision?

Geoff Royston at YOR 18

Geoff started by recognising that the audience represented the next generation. This was particularly pertinent as his talk was aimed at getting the delegates to think about how they saw O.R. in general and the OR Society in particular developing over the next decade.

He explored the threats and opportunities for O.R. over the next decade, in particular highlighting key growth points. He then set out a number of alternative futures for O.R. with a view to eliciting feedback from the audience by considering the merits of each possible future and participating in a group exercise. This exercise he believed would prove useful to the O.R. Society in determining directions to follow and useful to the individuals when contemplating which career direction in O.R. to follow. He emphasised the importance of being involved with the community of O.R. and thought that practitioners and academics alike should foster a sense of belonging by being members of the Operational Research Society throughout their career.

O.R. is a special science like medicine or engineering, O.R. is for improving things. It is the science of improving systems – complex and dynamic systems which involve resources, money and people. In three words O.R. is 'System Improvement Science.'

The Society's vision is, 'To see a world improved by rigorous analysis and better evidence based decision making.' And two of its aims are: 'members should try to ensure that decision makers actually understood what O.R. was, and be made aware of where to seek it' and; 'to try and ensure that its members were knowledgeable, well trained and in good supply'.

Geoff reminded his audience that Operational Research was 75 years old and of how it rose to prominence after it had made significant and important contributions to the allied war effort during WWII. The appliance of such science as O.R. may well have been a decisive factor in defeating the enemy.

O.R. professionals had for example, played a huge part in the development of 'Chain Home', the defence early warning system used to scramble fighters to meet incoming enemy aircraft using a ring of coastal radar stations and observers. At sea, O.R. was used to devise the system of convoy protection and determine the best tactics to combat the submarine (u-boat) menace. Indeed, it has been claimed that O.R. was a decisive factor in both the Battle of Britain and the Battle of the Atlantic.

After the war of course, O.R. quickly became recognised for its optimisation capabilities and a large spectrum of techniques which have helped it become adopted by many industries including utilities, engineering, transport, health services and logistics to name but a few examples.

O.R. today was everywhere, helped in no small part by the current popularity of 'Analytics' although O.R. people had been facilitating

'The future of O.R. is going to depend on how much it is valued and its visibility. It is no good to be valued but not visible; the best aim is to be valued and visible. We are probably reasonably valued but not very visible yet'.

'analytics' based solutions for many years prior to the advent of 'analytics'. According to Dr Royston, 'Analytics was going to make or break O.R..'

Situations can be uncertain, complex and changing and there is often a wealth of data available which people don't yet know how best to analyse. It was also notable that decision-makers were not necessarily numerate. Good decision-making needed a mixture of intuition and analysis and those making decisions needed the support of numerate individuals to assist them in the process, O.R. professionals could provide this assistance.

The Operational Research professional is equipped with a wide spectrum of tools to navigate complex, uncertain and changing systems. Decision support, optimising systems and providing real-world benefits through analysis are all aspects of O.R.

Many managers have latched onto the 80/20 concept. They are looking at how to get 20% of effort to give 80% of the results, and that is one of the reasons why they need Operational Research. There is a case for analysts being 80/20 as well. The analyst needs to enable the client to solve the problem for themselves, at least at the conceptual level. The client does not need to get involved in the maths or computing but if they understand some of the concepts they can work for themselves.

It is important that decision makers do not carry around the wrong concepts. In hospitals, many still see spare capacity as a 'waste' but it is not, spare capacity is a 'resource'. If run a hospital with no spare capacity, it will be unable to cope with unexpected peaks in demand (e.g. a coach, train or aeroplane crash). A small amount of spare capacity also allows for better management of critical resources – it can give managers time to be proactive rather than always being reactive.

Communication is also of prime importance – getting your message across in a way that your client can easily understand. Very often this can be done using simple, clear graphs.

Geoff 's final message was, 'The future of O.R. is going to depend on how much it is valued and its visibility. It is no good to be valued but not visible; the best aim is to be valued and visible. We are probably reasonably valued but not very visible yet'.

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:::::::: NOTICEBOARD ::

NEWS OF MEMBERS

NEW MEMBERS (June 2013)

The Society welcomes the following new members,
RICHARD ALLISON, Sheffield; DARREN BELLENGER, Bradford; MONICA BLANCO, London; THOMAS BRADLEY, Manchester; LIAM HASTIES, Glasgow; ALEX HART, Leeds; CARON HOLMES, Hants; ARTHUR MCLAUGHLIN, Northumberland; LOUISE MAYNARD-ATEM, Leeds; RHODA NAMOCO, Philippines; LAURA RICHARDS, Fareham; MARK ROBERTS, Staffs; THOMAS SADLER, London; ANDREW SCOTCHMER, Lancs.;

and Reinstated members,
Dominic Cave, Hants; CHARLES SIMON, Fareham; DINESH KAUSHIK, India;

and the following student members,
NASRULLAH KHILJI, BUCKS; ELAINE MCKECHNIE, Glasgow; JOHN MCKEOWN, Gloucestershire; CHRISTINE PEACHEY-PACE, Durham; FRANCESCA RAVENHILL, London; INE STEENMANS, London; UMAR ALI UMAR, Malaysia;

Total Membership
2346

NEW ACCREDITEES
The Society is pleased to announce that the Accreditation Panel has admitted the following members to the categories shown. These members are now entitled to use post-nominal letters as indicated: -

Admit to the category of Candidate Associate (CANDORS)
Rhona LEES

Admit to the category of Associate (AORS)
Martin SERPELL

Admit to the category of Fellow (FORS)
John SALT
Ian NEWSOME

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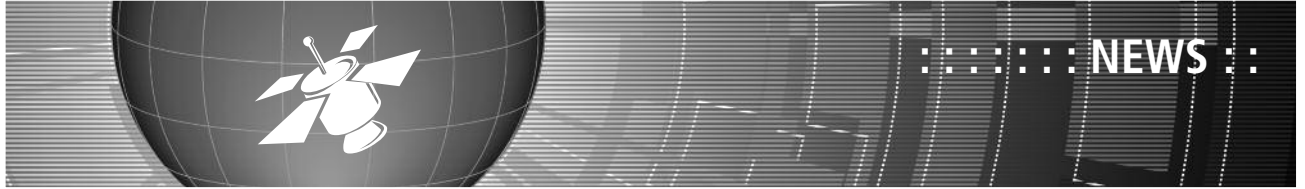
YOR18 INFRASTRUCTURE STREAM

NIGEL CUMMINGS

The infrastructure stream at YOR 18 was organised by Fuzhan Nasiri, University College London.

In his keynote paper, **Dr Andy Chow (University College London)** described a linear programming approach to the modelling and management of road transport Infrastructure and detailed how a framework for road transport infrastructure could be developed based upon macroscopic modelling of traffic flow. The concept of this approach was illustrated through a specific example of motorway networks. This provided useful insights and guidance on how best to manage traffic flow.

Joe Kirrane (St. Leger Homes of Doncaster) presented a paper concerning the impact of a 'decent homes' upgrade on the performance of a district heating system for social housing. He explained at the onset of his presentation, that he was an undergraduate in full-time employment, though he was on day release at Sheffield Hallam University to complete his studies. This work also included a significant contribution from Dr Fin O'Flaherty (Sheffield Hallam University).

This particular study concerned an estate managed by a housing association which consisted of a series of high and low rise apartment blocks built after World War II in Doncaster. The housing association had inherited a gas-fired district heating (DH) system which dated back to the 1970s.

The gas consumption of the heating system had been evaluated prior to the study which showed it to be highly inefficient. The implications of providing improvements under the decent homes programme were considered using O.R. techniques. This was accomplished by the use of degree-day analysis and the study showed that the extrapolated gas consumption indicated a decrease of 20% per annum, even though the upgraded high rise blocks affected by the upgrade only accounted for 37% of the apartments fed by the system.

The savings from this and improved thermal insulation carried out on the other apartments has already amounted to over two million kWh or £81,000 per year. The carbon dioxide emitted by the DH system has also been reduced by some 400 tonnes per year.

Residents reported feeling more comfortable and safer in their apartments as a result of less draughts and better security due to the upgrades of the windows and doors.

The third presentation in this stream was given by **Mr Richard Hawkins, (SEAMS)** which looked at modelling risk and investment for a water only company in preparation for England & Wales' water regulation price review 2014 (PR14).

Minimising costs was paramount, whilst at the same time consideration had to be given to the multiple stakeholder objectives – no easy task for water companies. In many examples from the past, he said the business cases had been challenged because of a lack of robustness in the expenditure forecasts. This lack of robustness exposed companies to risks in securing the appropriate asset investments needed to maintain their asset base and operating performance.

The project delivered a modelling and analytics tool kit to a water only company which was serving 1.1m customers, via a network of 68 water sources, 16 treatment works, 164 pumping stations, 139 storage reservoirs and distributed by 6,500km of buried pipes. The project linked asset behaviour, investments and outcomes (economic, social, and environmental) using an analytics software platform which considered a range of deterioration and cost models.

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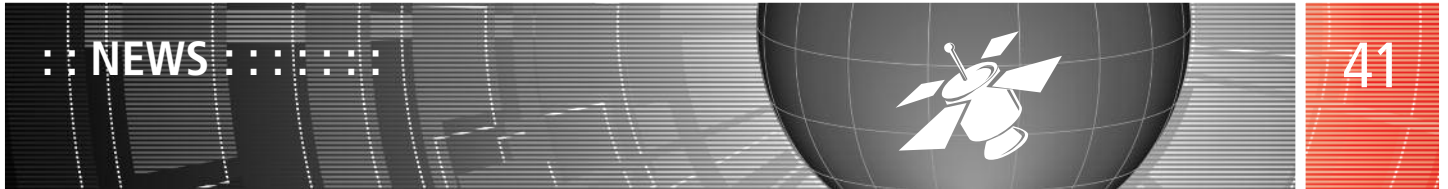
HAVE O.R. WILL TRAVEL

NIGEL CUMMINGS

The closing plenary at YOR18 provided insight and encouragement to those young Operational Researchers who might consider pursuing a career in the travel and accommodation industry.

Elizabeth Shepherd at YOR 18

Elizabeth Shepherd, Global Director of Business Intelligence and Data Strategy at Hotels.com provided the final plenary presentation at YOR18. Her talk was entitled 'Using data to drive action for customers'.

It began with Elizabeth telling her audience that she had seen 'a fantastic evolution in terms of data and one of the key successes for Hotels.com has been that data has become the centre of our world that goes all the way up to and all the way down from the CEO and all the way through our business'.

Analytics is very much the 'heart and soul' of what the company does. Hotels.com is part of the Expedia Group, a global organisation with a strong eco-presence, a company made up of a few brands including Expedia, Hotels.com, Venere and Trivago and is in the list of the top 100 Best companies to work for in the UK.

Trivago is a well known hotel comparison website allowing its users to compare hotel prices in just a few clicks from more than 150 booking sites for over 600,000 hotels throughout the world. More than 20 million people use these facilities every month and save an average of 35% for the same hotel room, in the same city.

The company has multiple 'touch points' from mobiles such as Android and Apple platforms, to the website itself. There has been a massive shift onto mobile platforms. At the same time, it has gone from very simple 'picks' and data to things like Facebook and social media and that presents a whole range of problems and opportunities.

There is quite an emphasis on the use of soft O.R. techniques; the company's main operating aegis was to take something and to think about how it was possible to try something new. This was important especially with regard to 'customer facing' as a product that existed largely on screen. Such screens had to catch the attention of potential users in order for them to be effective selling media – after all Hotels.com was about making money.

At this point the audience were asked to comment on the content and attractiveness of a number of slides which depicted typical Hotels.com, Trivago and Expedia information screens. With each screen, it is important to hold the potential customer's attention and there are many 'tricks of the trade' for doing this. These range from merely changing text size or colour through adding an extra photograph tor moving photographs across to a different part of the screen or highlighting buttons which would lead to further information screens or a potential saving. These could make all the difference between making a good sale or turn the customer away.

Throughout, the emphasis is on support, thinking of new ways to support the customer and each other within the company. The use of data to achieve this has grown from a base of accurate and assessable data through dashboards and standard reporting on to a more hypotheses-based analysis to test and learn from those projects. This has led onto predictive analytics, modelling and what might be regarded as more traditional O.R. activities.
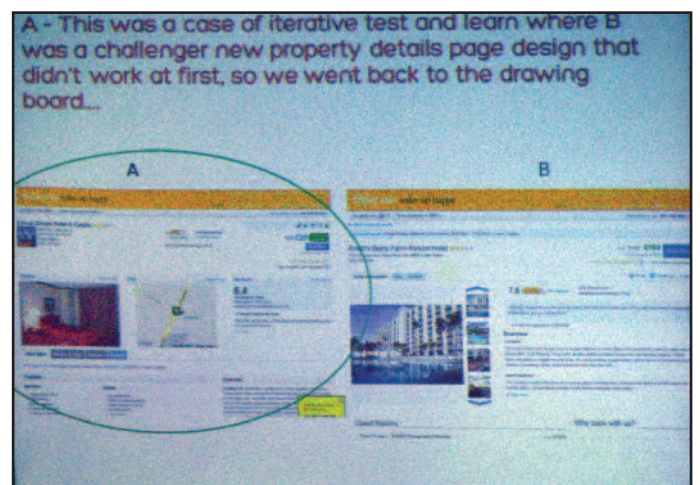
Part of the exercises which showed how small changes to the appearance of a web page can make vast commercial differences

<OR>

STRING THEORY A SERIES OF ABSTRACT PUZZLES, OR A USEFUL PREDICTION TOOL

NIGEL CUMMINGS

Recently 'string theory', or at least what some economists are calling string theory, has been applied to stock market prediction.

Essentially it has been applied to states where the more severe a pullback in the economy or the equity markets the more intense will be the recovery or rally (some might be tempted to call this Young's modulus or hysteresis). String theory in this case refers to a branch of pseudo-science, not a branch of theoretical physics.

The 'push and pull' thought process of String Theory can be applied in stock market situations when stock prices decline in a very forceful manner. The thinking behind it is that when stocks start their price recovery, they eventually do so just as forcefully, recording major jumps in the stock market in the process.

'Snap-back market theory' is also part of string theory and it is based on the thinking that underutilised capacity and idle resources that are available can quickly be put back into production, rapidly fuelling a company's return to prosperity. Today investors routinely apply this string theory approach to their stock portfolios. It allows them to view major stock market decline as an opportune time to go value hunting for fundamentally strong stocks that are poised to break out when the snap-back effect takes hold.

Regardless of the method employed, it is important to understand that based on the stock market string theory, a stock market decline is a good time to take advantage of the snap-back that has historically followed. Application of the theory and its many derivatives appears to be useful in market prediction.

The problem with this type of pseudo-science is that if enough people believe it to be true, it will be as the stock market tends to behave a bit like a herd, if one panics, everyone panics, if one buys/sells, everyone buys/sells and we get events like 'Black Monday'. An attempt to avoid such cases was made by insisting that different groups of stock-brokers used either different algorithms or different parameter values so that hopefully they would react in different ways.

Warren Buffett an American business magnate, investor, and philanthropist is said to have embraced the principles of string theory to help him make investments and optimise yields on investment in decline conditions prior to snap back. So then, string theory appears to be coming of age with regard to economics and its use is being recognised by big value, award giving institutions too. It will be interesting to see what future lies ahead for its application.

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:: NEWS :: :: :: ::
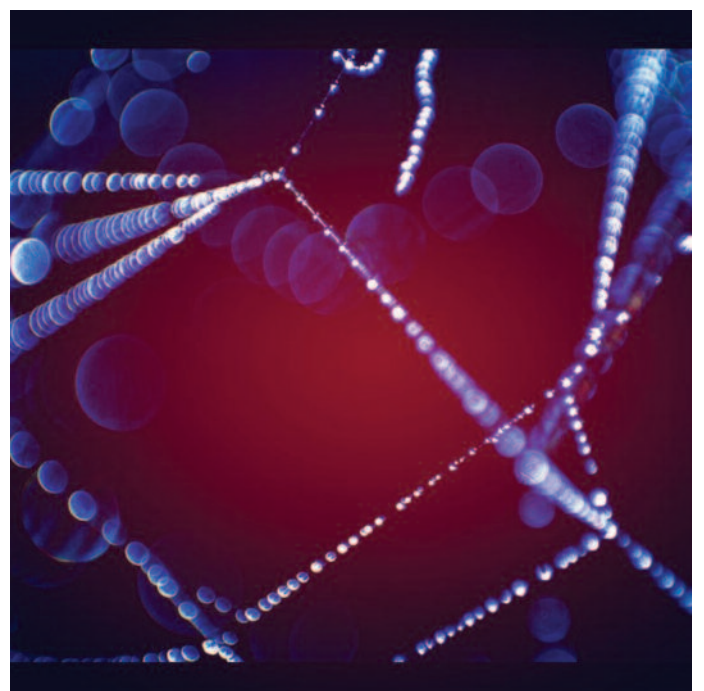
FIFTH EUROPEAN CONFERENCE ON INTELLIGENT MANAGEMENT SYSTEMS IN OPERATIONS

SUNIL VADERA AND KHAIRY KOBBACY

IMSIO5 3-4 July 2013 - Book online at **www.theorsociety.com/IMSIO2013**

Please Note: The deadline for booking and payment for your paper to be included in the Proceedings is 29 May 2013.

We have an excellent schedule of papers included in the programme for the fifth Intelligent Management Systems conference coming up in July.

Plenary speaker, Professor Qiang Shen will open the conference with his talk on the 'Feature Selection in Intelligent Information Systems'. His talk will be followed by a Review Paper given by the Chairs of IMSIO, Sunil Vadera and Khairy Kobbacy, called a '*Review of AI applications in Operations: 2009-2013'.* Various talks on topics of interest then follow and the current list of paper titles and their authors are shown below. (Please note, these may be subject to change) :-

Production/Manufacturing
- *An intelligent method to support joint production management in a cluster*, Anna Ławrynowicz
- *Hybrid Multi-Objective Genetic Algorithm for Integrated Conflict-Free Automated Guided Vehicle (AGV) Routing,* U. A. Umar, M. K. A. Ariffin, N. Ismail, Tang. S. H.

Knowledge Structure/Supply Chains
- *Knowledge Structure Mapping Design by Evolution*, John Gordon
- *Supplier selection using different metric functions*, S.E. Omosigho and Dickson E. A.Omorogbe

- *Value Chain Management: An Illustration using Variability Mapping and Decision Frontier Analysis,* Michael Pearson

Data Mining
- *Learning a Grammar for SMART objectives using Inductive Logic Programming,* Darah Aqel, Sunil Vadera
- *Access to GP Services Supported by IT Infrastructure Readiness: Analysing Publically Available GP Practice Data,* David Lengu, Stelios Sapountzis, Rob Smith, Mike Kagioglou, Khairy Kobbacy
- *Latent Dirichlet Markov Allocation for Sentiment Analysis,* Ayoub Bagheri, Mohamad Saraee and Franciska de Jong
- *A meta-learner for cost effective induction,* Samar A.Shilbayeh and Sunil Vadera

Maintenance
- *Development and validation of rule-based GAMM for preventive maintenance program evaluation,* Luis Barberáa, Adolfo Crespoa, Khairy Kobbacy
- *Criticality analysis for maintenance purposes. A study for complex in-service engineering assets,* Adolfo Crespo Márquez, Pedro Moreu de León, Antonio Sola Rosique
- *Modeling and analysis of the failure process for cost effective maintenance scheduling of MV XLPE cables,* B. M Alkali, M. Qatan C. Zhou and M Farrag

<OR>

OR55 CALL FOR PAPERS

3 - 5 September 2013, University of Exeter

HILARY WILKES

It's time to go online and submit your title and abstract for our next annual conference, OR55! www.theorsociety.com/OR55

To help with our supply of interesting, informative and challenging papers, academics, practitioners, researchers and students with interests in any aspect of Operational Research are invited to present their work at OR55.

The deadline for submission of Titles and Abstracts in time to appear in the Conference Programme and for submission of full Keynote Papers and Extended Abstracts, is 14 June 2013.

Please see below our list of streams and (where submitted), their stream definitions:-

Analytics
Catherine Mulligan - c.mulligan@imperial.ac.uk - definition to be advised

Big Data and Optimisation
Ali Emrouznejad - a.emrouznejad@aston.ac.uk
The aim of this stream is bringing together scholars and practitioners interested in **Business Analytics Optimisation** to address **current developments and challenges** to organize, store, manage, protect, analyse, mine and optimise Big Data, and to benefit society, industry, academia, and government.

Major topics include but not limited to: managing Big Data, analytics techniques in Big Data; architectures for massively parallel processing; Big Data mining tools and techniques; machine learning algorithms for Big Data, algorithms and systems for Big Data search, visualization analytics for Big Data, software / algorithms to support any aspect of Big Data computation, large-scale modelling for social media, and optimisation modelling for **Big Data**.

We also encourage practitioners to present their experiences of dealing with complex Big Data applications in science, engineering, medicine, healthcare, finance, business, law, education, transportation, retailing, telecommunication, and others.

Community and Third Sector O.R.
Martha Vahl - martha@cict.demon.co.uk
Eliseo L. Vilalta-Perdomo - evilaltaperdomo@lincoln.ac.uk
Jane Parkin - janeparkinch@gmail.com
OR55 Community and Third Sector O.R.: modelling for a better world
This year we want to combine Community O.R. and Third Sector O.R. in one stream. Both have O.R. in common but have different areas

of O.R. interest. They share the objective of modelling for a better world, in the context of not for profit organisations and small groups.

Communities in the UK and elsewhere are increasingly becoming the focus of attention for achieving social innovation in the context of the civil society. Governments and their institutions want communities to develop new forms of enterprise, of engagement, and of organised social and economic activities that will be managed by community collectives. In the UK the localism agenda seeks to empower communities on a local authority level to commission and deliver services relevant to their context. In this time of the economic downturn and decreasing budgets for social care, social innovation is not merely a desire for the government but increasingly a necessity.

Areas of Community O.R. research include social care, housing, employment (including social enterprise and businesses), volunteering, spirituality, health, community development, impact evaluation, coordination systems, user-led organisations, etc. It also includes discussions on the contributions that certain methodologies and analytical modelling tools offer to support communities in their task to achieve better lives for their members.

The Third Sector O.R. initiative works with formally-structured voluntary organisations and social enterprises. Consultants use the classic O.R. approach of 'whatever works' (with methods and tools which may have originated anywhere in the vast domain of O.R. work, whether community-based or not) to help the organisation achieve its objectives more efficiently or effectively. In this stream, we want to showcase the practical work that we have been doing, and stimulate ideas for developing it further.

Community O.R. includes Third Sector examples, but aims to explore ways in which the wider developments of individuals and collectives can be supported, e.g. to take initiatives that are sustainable and self-organising. It includes researching how O.R. modelling can be developed to support this type of social innovation.

Criminal Justice
Ian Seath - ian.seath@improvement-skills.co.uk
The Criminal Justice stream welcomes papers on the theory and practice of Operational Research across the CJ Sector. We are interested in papers that present the methods and outcomes of academic research as well as case studies demonstrating the benefits of applied O.R. methods. If you have a topic you'd like to

present, please submit an Abstract. We normally have a good mix of academic and practitioner papers which makes for a Stream that has something for everybody.

Slots for presentations are normally 20 minutes, but if you have a topic that warrants longer, we can consider allocating a double slot. Topics from any part of the CJ system are welcome i.e. Police, Prisons, Probation, Home Office, MoJ, Courts, Crime Prevention Partnerships etc. Papers on current 'hot topics' such as efficiency savings or payment by results would be of general interest. Past talks have ranged from simple analytical studies that demonstrated practical value, through to applications involving more complex tools.

We would also be interested in non-CJS applications where the work could easily have CJS relevance e.g. scheduling rotas, ambulance emergency responses etc.

Data Envelopment Analysis – DEA
Bing Xu - B.Xu@hw.ac.uk
The DEA stream invites researchers and practitioners who are interested in the development of DEA methodology and applications of DEA to performance management and measurement in different application contexts.

Submissions on DEA theory and empirical papers from both the academic and practitioner communities are all welcomed. Theoretical themes may include but not be limited to computational aspects, properties of new DEA models and hybrids, and methodological developments. Applications may include but not be limited to Banking, Economics, Education, Environment and Energy, Finance, Marketing, Production and Operations Management.

Distributed Computing and Simulation
Andrew Poulter - ajpoulter@dstl.gov.uk definition to be advised

Energy
Paul Jennings - paul.jennings@nnl.co.uk
With a worldwide drive for a low carbon future, both industry and governments in the UK and internationally are looking for ways to improve, become more efficient and increasingly more sustainable. For many this means applying O.R. tools and techniques to support both innovation and continuous improvement, to inform strategy and policy decisions and engage stakeholders, to improve design, to effectively manage operations and to plan and optimise the supporting infrastructure (e.g. transport and logistics).

This stream is interested in understanding how O.R. is being applied in the energy sector, what the key challenges are, how they are being investigated, the processes, tools and techniques that are being applied and the resulting impact. The stream is interested in soliciting papers from academia, the public and private sector and collaborations between these sectors.

Forecasting
Fotios Petropoulos - f.petropoulos@lancaster.ac.uk
Forecasting is a multidisciplinary research field drawing on mathematics, management, information sciences, behavioural sciences, social sciences, engineering, and other fields. Topics of interest for the OR55 stream include but are not limited to:
• Forecasting principles
• Forecasting competitions
• Time series forecasting methods
• Econometric/causal models
• Judgmental forecasting
• Adjusting for special events (promotions, weather)
• Financial and economic forecasting
• E-forecasting
• Energy Forecasting
• Forecasting with Neural Networks
• Forecasting support systems
• Forecasting software evaluation

Green Logistics
Tolga Bektas - T.Bektas@soton.ac.uk
With the ever-growing volume of freight and people on trains, buses, trucks, ships and airplanes, externalities of transportation including pollution, noise, accidents, congestion, carbon emissions are on a constant increase. More importantly, such externalities are likely to have negative consequences on the environment and human health. Urgent actions need to be taken to reduce the externalities, and this is where O.R. can help!

The Green Logistics Stream at OR55 welcomes contributions that either present case studies or new challenges related to environmental hazards of transportation and logistics, along with description of O.R. tools and techniques to help solve such problems. Topics include, but are not limited to:
• city logistics,
• intelligent transportation systems,
• intermodal transportation,
• network design and planning,
• passenger transportation,
• reverse logistics,
• road, rail, air and maritime freight operations,
• supply chain management,
• terminal operations management and planning,
• vehicle routing and scheduling.

Healthcare and Social Care Modelling
Kirandeep Chahal - Kirandeep.Chahal@brunel.ac.uk
Tillal Eldabi - tillal.eldabi@brunel.ac.uk
Due to changing demographic trends, increased customer expectation and reactive government policies, Health and Social Care systems are facing major challenges worldwide. Providers are experiencing enormous pressure from the public and governments alike to improve provision of healthcare and wellbeing. Over the years, extensive research has been conducted to find immediate and long-term solutions to issues that are routinely faced by health and social care professionals. Operations Research methods have

proven to be increasingly valuable in providing useful information to aid planning and management.

The health and social care stream welcomes presentations on the development and application of O.R. methods to health and social care. We are particularly interested in studies that developed and applied practical methods for assisting with real- life problems faced by health and/or social care professionals and managers. We are also seeking presentations (possibly by health and social care practitioners) on challenging problems that could be tackled using operational research methods

Information Systems & Knowledge Management

Jo Smedley - jo.smedley@newport.ac.uk
Organisations have spent huge amounts of funding to increase the effectiveness of operations and information systems. Implementation plans can over-emphasise the role of technology with less importance attached to organisational structure and institutional processes. The overall challenge is to make information accessible, enhance transparency and encourage sharing with technology as the enabler. Enhanced communication and enriched outcomes result with learning analytics informing continuing professional development.

This stream will enable participants to discuss the effective design, delivery, use and management and analysis of knowledge and information using technology developments from individual and organisational perspectives.

Inventory Management, Logistics and Supply Chain

Babai Mohamed Zied – Mohamed-Zied.Babai@bem.edu
This stream addresses issues related to various aspects of inventory research, logistics and supply chain management. It will provide an opportunity for the constructive exchange of ideas in this area and both theoretical and empirical contributions are welcome. The stream is sponsored by the International Society for Inventory Research (ISIR). Potential topics include, but are not limited to:
• Mathematical Models of Inventories
• Forecasting for Inventories
• Economics of Inventories
• Inventory Management.
• Supply Chain Management
• Supply Chain Modelling
• Logistics

MCDA

Alessio Ishizaka - Alessio.Ishizaka@port.ac.uk
This stream welcomes papers from researchers and practitioners engaged in using MCDA, in isolation or combined with other techniques, to assist individuals or groups in their decision.

Both practical and theoretical papers are welcomed. For papers with a practical nature we expect innovative applications, which bring important insights about the way MCDA methods can be deployed and provide in-depth reflections about their application. Contributions to the conference are sought in areas including:

• Conflict Resolution
• Environmental Applications
• General Resource Allocation & Optimization
• Group Decision Making
• Human Resources
• Marketing Decisions
• Medical Decision Making
• Military Applications
• Finance and Accounting Decision Making
• Operations Management Decision Making

Metaheuristics

Ender Ozcan - exo@cs.nott.ac.uk and **Andrew Parkes** - ajp@Cs.Nott.AC.UK
We invite abstracts and presentations, either theory or practice-oriented (preferably on real-world applications) that discuss any of the issues of:
• Meta-heuristics
• Systems to build systems, particularly (meta/hyper-) heuristics.
• Developing the analytical /theoretical understanding of (meta/hyper-)heuristics.

We are particularly interested in:
• Analyses that lead to some insight into the behaviour of one or more meta-heuristics. For example, but not limited to, landscape analysis, stochastic analysis methods or modelling.
• Methods that are based on machine learning and/or allow a more general use of meta-heuristics and heuristics. For example, hyper-heuristics or adaptive search control systems.

Please do not hesitate to contact us directly if you are unsure as to whether a particular topic would be appropriate.

Optimisation

Iskander Aliev - ALIEVI@cardiff.ac.uk
Optimisation is an inter-disciplinary field, lying at the interface between Operational Research, Pure and Applied Mathematics and Computer Science. Discrete (or combinatorial) optimisation is concerned with problems in which some or all of the decision variables are restricted to take values from a finite set.

Continuous optimisation, on the other hand, is concerned with (often large-scale) continuous problems. In particular, nonlinear optimisation deals with continuous problems in which the objective function and/or constraints are non-linear. We welcome abstracts on any aspects of:
• discrete optimisation,
• nonlinear optimisation,
• large-scale optimisation
in the broad sense, whether theoretical, algorithmic or applied.

Abstracts that build connections between different sub-fields of Optimisation will be particularly welcomed.
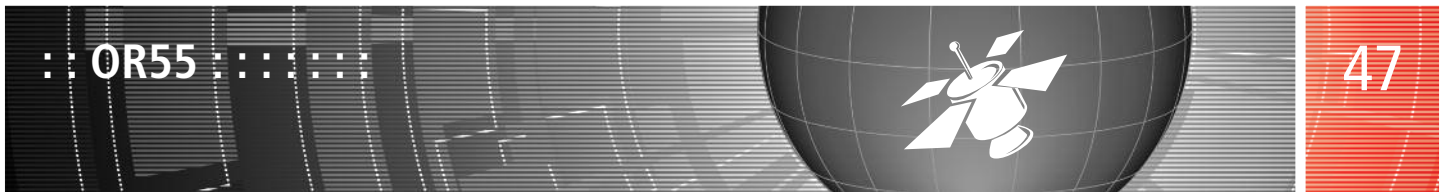
O.R. Consultancy and Case Studies

David Wrigley - david.wrigley@ntlworld.com

Consultants, on either internal or external roles, are using more and more Operational Research/Business Analytics to assist decision making, problem structuring and problem solving in organisations. Many tools and techniques, such as scorecards, dashboards, KPIs, data analysis, spreadsheet modelling, simulation etc, are widely used in consulting projects across industries and sectors. Meanwhile, challenges also appear either during the application of particular techniques or when working with stakeholders.

We would like to invite practitioners to share their experience of using O.R. on real-world problems, covering
• What was the context of the study
• What methods and approaches were first considered/eventually implemented
• What were the challenges and how they were solved
• What lessons were learnt

Methods and industries are not restricted. We are also looking for a Keynote Speaker, who would occupy a double slot i.e. 60 minutes.

Please feel free to drop me a line if you have an enquiry about either the stream or attending the conference.

O.R. in Construction

Ammar Al-Bazi aa8535@coventry.ac.uk

This stream provides researchers and users with a platform where ideas and knowledge are exchanged in the area of Operational Research and its applications in construction management.

We are looking for contributions in the area of developing innovative optimisation algorithms, using optimisation tools and techniques in construction management. These tools and techniques, including, but not limited to: Traditional and Probabilistic Operational Research techniques, Artificial Intelligence, nD Simulation Modelling, Neural Networks, Lean Concept, Multiple Criteria Analysis, System Dynamics Methodology, Heuristic Algorithms, and Hybrid Systems.

We are interested in papers covering a range of themes, including, but not restricted to:
• Modelling the construction process
• Manufacturing the offsite concrete products
• Building Information Modelling
• Human resources management
• Forecasting & Decision Making
• Information management
• Research and Education
• Offsite Construction
• Planning, productivity and quality
• Construction Design & Technology
• Disaster Management
• Risk Management
• Construction Supply Chain Management

O.R. in Sport

Philip Scarf - p.a.Scarf@salford.ac.uk

Sport is now arguably a major sector of business and industry. Sport is consumed by billions worldwide; tournaments that were once the purely of interest to the participants themselves are now packaged for light entertainment through the medium of television. Consequently, the management of sport has become a subject of academic study and operational researchers recognise that there are technical questions that arise in sporting contexts that are interesting and unique. In particular, sport provides a rich and fascinating area in which to model decision problems, not least because sporting contests are subject to strict regulations.

There are open tactical questions. For example: given the state of a game, what playing strategy should a player or players adopt? How can playing strategy be quantified? Can a competitive advantage be gained through the use of modelling? The design and scheduling of tournaments continues to absorb the attention of optimizers. There are opportunities to work with the sports industry, tackle interesting decision problems in this industry, to publish research applied to sport, and to generate good publicity for O.R.. The so-called 'Duckworth Lewis method', used for setting revised targets in rain-interrupted one-day cricket matches, is a case in point. Sport itself requires little definition; we just note that the terms sport and the sports industry will be interpreted liberally and contributions to the stream that are broad ranging are invited.

Problem Structuring/Soft O.R.

John Holt - JHOLT@dstl.gov.uk

Problem Structuring is a key part of the characterising a project's analytical processes when the path is uncertain. It is used when organisations are dealing with high uncertainty problems, often at the early phases of a project. These factors are common in modern organizations, with many facing cuts and major uncertainties, whilst dealing with multiple stakeholders.

Recent O.R. conferences have covered the following:
• Organizational process assessment (i.e. are an organizations internal process working correctly?);
• Training effectiveness assessment (is a training course succeeding or not?);
• Business process assessment (are these working or not?).
• Problem identification (when an organization must respond, or face the consequences);
• Application of problem structuring methods to deal with specific issues;
• Model coverage assessment (i.e. are models covering the areas they need to?);
• Business management process coverage (i.e. are the processes working as needed?);
• Comparison of proposed organizational designs for dealing with bombs/mine coverage!

Project Management

Gary Bell - g.bell@lsbu.ac.uk, **Rosane Pagano -** R.Pagano@mmu.ac.uk and **Jon Warwick -** warwick@lsbu.ac.uk

Organisations are continually evolving which has led to increased levels of change. Projects are a means by which change is introduced. Moreover, the management of projects is becoming a critical issue for business. However, too many projects are associated with the symptoms of cost overrun, schedule slippage and poor quality. This has led to new thinking within the project management community. Recently, projects have been described as highly complex and uncertain phenomenon. We believe there is a need to explore techniques and methodologies associated with Operational Research for use in managing projects. Additionally, the stream has the opportunity to discuss some underpinning ideas, e.g. Systems Thinking, principles, e.g. participation, and emerging concepts, e.g. multi-methodology, that may contribute to the Project Management Discipline.

All aspects of project management are of interest. To facilitate stream discussion the following topics are identified:

- The utility of Soft and Hard Operational Research approaches, e.g. Cognitive Mapping and System Dynamics;
- Connectivity between Operational Research, Project Management and Research methodology;
- Business case research;
- Project organisational research;
- Risk Analysis and Risk Management;
- Process improvement studies.

Queue Modelling

Navid Izady - N.Izady@soton.ac.uk

Queue Modelling Stream aims to attract papers presenting developments in obtaining analytical as well as numerical solution for challenging queues. It also invites papers presenting new applications of queueing models in solving real-world problems.

Routing Applications & Transportation

Luc Muyldermans - luc.muyldermans@nottingham.ac.uk

This stream invites submissions on all aspects related to vehicle routing, all modes of transportation, and all levels of transportation systems planning. Both theoretical and application based submissions are welcome. Potential topics include applications of and methodologies for:

- Node routing
- Arc routing
- Multi-objective routing
- Rich or real-world routing problems
- Inventory-routing
- Districting, zoning, territory design
- Location
- Location-routing
- Location-districting
- Economic analysis of transportation systems
- Environmental analysis/aspects of transportation systems
- Strategic, tactical and operational planning
- Transportation system design

Scheduling

Djamila Ouelhadj - djamila.ouelhadj@port.ac.uk

The aim of the stream on scheduling is to bring together scheduling researchers and practitioners to share their ideas, latest methods and results on all aspects of scheduling. The scope of the stream includes (but is not limited to):

- Heuristics, meta-heuristics, evolutionary algorithms, and hyper-heuristics for scheduling.
- Machine learning for scheduling.
- Production scheduling.
- Job shop scheduling.
- Flow shop scheduling.
- Open shop scheduling.
- Workforce scheduling.
- Scheduling in healthcare systems.
- Rostering.
- Sport scheduling.
- Timetabling.
- Railway scheduling.
- Crew scheduling.
- Airline scheduling.
- Transport scheduling
- Vehicle Routing.
- Complexity analysis of scheduling problems.
- Scheduling under uncertainty.
- Real-time scheduling.
- Performance metrics to compare scheduling methods.
- Large scale scheduling problems.
- Agent based scheduling
- Applications and case studies, etc.

Simulation

Korina Katsaliaki - k.katsaliaki@ihu.edu.gr and **Navonil Mustafee** - n.mustafee@exeter.ac.uk

Simulation methods enable stakeholders to analyse and evaluate strategies for effective management of complex systems. It is therefore not surprising that an increasing number of studies have used a plethora of simulation methods to facilitate better and more informed decision making. Topics of interest to the Simulation stream include but are not limited to:

- Discrete-event simulation;
- Monte Carlo simulation;
- Agent-based simulation;
- System Dynamics;
- Mixed Method/Hybrid simulation;
- Parallel and Distributed Simulation (PADS);
- Simulation software and technology;
- Conceptual modelling;
- Verification & validation;
- Design and analysis of experiments;
- Input and output analysis;
- Serious games;

We are also particularly keen on practice-oriented abstracts and presentations of simulation case studies in all application ar
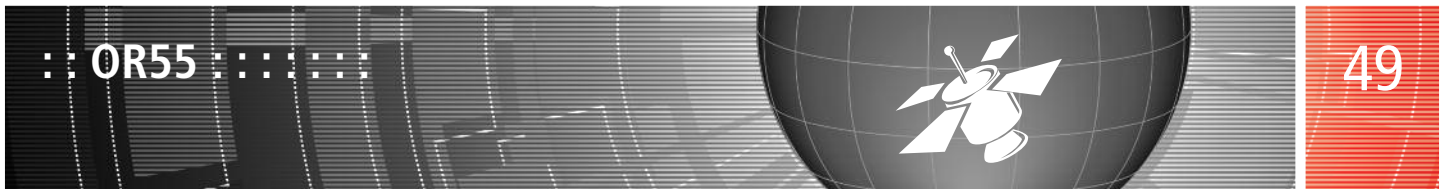
Strategy Analytics

Frances O'Brien - frances.o-brien@wbs.ac.uk and **Martin Kunc** - Martin.Kunc@wbs.ac.uk - stream definition to be advised

Sustainable Supply Chain

Lampros Stergioulas - Lampros.Stergioulas@brunel.ac.uk
Sustainability is more and more these days viewed by companies and organisations not only as an area of opportunity for social contribution and the positive reputation this can bring, but also as a source of significant competitive advantage. Sustainability is usually conceptualised in terms of environmental, social and economic criteria that are necessary for an organisation to long term viability. The stream focuses on the sustainability aspects of supply chain management.

Contributions to this stream are welcome on all topics that involve the use of using OR and Modelling & Simulation approaches and address supply chain issues in sustainability problems including, but not restricted to,

- Management of sustainable supply chains (including design, planning, and management processes)
- Green logistics management
- sustainable farming (agri-supply chains),
- sustainable manufacturing (including sustainable products and production lines)
- reverse logistics
- green procurement and sourcing
- waste management and recycling (including product returns, material reuse, source reduction, repair/re-manufacturing)
- green transportation
- energy consumption efficiency
- green accounting
- green marketing
- corporate environmental stewardship and social responsibility
- sustainable corporate strategy

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CRIMINAL JUSTICE - SPECIAL INTEREST GROUP

IAN SEATH

A Criminal Justice SIG meeting is planned for the afternoon of 24 June 2013 in central London. We are currently finalising details of the four presentations which are likely to include:
- The analysis/prediction of burglaries and use of agent based simulation
- Measures of effectiveness in Community based policing in the US
- Developing a 20-Year Facilities Master Plan for a Police Force

Our CJ SIG meetings always generate lots of lively discussion and provide plenty of time for individual networking as well. Places are usually limited so be sure to book early by contacting Sue Merchant (suemerchant@hotmail.com). We also have a LinkedIn Group where further information will be published.

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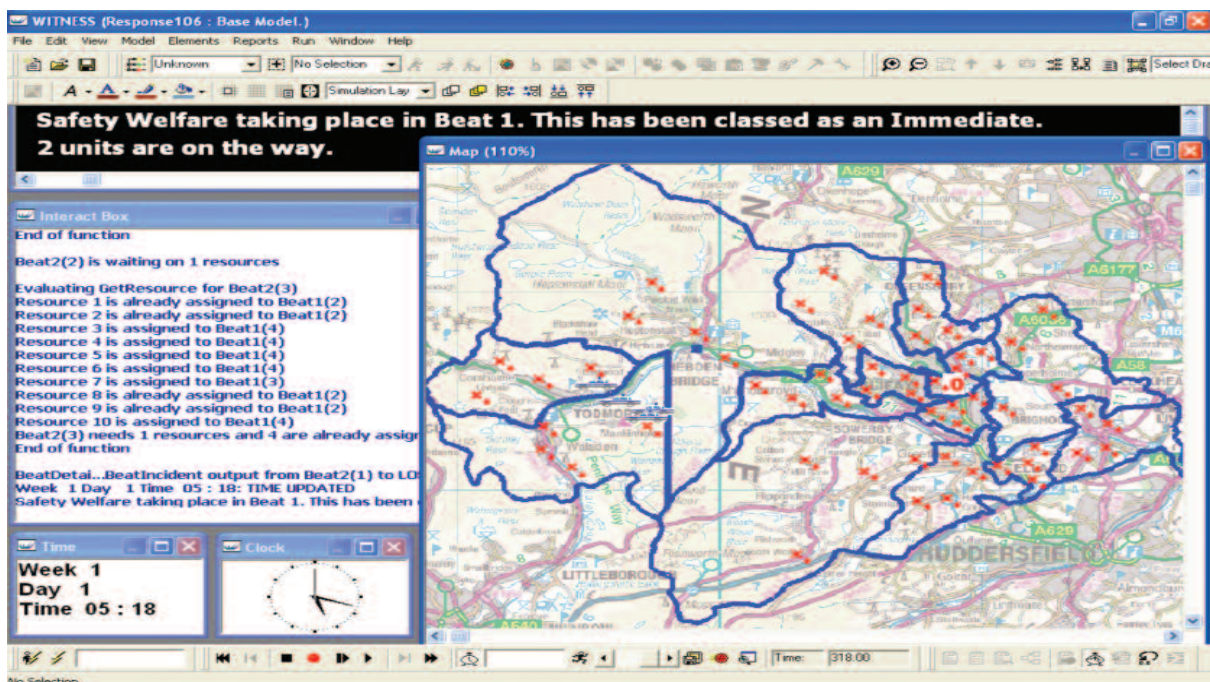
Simulation and Modelling presentations feature among the CJ SIG's topics.

REGIONAL SOCIETIES

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EMAIL: Sandra.Weddell@tube.tfl.gov.uk
or Martin Caunt
TEL: 020 7215 3317,
EMAIL: Martin.Caunt@dti.gsi.gov.uk

MIDLAND (MORS)
CONTACT: Jen East (Secretary)
EMAIL: MidlandsORSociety@live.co.uk
MORS - Modelling and measuring demand and performance in HMRC call centres
Date/Time: Wednesday, 19 June 2013 at 18.00
Venue: tbc
Speaker: Steve O'Donnell, HMRC
Abstract: The management of call centre performance relies heavily on queuing theory work first carried out by Erlang in the early 20th century and much elaborated since. But this approach requires copious and detailed forecasting of future demand and resources and while it is excellent for short term performance management HMRC has found it less suitable for medium to long term performance planning of their call centres. Part of the problem, which any call centre under pressure faces, is it is difficult to establish how much demand the call centre has to handle. The work described here outlines a novel way of measuring the real demand faced by a call centre. This measure turns out to be intimately related to the performance of a call centre and allows the building of extremely accurate models of medium to long term call centre performance. HMRC adopted this model for managing call centre performance from April 2011 and, with the assistance of the improved understanding of demand and performance the model brings, went from handling 48% of calls in 2010-11 to handling 74% of call in 2011-12. This performance has been sustained in 2012-13 with performance in the later part of the year regularly achieving 90% + calls handled. The model was the primary tool supporting the recent decision to reprioritize £34m of HMRC funding into contact centre investment at a time of austerity in Government financing.

MORS - Just messing about with models: experiences as an O.R. practitioner
Date/Time: Wednesday, 09 October 2013 at 18.00
Venue: Aston University
Speaker: Jane Parkin, Independent O.R. Consultant

Abstract: Life as a practitioner is full of interesting questions: how do you start off negotiations with a new client? How do you get to grips with the client's business area and problem fast? How to decide on the most appropriate approach to take/model to use and how to persuade the client that your model will help to solve their problems? What do you do if the client doesn't think an analytical approach will help or even if the client doesn't realise that they have a problem? How best to manage client expectations and relationships? And finally, how best to finish off an assignment to everyone's satisfaction? These issues will be addressed via a selection of consultancy projects and there will be time for discussion on any aspect of working as an O.R. practitioner.

MORS - Florence Nightingale: using graphical statistical analysis to combat the spread of disease
Date/Time: Tuesday, 12 November 2013 at 18.00
Venue: The Club Room, The Old Joint Stock, 4 Temple Row West, Birmingham, B2 5NY
Speaker: Noel-Ann Bradshaw, University of Greenwich
Abstract: Florence Nightingale (from Lea, Derbyshire) is well known in mathematical and statistical circles for her graphical representations of data. But what exactly did these diagrams show and what other diagrams and statistical methods were being used at the time to analyse data? This talk will look in detail at Nightingale's graphical representation of the causes of mortality during the Crimean War. It will demonstrate how these were used by Nightingale and others to show that preventable diseases contributed to the army's high mortality rate and how the use of this data led to dramatic changes to nursing practices in Army hospitals.

Non-members welcome, no charge is made. After the talks, you are welcome to join us and the speaker for a meal. For further information please contact MidlandsORSociety@live.co.uk

NORTH WEST (NWORG)
CONTACT: Nathan Proudlove
EMAIL: nathan.proudlove@mbs.ac.uk

SCOTLAND (ORGS)
CONTACT: Kerem Akartunali (Chair)
EMAIL: Kerem.Akartunali@Strath.ac.uk
CONTACT: Roberto Rossi (Secretary)
EMAIL: roberto.rossi@ed.ac.uk

SOUTHERN OR GROUP (SORG)
CONTACT: Patrick Beullens
TEL: 023 9284 6357
EMAIL: p.beullens@soton.ac.uk
SORG - Using Sports Analytics to drive fan engagement
Date/Time: 4.00pm on Thursday 23 May
Venue: Room 3041, School of Management, Building 2, Highfield

: : NOTICEBOARD : : : : : :

Campus, University of Southampton
Speakers: Matin Jouzdani/Mike Nicholson, Global Business Services, IBM

Abstract: IBM is growing sports analytics practice in the UK. The talk will start by introducing the experience and technology that has led to IBM entering the field of Sports Analytics and why they believe it is of growing importance to so many stakeholders in sport. It will then be demonstrated, through recent IBM projects in Football, Rugby and Tennis, how combing social media analysis, real-time statistical insight, and second screen technology can deliver a new capability that drives fan engagement, enhances the experience and creates a new standard in how sports matches are analysed.

SORG AGM
At the end of the talk, the SORG AGM will take place.
For more information please contact P.Beullens@soton.ac.uk

SOUTH WALES (SWORDS)

CONTACT: Dr Jonathan Thompson.
TEL: 029 2087 5524 Fax: 029 2087 4199
EMAIL: ThompsonJMI@cardiff.ac.uk

WESTERN (WORDS)

CONTACT: Dr Jo Smedley
TEL: 01633 432573
EMAIL: jo.smedley@newport.ac.uk
WORDS meeting
Is 42 the answer ?
Date/Time: Tuesday 21 May 2013 at 18.00
Venue: University of the West of England (UWE), room 2Q49
Speakers: Dr. John Crocker

Mathematical models are frequently used to predict the future often with the primary intention of changing or managing that future. In a good many cases they do so with a reasonable level of accuracy and success but there has been an alarming number of instances recently where one suspects the validity of the assumptions being made. People are extremely good at noticing coincidences - how many of you have noticed a remarkable increase in the number of cars of the same type/colour as your new one. Few of us would use this observation as a argument to say that sales of said car had suddenly escalated but are we in danger of doing something similar with the way we handle 'big data' etc?

John has spent is working life developing simulation and optimization models, working for the British Steel Corporation, Rolls Royce and as a operational research consultant. An active member of the OR Society and is currently the editor of Inside O.R. (OR Society monthly newsletter).

YORKSHIRE & HUMBERSIDE (YHORG)

CONTACT: Stuart Johns.
TEL: (0114) 225 3136
EMAIL: s.l.johns@shu.ac.uk
YHORG meeting
Seminar in Group Causal Mapping
Date/Time: Thursday, 13 June 2013 16.00-18.00
Venue: Department for Education, 2 St Paul's Place, 125 Norfolk Street, Sheffield, S1 2FJ
Speakers: L.Alberto Franco, Loughborough University and Ashley Carreras, De Montfort University

Alberto Franco and Ashley Carreras are both senior academics with considerable experience in using problem structuring methods and group strategic decision making workshops. YHORG is very fortunate to have secured them to run a seminar using the Group Explorer* causal mapping software.

Causal Mapping is a flexible problem structuring method that has many uses in Operational Research. It is commonly used to help a group reach agreements about how to deal with strategic issues. It is also used to help structure goals and objectives at the front-end of decision analyses, to explore ways of managing stakeholders by surfacing their sources of influence and interest, and to develop scenario-driven strategies by articulating key external driving forces affecting a particular context. Mapping provides a common language and format to communicate about a problem situation of concern, and the models it helps to create represent how we think about that situation in terms of means-ends. The models are visible objects, always in transition to reflect ongoing group discussions about the situation, and amenable to formal analyses 'on-the-spot'. Provided their content and use is well managed during group discussions, shared understandings and common interests are likely to develop, which can lead to changing the situation of concern.

Group Explorer provides an effective computer supported environment in which mapping can be deployed. It provides participants with the opportunity to contribute directly to the construction of the group map, and its analyses. The seminar will provide 'hands on' experience with mapping through Group Explorer. This will act as the focus for reviewing coding practice, 'on-the-spot' analyses, and group process issues. Managing both content and process in group causal mapping events is demanding, and the session will address some of the ways in which this can be addressed in practice. Examples from recent interventions with organizations will be used to illustrate the talk.

Numbers for this event are limited to 16 OR Society members only. Please contact janeparkinch@gmail.com if you would like to attend.

The seminar will be followed by the YHORG Annual General Meeting; all welcome.

*Group Explorer was developed by Colin Eden and Fran Ackermann at the University of Strathclyde.

<OR>

SPECIAL INTEREST GROUPS

ANALYTICS NETWORK (ANSIG)

CONTACT John Hopes
EMAIL: ANChair@theorsociety.com
ANSIG NEXT MEETING: Adding Value In Analytics
Date/Time: Wednesday, 12 June 2013 9am – 17.30pm (Buffett lunch and refreshments provided)
Venue: Institution of Engineering & Technology, Savoy Place, London, WC2R 0BL
Speaker: TBA

Abstract: Experience shows that the most successful businesses are those with the clearest picture of what they are doing, and what they need to change or do better.

The vast amounts of data now gathered by organisations, together with the computing power that's available to analyse it, has led to a revolution that's transforming business decision making: Advanced Analytics. Our one-day seminar examines developments in the field of Advanced Analytics – the latest ways of gaining business insight through quantitative analysis to aid the decision-making process.

Further information on this event, including speakers, programme and booking will follow shortly.

To book on event go to:
https://www.theorsociety.com/Pages/SpecialInterest/AnalyticsNetwork_future.aspx

COMMUNITY OR NETWORK

CONTACT Leroy White
EMAIL: leroy.white@bristol.ac.uk
TEL: 0117 954 5683

COMPLEX SYSTEMS DISCUSSION GROUP

CONTACT: Kevin Gilligan
TEL: 0208 977 8553
EMAIL: GilliganMauve@geo2.Poptel.org.uk
Group meetings to be held at 12 Noon
Last Friday of the month
The Adelaide, Park Road, Teddington
Meeting Title : The Management of Uncertainty

CRIMINAL JUSTICE

CONTACT: Ian Newsome
TEL. DDI: 01924 292244 **Extension:** 22244
EMAIL: ian.newsome@westyorkshire.pnn.police.uk
Criminal Justice SIG meeting
Date/Time: Monday 24 June 2013 at 13:30 - 17:00
Venue: Home Office, Westminster
Speakers: Various
The programme will include talks on:

- 'Analysis/prediction of burglaries and use of agent based simulation for crime reduction', by Leeds University;
- 'Measures of effectiveness in Community based policing in the US', by Cogentus Consulting Ltd ;
- 'Developing a 20-year facilities Master Plan for York Regional Police', by ORH Ltd;
- 'Offender segmentation in the National Offender Management Service (NOMS)' by the Ministry of Justice

The event will be at the Home Office in London, from about 1.30pm-5pm, exact location and timings to be confirmed to delegates asap.

Please contact Sue Merchant as soon as possible if you are interested in attending. suemerchant@hotmail.com

DECISION ANALYSIS

CONTACT: Nadia Papamichail
TEL: 0161 275 6539
EMAIL: nadia.papamichail@mbs.ac.uk
Decision Analysis SIG meeting
Joint GOR OR Society Conference
Date/Time: Monday, 23 September 2013 at 09.15 – 17.00
Venue: Helmut-Schmidt-University, University of the Federal Armed Forces (HSU), in Hamburg, Germany
Speakers: Various

We have been working with DASIG-equivalent of the German OR Society to organize a meeting in Hamburg this summer and are in the process of putting the program together.

The website for the event is now online: http://www2.hsu-hh.de/logistik/GOR-DASIG-2013/ . GOR operates on a slightly different basis from the usual DASIG meetings and the event will follow their format, with participants invited to give talks and submit papers.

Hamburg is a great and destination and the conference promises to be an exciting event and a good opportunity to get to know our counterparts in the German Society, so do consider attending and perhaps also submitting a talk.

DEFENCE

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:: NOTICEBOARD :::::::

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O.R. AND STRATEGY

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O.R. FOR DEVELOPING COUNTRIES

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eric.soubeiga@orpagroup.net

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PRODUCTIVITY MEASUREMENT

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SD+ (SYSTEM DYNAMICS)

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THIRD SECTOR O.R.

CONTACT: Katherine Byrne
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OR-30

John Crocker

June 1983

The National Coal Board was created by the Attlee government in 1946. It brought together around 200 independent companies into a single nationalised industry. At its peak, it employed over 700,000 people but British coal could not compete against the heavily subsided European coal or that which came from open-cast mines so production went into decline with a large number of the less productive pits being closed. There was a short reprieve in 1974 when oil prices rose very steeply due to unrest in the Middle East.

The general policy had been to replace what had been a highly labour-intensive industry by mechanisation. Those pits which for various reasons did not lend themselves to this change were steadily taken out of action. In many cases, once a pit has been closed, it is virtually impossible to re-open it. By the time Richard Ormerod presented his paper at the 1981 Conference he had been in the Central Planning Unit (CPU) some three years having moved from the O.R. group. One of the characteristics of the nationalised industries was that they all had O.R. groups, many of which had grown in both size and influence possibly reaching their peak in the mid to late 70's.

It is noted that in Richard's paper, he draws attention to the fact that five of the members of the O.R. group were working directly with/for the six members of the CPU which sometimes made it difficult to determine the relative boundaries. Richard also made a particularly interesting comment, '…O.R.'s continual struggle for relevance and influence'. It was around this time that the O.R. group that I was working in was also facing similar problems and had, if my memory serves me correctly, disappeared within five years. (I should point out that I was not working for a nationalised industry at that time although the government did own 100% of its shares.)

As you know, I don't very often write about 'technical' papers but this month I shall make an exception. Don't worry, though, I am not going get all mathematical or technical. The particular paper, by Clementson and Elphick (University of Birmingham), was about the algorithms used to produce school timetables. Like the Travelling Salesman Problem, this is a problem of combinatorics and, as such, is classed as an NP-hard problem which means that as the number of lessons, rooms and teachers increases, the number of possible solutions increases exponentially (i.e. non-polynomial). Also, like the TSP, the requirements and constraints or rules are very simple to express, but by no means easy to satisfy.

Unlike the TSP, there is not bound to be a feasible solution. Given the towns are situated at points on a 2-dimensional Euclidian plane, there will always be at least one route which passes through every town once and only once without any crossovers. With the timetable problem, it is possible that there are not enough rooms or teachers to enable the timetable to fit into the time available. At the senior school I attended, we had a 7-day timetable although we only attended five days a week so the first lesson on Monday morning in the first week of term next took place first thing Wednesday morning and so on.

At the time, there was an algorithm using the colouring of graphs which solved the problem when all lessons were single periods but in senior schools, it was (and no doubt still is) common practice to have lessons allocated to double periods and for games, it was often a triple period (i.e. all afternoon). In this paper, the authors have considered a number of algorithms that overcome this problem although none of them are guaranteed to produce the 'optimum' solution. At this point it gets very technical and as it happens, I have run out of space!

Ormerod, R. (1983) Corporate Planning and its Use of O.R. in the N.C.B.: a Personal View, *JORS* **34**.6, Pp 461-467 (jors1983113a.pdf)

Clementson, A.T. and C.H. Elphick, (1983), Approximate Colouring Algorithms for Composite Graphs, *JORS* **34**.6, Pp 503-509 (jors1983117a.pdf)

<OR>

OR-20

COMMUNITY OR NEWS

Sociodrama engenders participation

The first Community OR Conference

A conference for Community O.R? Isn't that rather traditional and mainstream? How could it cater for the different levels of experience? Anyway, how many people would want – or be able to afford – to come? Yes, we had had those doubts last summer when thinking about holding a conference, but we continued …

Generous support

Generous support from the Paul S Cadbury Trust meant that we were able to offer weekend residential places at Northern College for £35 and still give a student / unwaged discount … and, in the modern OR Society tradition, we even managed to break even. Forty Four people came from all over the country, reflecting a wide range of backgrounds, experience and interests.

But the conference was not designed along traditional lines of papers and presentations. Participation was the keyword: my view

: : LAST WORDS : : : : : : :

is that the conference itself was a piece of community O.R., with us as the community, aiming to learn from each other and to plot (joint) ways forward. The design was meant to allow people to ensure that the conference covered their interests. There was a great deal of facilitated small group work to encourage the active participation of as many people as possible, to ensure that proceedings were not dominated by the confident few and to give people the chance to have a go at facilitating.

Warning that this was not to be a 'normal' conference came in the first session. After the formal welcome, everyone was up and moving about introducing themselves to each other. After a few minutes of this, some of the group's characteristics – such as location, knowledge of each other and experience of COR, O.R. and community work – were explored by the whole group using different physical representations. Apart from being enjoyable and useful exercises, this allowed the group to see some basic sociodramatic methods (which have been widely used by the Unit) in action.

Traditional Fare

The following two sessions were more traditional conference fare. First there were presentations from six people who had been involved in COR for some time, each focusing on different aspects of the subject. On reflection, perhaps a smaller number of speakers giving more detailed project reports would have responded better to the need to communicate what community O.R. involves. However, some important points were made and these were debated further in the later sessions. This session was followed by talks from Eddie Walker (Association of Community Technical Aid Centres), Steve Simpson (Radical Statistics) and Libby Cooper (Charities Evaluation Services) who were able to present some very different organisational alternatives that COR could learn from. These were invaluable and many of the issues which they raised continued to feature throughout.

Surfacing issues

The final session on Saturday, which was aimed at surfacing the issues that different people wanted to discuss in the Sunday sessions, was structured using another established participatory approach, known as Nominal Group Technique. After some time spent on individual and small work group, we all met together to cluster the various issues and to decide which sessions could go ahead. The final timetabling phase of this proved too much at 9pm on Saturday night, so we all retired to the bar where our combined intellect and knowledge was beaten in the bar quiz by a team from community centre in Bradford.

The two Sunday morning's sessions saw ten different discussion groups focusing on 'national organisation', ' the purpose and ethics of COR', 'is COR distinctive?', 'theory and practice', marketing and publicity', 'setting up COR groups' and 'finding roles for COR people/students'. Each group appointed a facilitator and rapporteur to record the discussion on flip charts and to note any action points. The flip charts were displayed over lunch time to allow people to note connections and commonalities for themselves.

The final season attempted to draw together some of the discussions and to plot the next steps. While not entirely successful in this aim there was an enormous amount of material – a number of groups were formed who agreed to meet later. These were a publicity and marketing group, a forum for reflective practice and two regional groups- Birmingham and Midlands, and Northern. The wealth of material generated has meant that analysis and reporting of the conference is extremely important and a number of people have agreed to be involved in producing something substantial. Please contact me if you would like to receive the report when it is completed.

Inspired

It is always difficult to assess the success of something that you have been so closely involved in, so I asked Mike Luck to give a more detached view (below) However I was inspired by the conference : the number of new faces, the enthusiasm and level of contributions, the quality of discussions, my own learning, and the feeling that new things will happen as a result … as well being able to look back and think that was fun. Therefore I was delighted when I received a letter from one participant (who had better remain anonymous for fear of blighting their career by association with COR!) which included the following:

'As a result my confidence and enthusiasm were increased and I have managed to convince a fellow **** employee … to join me in actually doing some Community O.R..'

By Charles Ritchie

<OR>

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For an informal discussion in total confidence on any of these positions or the market in general, please contact: Mark Chapman, Teresa Cheeseman, Kate Fuller or Sarah Sambrook. Alternatively visit our website to view our current vacancies.

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