In at the deep end! Reflections on a life of OR practice

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Blue Link Consulting, UK
My background

- **BSc Physics 1970**
- **Ministry of Defence – OR analyst; MSc in OR/Stats part time 1970-1975**
- **Met Police (Scotland Yard) – from senior OR analyst to Director of Internal Consultancy 1975 - 2000**
- **Met Police - Head of Policy Unit; Assistant Commissioner’s right hand woman; Head of Business Change Group 2000 - 2002**
- **Independent Consultant; ex president of OR Society and ex VP IFORS**
Facts about the Met Police circa 1990

• 28000 police officers
• 15000 other staff: forensic scientists, police car repairers, cooks....etc
• 7 million residents in greater London + visitors
• Area about 1,600 square kilometres
• Local and National functions
• Budget > £ 1 billion p.a.
• Internal consultancy department: around 50 staff (mix of police, work study officers, OR scientists, psychologists, administrators)
Examples of Met project requests

• Optimal location of police stations?
• Does the Neighbourhood Watch scheme work?
• How can we improve the operation of Criminal Record Office & can we move to a microfiche system? *
• How can we automate Witness Albums?
• How should we prioritise building works within limited budget?
• Which are the best performing police units and why?
• Which routes should our dispatch vans take to minimise time?
• How can we make out a business case for replacing our intelligence system?
• Which computer systems should we develop and in which order over next 10 years? What should be our strategy? *
• How can we rationalise our inspecting bodies?
• How can we distribute our manpower fairly?
• How can we show that London is the safest city in the world? (!)
Example of a Met problem

- 4.5m hard copy criminal record files at Scotland Yard
- Floor collapsing under weight
- No chance of moving offices
- Had to adopt a microfiche solution - microfilm no good because can’t update it
- Needed project to completely re-design the process for handling arrest/conviction info in 6 months and sort out technicalities of microfiche
Team composition

• Detective Ch Supt who was deputy to the head of the records office
• CRO’s microfilm expert
• A Chief Inspector who knew the records office processes
• me
Project title

Criminal
Records
Utilising
Microfiche
Project
Evaluation
Team

Criminal
Records
On
Microfiche
Project
My role

• To help plan the project
• Draw up a critical path analysis for the project
• Write all the progress reports for the steering cte
• Do any analyses needed eg forecasting how many filing cabinets we would need for the next 10 years; estimate how many new criminal files would be created and how many would have to be updated
• Review, change and document many of the processes
• Decide which type of microfiche to use
• Organise tests to find best types of equipment
Microfiche layout
### Microfiche layout for CRO

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<tr>
<th>234712/64</th>
<th>BLOGGS</th>
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<tr>
<td></td>
<td>Arrest forms</td>
</tr>
<tr>
<td></td>
<td>Result forms</td>
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<td></td>
<td>Antecedent forms</td>
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<td></td>
<td>Descriptive form</td>
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<td>Spare for overflow</td>
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Microfiche viewers

• How would the fiche be read by police investigators?
• All police stations would need fiche viewers - how many and what type?
• Examined three or four commercial police and prisoner-proof viewers/printers
• MCDA used for selecting best on range of weighted criteria (cost, clarity of picture, ease of use, robustness, size, adjustability)
Outcome

• Our system was adopted and implementation commenced during 1978
• System was still being used some 20 years later as back up when the records were eventually computerised
• Was it a success?
  Yes and no! A necessary evil but it worked!
• **Success factors**
  Good supportive team leader, complementary skills of team members, much humour, all pulled together under pressure, clear goal
CRIMESTOPPERS

A charity which helps fight crime

Members of the public telephone the call centre **anonymously** to give info about criminals and crimes

*Possible Reward!!!*
The Crimestoppers project mountain to climb

• Call centre was expecting huge increase in volume
• Management had a hunch that changing the shift pattern would help improve performance but couldn’t test this or agree amongst themselves
• Decision needed: **which shift pattern will cope best with increased demand**
• One month to get answers
• No documentation of call centre process
• Very patchy data available
• Location awkward for us
• No simulation software
## Main Performance Measures

<table>
<thead>
<tr>
<th>Measure</th>
<th>Target</th>
<th>Actual 2011</th>
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<tbody>
<tr>
<td>% calls answered in 20 secs</td>
<td>90%</td>
<td>86%</td>
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<tr>
<td>Abandoned calls per week</td>
<td>&lt; 200</td>
<td>355 (of 5800) 6.12%</td>
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<tr>
<td>Staff utilisation</td>
<td>Better balance of busy/not busy</td>
<td>Not measured</td>
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</table>

Also: staff costs not to be greatly increased above current levels
Business processes

- **Main categories of staff**
  - call handlers
  - online form handlers
  - Shift leaders

- **Original process**
  - Shift leaders take calls if all call handlers busy

- **Possible alternative process**
  - calls diverted to shift leaders then online staff
Modelling *original* process

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<th>2 types of customer contact</th>
<th>3 categories of staff</th>
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<td>Online</td>
<td>Online staff</td>
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<td>Shift leaders</td>
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Modelling *proposed* process

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<td>Online</td>
<td>Online staff</td>
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<td>Shift leaders</td>
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Diagram:
- Arrival profile
- Call type: Phone calls, Online
- Queue: Q, SL Q, Late call Q, Online Q
- Staff: Call handlers, Shift leaders
- Online Staff
- Rosters
- Shifts
- Staff teams
Illustration of original roster patterns

6 days on, 4 days off

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Key: E=07:00-16:00  M=09:00-18:00  L=16:00-01:00  N=22:00-07:00  R=rest day
Data needed for model

- Incoming call volumes – distribution by hour of day, day of week
- Time to answer calls and do follow up tasks – distribution
- Number of staff on duty across the day and week
- Break times and durations
- Targets to be met
Analysis of 2011 calls data

Call volumes similar Monday - Friday

Additional business was being taken on during year.

Peak in summer 2011 was a result of the riots.
Screenshot of 1 week’s run using current shifts

Target: 90% of calls to be answered in 20 seconds
Model outputs: current shifts
phone calls offered and answered

Problem with Saturday
Model outputs: original shifts call handling staff utilisation on Saturday

Inefficient use of staff over 24 hour period
Iterative improvements
Results for an average week

% calls answered in 20 seconds

Alternatives modelled

1. Client initial proposal - longer shifts

2. as 1 with some part time weekend shifts added

3. as 2 with amendments to weekend shifts

4. as 3 but extending one shift

5. as 4 but changing start times for early shifts

Abandoned calls in week
And then…….

• Modelling work complete, shifts agreed June
• Phone call from Crimestoppers in August:
  – staff don’t like proposed shifts
  – they have a proposal of their own
  – can you check this out?
• Took opportunity to get some actual data
  – for April – August
  – phone call patterns close to estimated
  – some concern with online form data
• Staff proposal more expensive but
  – no better service
And what happened?

- New rosters introduced Jan 2013
- Managers pleased (verbal)
- Early Feb we were told that results were great! The staff were able to deliver a reduction in lost calls and better performance against target.

- **Success factors**: good visual simulation tool enabled working *with* the client
Met Information Strategy
Why needed?

• Over 200 legacy systems
• Many systems needing replacement
• Much double/triple entering of info
• Systems didn’t talk to each other
• Many new systems required
• Lack of info where needed
• Tiny budget
• Produced a hierarchical business model of all Met functions
• Analysed the model to see what information systems would improve the functions
• Produced a data model showing info entities and relationships
• Plus a usage matrix showing links between systems and entities
• Listed, grouped and ranked potential systems v weighted policing objectives
• Established technical implementation order required
• Analysed inter-relationships between systems
• Produced 10 year implementation plan options for management showing costs v impact on policing objectives
Top level hierarchical business model

**Police London cost effectively**

- Maintain Met strategy
  - Provide appropriate infrastructure
  - Promote the image of the Met
- Obtain finance
- Preserve public tranquility (ie provide policing services)
  - Provide people to do effective police work
- Measure and control performance
  - Provide National and Regional services
Template for producing business model using types of business function

- Scan
- Plan
- Review
- Do
- Resource

Info needs
Outcome

• A ten year plan was adopted
• The IT dept took on the maintenance of the data model
• My dept set up a section to support the Strategy
• Some of the major systems were introduced but then pressure built to devolve computing to fit a new structure of the Met!

Lessons

• Competent/respected police team members supported by experts were vital to enable support for such a large project
• The need to appoint a high level respected sponsor
• The need to involve everyone affected as much as possible
• Workshops/simple leaflets were valuable to sell the strategy - you can never over-communicate!
• Don’t try to plan too far ahead in detail in a technology project!
Tips for dealing with clients

• Find out about, and keep communicating with your client
• Get to know secretaries! Find out about the culture.
• Try to see the problem from the client’s point of view and the point of view of those affected.
• Identify other stakeholders and their level of influence.
• Think very carefully about the real problem behind the request and don’t be afraid to challenge the client (diplomatically!).
• Don’t assume the data are right – check the source.
• Use project management procedures and plan projects carefully; identify risks and communication strategies.
• Keep a sense of humour and build in the fun!
Top tip:

Don’t forget:

‘Old age and treachery will always defeat youth and intelligence!’

David Mamet
Thanks for listening!
Questions?

May all your clients be contented ones!