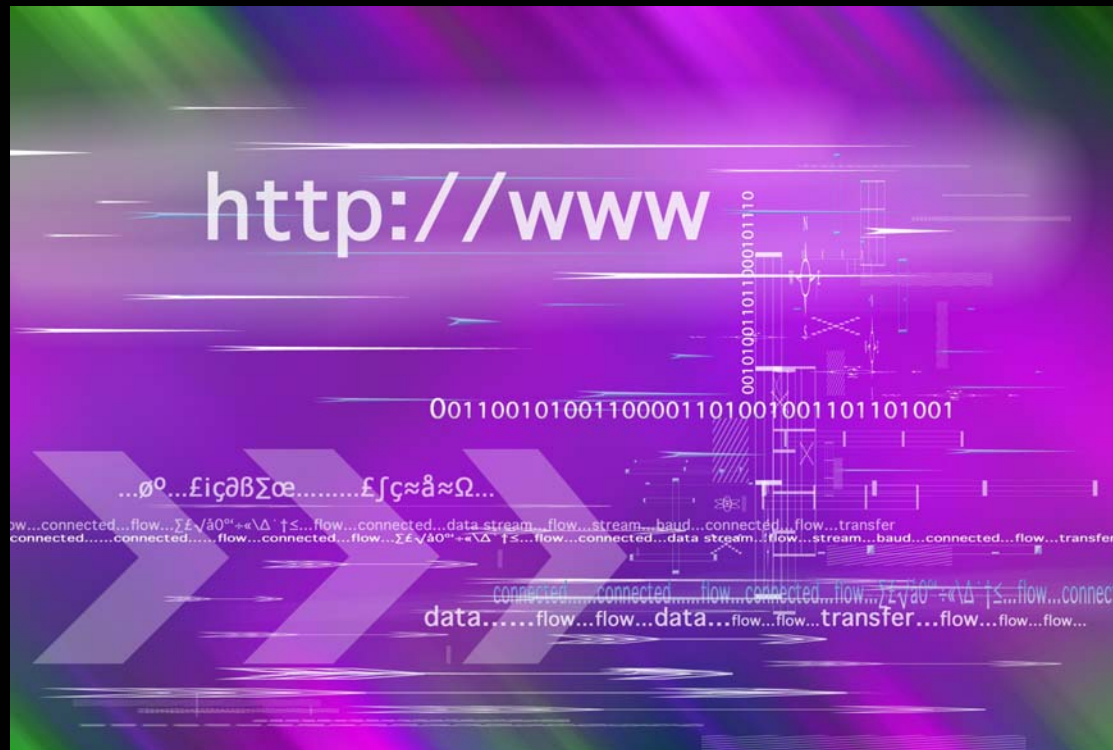


# Action, interaction and the role of ambiguity in the introduction of mobile information systems



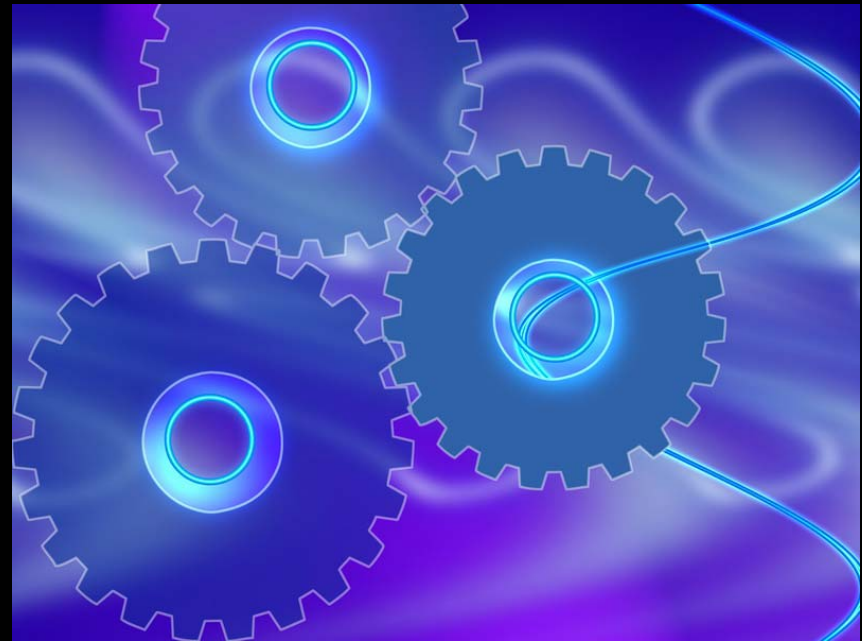
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# Initial aims of the research

- Explore the social and organisational issues related to the implementation of mobile information systems
- Provide a *rich description* of the situated activities of a particular set of mobile workers
- Start to explore *what* changes



# Theoretical Assumptions



- Technologies are socially constructed and enacted;
- practices are historically and culturally contingent;
- both shape and are shaped by vested interests and power; and
- Research must be relevant to organisations.

# Methodology

- Three interventions over a one year period
- Inductive (*grounding* theory)
- Case based (Two sites)
- Multiple sources (formal documentation, interviews with insiders and outsiders – dissenting voices)/ Semi- structured interviews with most of the key stakeholders/ Group ‘focus group sessions’
- Focus on critical incidents, crisis, ‘turning points’.



# Research Site: Surrey Police

- Mobilisation of existing intranet based information architecture: SPIKE (Surrey Police Information and Knowledge Environment).
- ROVER (Remote Officer and Vehicle Environment) units in Surrey Police.
- Implementations in two sites: CID and Uniformed Division



# Ambiguity

- As the research progressed we felt that the role of ambiguity during the process of implementation was particularly significant.
- We turned to the body of work about how people make sense of ambiguity (multiple meanings) created by the implementation of IT.
- There is only a small amount of literature which focuses on the collective creation and shaping of interpretations for understanding and enacting IT (Henfridsson 2000). Much of this work draws upon sense-making perspectives and also utilizes a cognitive perspective.



# Theoretical Assumptions

- Key area emerged: ambiguity about norms and technology
  - Multiple, conflicting interpretations, different value orientations and political and emotional clashes (McCaskey 1982)
- Lack of consensus in the research literature
- Socio-cognitive approach dominates literature
  - Use of cognitive approaches within ideographic frameworks problematic (Mainstream OT)
  - Uneasy relationship with interactionist perspective (a tendency to assume socio-cognitive structures determine and shaping action)
- Strauss as a sensitising device

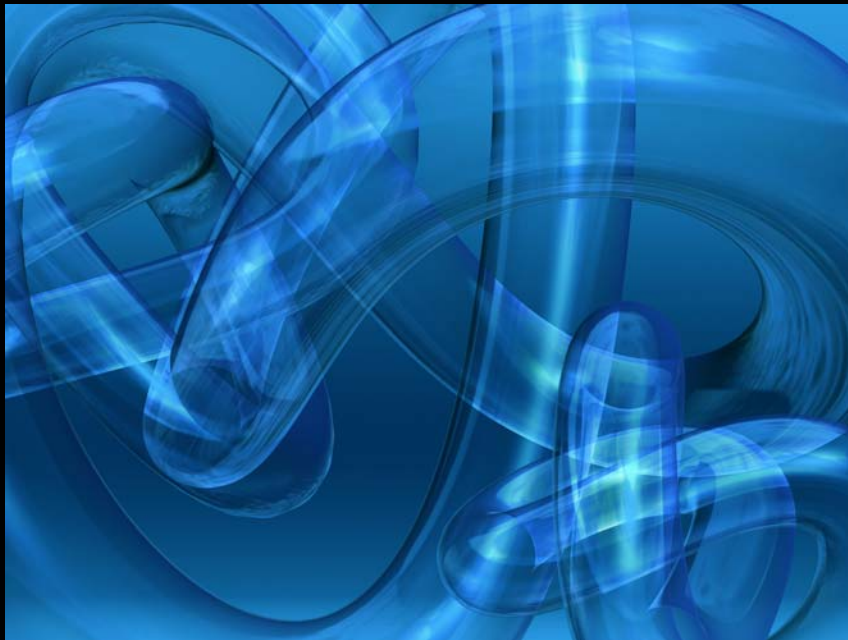


# Strauss's (1993) Theory of Action

- Four concepts are drawn upon: trajectory, trajectory phasing, trajectory projection, and orders.
- Trajectory refers both to the course of any observed phenomenon as it evolves over time and the actions and interactions contributing to its evolution
- Those involved in the interaction can distinguish phases in the trajectory of a phenomenon
- Trajectory projection refers to a vision of the expected course of interaction, which may or may not be shared by the actors.
- Orders are defined as analytic abstractions that summarize what the actions and interactions involved in a phenomenon are intended to achieve. The orders used here are: temporal order, spatial order, work order, informational order and technological order.



# Two Narratives behind this research



- Sense-making about the data
- Sense-making and evaluation of the framework in order to give a common language and theoretical standpoint for our group

# Findings

# Trajectory projection: Why ROVER?

- Tag Line: Information when & where police officers need it
- Operational efficiencies "yo-yo effect"
- Increase the visibility of uniformed police
- Support intelligence led pro-active style of policing
- Driven by Senior Operational Officers
- Enthusiastically received in both implementation sites



# Changes: Orders

- Spatial: changes working patterns (more visible, more time out on the beat, more flexibility)
- Temporal: Pace of work (more efficient), more current and accurate information environment
- Work: Process change leading to increased coordination & removal of bureaucracy. Increased emphasis placed on information as an integral element of police work process. Individuals and teams as active learners. **More autonomous officers (empowerment or control)**



# Changes: Orders

- Information:
  - New information behaviours (sharing, scanning & using) – sharing across shifts
  - Information where & when officers need it (safety aspect)
  - Enabled exploration and increased use of existing internal resources
  - Increased utilization of external information resources
  - Direct input of information & single entry of data (accuracy, timeliness etc)



# Initial Trajectory

- Common: Characterised by a lack of ambiguity and widespread use of the technology in both sites
- Informational order: “I used PNLD when I was out. It gets a bit embarrassing when you don’t know the law. If you have got it to hand, before you pop in the house to speak to them you can just think look it up on PNLD and I will be up to speed, you are more aware of your power to deal with things.” (Uniformed PC)



# Initial Trajectory

- Temporal order: "I use it quite a lot - linking up when I am a passenger in a car looking at current jobs and my workload, doing checks on vehicles rather than doing it over the air, updating crime reports at the scene. It is very useful for that, I can go in, do the update while I am standing there talking to them and if they ask any questions I have got it at my fingertips I don't have to do it from memory and I can give them the relevant numbers." (Uniformed PC)
- Spatial order: "I've personally used it at what was suspected murder scene, where in the middle of nowhere radios weren't very good. With a cricket pavilion as a control point (basically the whole detective team based there), you could walk in and ... you had a computer terminal where you needed it."



# Trajectories diverge

- CID officers were enthusiastic
  - *“It would have to be a very big bloke that comes and takes my computer off me.” “The big fear is that it will be taken away.”*
- ROVER roll-out extended
- Uniformed officers initial enthusiasm was rapidly translated into apathy and resistance
  - *“It made my life easier not to get the laptop out of the bag”.*
- *Uniformed Project abandoned*



# Uniformed: Ambiguity and Spatial Order

- “I was sure that they also meant it to assist us with our job as well. That we would have it out with us and would have more access to information that we wouldn't use the airways so much, because we would be able to do checks whilst we are out. That we wouldn't have to keep on going back in wasting our time on the phone in order to make enquiries whilst we were out and about...we weren't sold on this. The American thing was sold a lot, that you can have your RV outside, *almost that you could almost not use the police stations anymore.*”



# Uniformed: spatial order and information sharing

“We are all very young in service, so we need people who have more experience so that we can sit and socialise with them and ask how would you deal with this...if you can sit face to face you can explain the thing more effectively”.



# Uniformed: Work Order & Supervision

“There was fear that you would be out there on your own (because we are single crewed) for eight hours. I wouldn't be able to supervise people, lot of probationers, I wouldn't be able to go out with them and see what they are doing, because I would never see them. They used to come back regularly and I would say what are you doing now and someone would say, 'I have just been to this job and this happened'. So I would know what was going on. That wouldn't happen with the new system.”



## Uniformed: Work Order and Uncertainty

“Promoted my pulling up and using it to see, pulling up on nights and saying to myself ‘is there anything about’ and using the terminal – quickly check my mails to see what was going on at 2.00am in the morning. I felt that if a governor pulled up next to me, I would think – what do I say? I am checking my e-mails, using CIS, PNDL etc [I was] worried that I would be seen as a bit of a skiver”.



# Negotiation of Technology as interpretations start to crystallize

- **Traditionalists: 'realistic'**

- To work harder rather than smarter.
- 'a technological solution forced on operational officers' 'IT trying to take over the world'
- Frustrating and embarrassing.

- **Modernists: 'defensive'**

- 'It hasn't been lightning quick , but, you cannot expect it to be as quick as in the nick. But I have only used mine around town or in areas where I know the signal is ok... for me it has been quick and people who have used and updated it with their crime numbers or taken their details have been very impressed...'



# The Uniformed Case

- Use of ROVER finally seen as 'unacceptable' by peers
- ROVER project abandoned on 'Health & Safety Grounds'
- Uniformed station closed
- Other Stations have requested ROVER units (community policing/ covert/ proactive teams)
- Other delivery mechanisms are being explored (WAP)



# CID: Temporal & Spatial

- “I take it home every night because I am on call every weekday night. It's an invaluable tool for when you get the call at one o'clock in the morning, you're debating whether to go out or not - you want to know more about it. As well as talking to people on the phone you can actually go in to the incident, you can go to the crime reports and sometimes you can completely get it from home because you've got the tool there.” (CID Officer 1)
- “I do work 8 hours everyday, but it means that I can choose when I do extra and where I do the extra. **It means I can see my daughter** before she goes to bed and do a little bit afterwards if required. That's the usage I get from it.” (CID Officer 2)

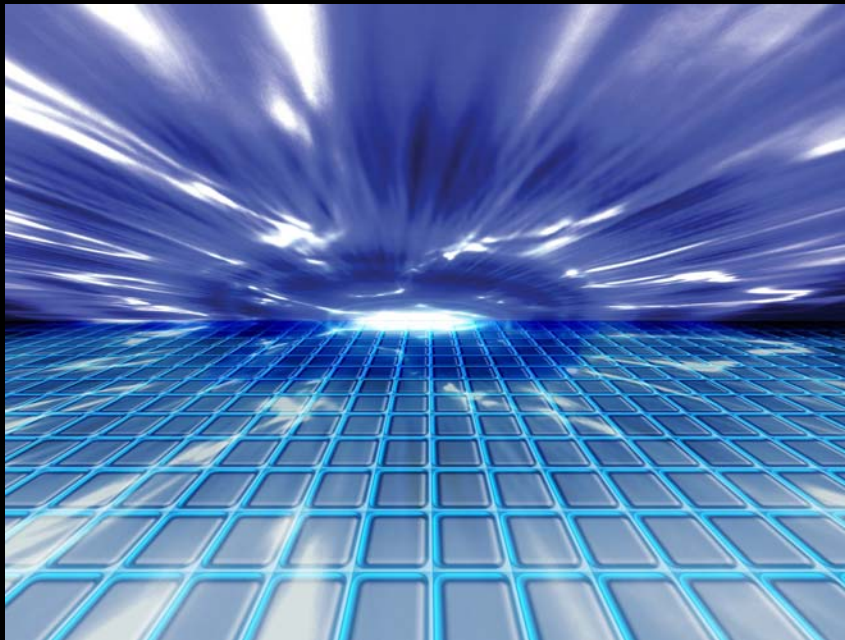


# CID: Work Order

“They were asking me questions, the defence were coming up with items and the prosecution were saying that they wanted this, this, and this. And instead of my rushing off for hours and trying to find someone to ask, I would just turn this on and answer it within a couple of minutes...it speeded the whole process up.”



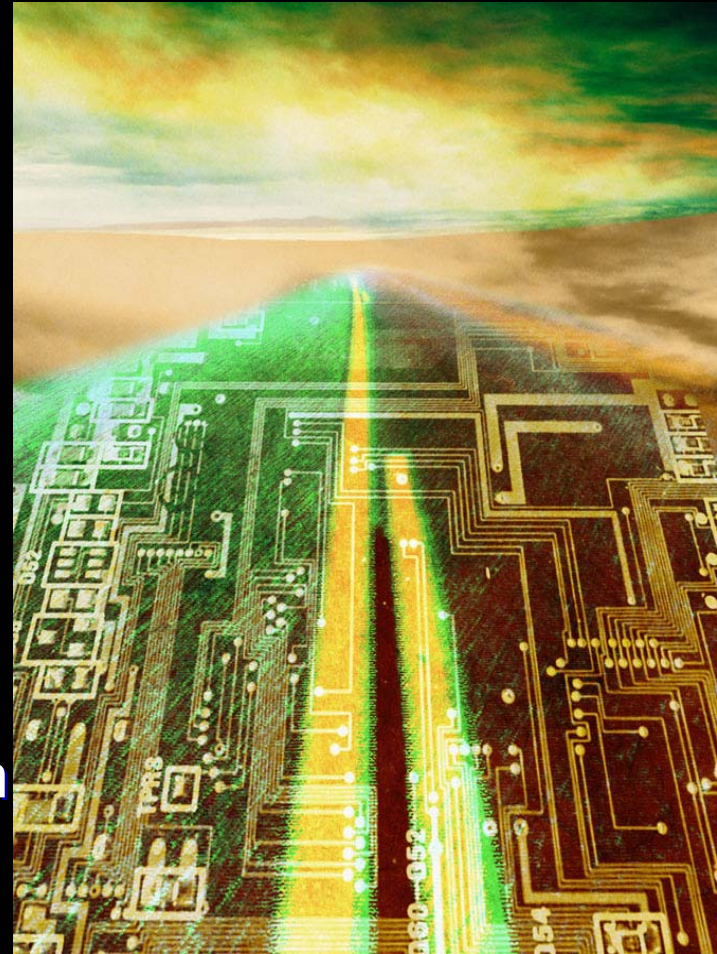
# CID: Reduction of ambiguity



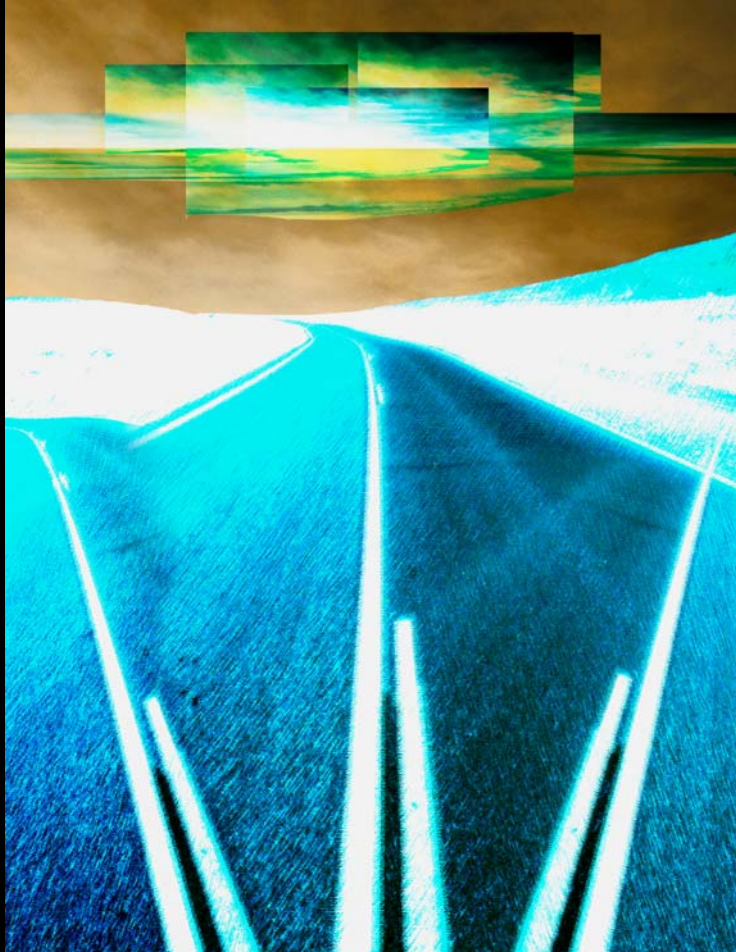
- the systems supported existing work practices and cultural values;
- Use of internal champion to foster and develop supportive attitudes towards the technology
- Strong emphasis on training and support

# Conclusions

- Two sites: mobile technology to 'nomadic' workers in a highly structured environment.
- The same process and technology in both sites.
- Demonstrates qualitative differences in spatial, informational, work and temporal orders.
- Initial trajectory the same.
- Enabled officers to re-order their actions and behaviours in new and unexpected ways.
- Challenged embedded routines



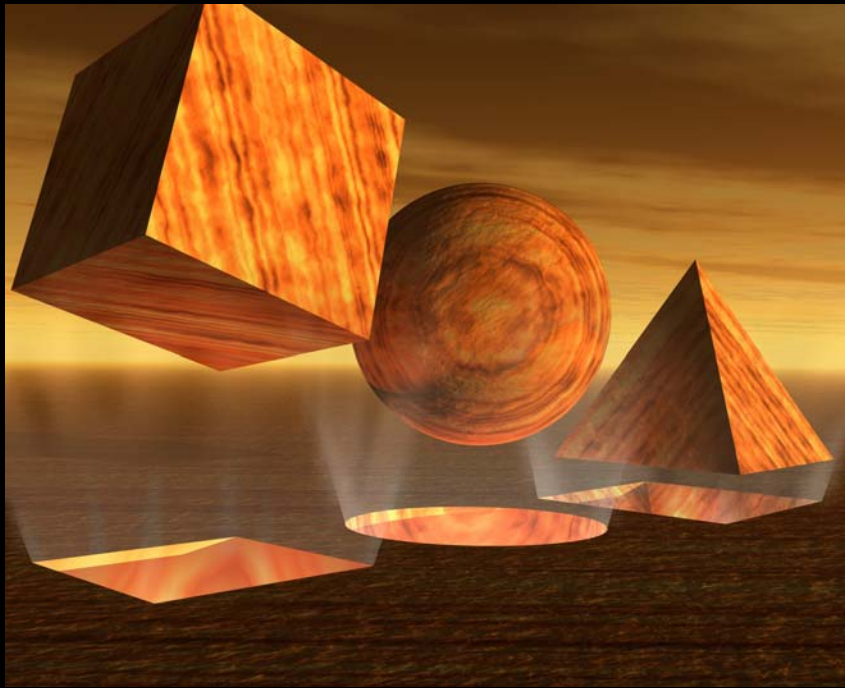
# Conclusions



## Trajectories diverge

- CID trajectory ambiguity actively reduced;
- Uniformed ambiguity increases as the implementation continues.

# Conclusion



- Where high levels of ambiguity people make sense based on plausibility rather than accuracy
- Emphasizes the relevance of the work of Henfridsson (2000) and Mantovani and Spagnolli (2001) on the importance of understanding the relationship between ambiguity created by the implementation of information technology and the sense-making process.