Innovation, Security and Crime

Paul Ekblom
Dawes Centre for Future Crime
Department of Security and Crime Science
University College London
p.ekblom@ucl.ac.uk

European Forum for Urban Security

https://www.ucl.ac.uk/jill-dando-institute/research/dawes-centre-future-crime
http://5Isframework.wordpress.com

Coming up…

- Why should we innovate in urban security?
- What is innovation?
- How does Efus view it?
- Innovation as a process
- Innovation and anticipation
- How important are human/ social factors in innovation?
- What is social innovation?
- Extras (in discussion, if time)
  - Example of technological/ social innovation in urban security
  - Work of the Dawes Centre for Future Crime

Why should we innovate in urban security?

- **Current solutions** to crime may be inefficient/too expensive, may not work, may have adverse side effects e.g. on privacy or aesthetics
- **Cookbook replication** of success stories doesn't work. Crime prevention needs attuning to context, which has multiple dimensions. So every replication involves **innovation, feedback and adjustment**
- **New crime problems** emerge, also new constraints, possibilities or contexts – e.g. funding source dries up, priorities change, a law or a policy changes in the operating environment
- New **opportunities** for improving safety and quality of life arise
- **Adaptive criminals** may exploit new technology or use social engineering to overcome existing security measures – meaning that what used to work, works no longer
- In extreme cases, **arms races** between criminals and security mean we must develop and disseminate the **capacity to out-innovate adaptive offenders**
- Special challenges and opportunities of **ICT** – major **accelerants** of innovation in both crime and security, and huge ability to **scale up** operations at little extra cost

What is innovation?

A UK government report offered this definition:

- **Creativity** is the generation of new ideas
- **Innovation** is the successful **exploitation** of new ideas – creativity deployed to a specific **purpose**
- Creativity becomes innovation through **design**, which shapes novel ideas to become practical and attractive propositions for users or customers
- These definitions apply equally to everyday **social and commercial life**, the **security** world or the actions of **criminals**

Innovation from an Efus perspective

- **Innovations** are new ways to solve **problems** – or to exploit (and even create) **opportunities** to enhance security and quality of life

  – The **problems/opportunities** in question can be anything from local to global, but with local impact; and familiar, changing or entirely novel

  – The innovations can range from **minor** quantitative adjustments to **fundamental** qualitative reform

  – The **capacity to innovate** in timely, appropriate and creative ways confers increased **resilience and adaptability** over how we do things now, and how we will need to do things in the future

Characteristics of innovations considered important by Efus

- **Originality and improvement**: if the changes introduced substantially differ from the previous state of affairs, and have not merely been copied from elsewhere, they are **original**. But a response that is original can only be considered innovative if it **improves and adds value** in a given location

- **Relevance**: an innovative initiative must address needs and opportunities in a given social **context**, whether in response to **current circumstances** or **anticipated changes**

- **Measurability, plausibility and transferability**: an innovative initiative must be built on **evidence**, and should be **plausible** in both theoretical and practical terms. **Safety audits in particular** allow us to design forward-thinking measures based on past experiences

- **Co-production**: an innovative initiative should be developed with the participation and cooperation of relevant stakeholders, including users and others most affected. This serves to exploit valuable **experience and local knowledge**, and to boost **commitment** once the initiative has been implemented

Innovation as a process

- Innovation should be seen not just as an **outcome**, but also as a **process**
- The **capacity to innovate** in timely, appropriate and creative ways
  - Helps us address local **needs**, exploit local **resources and opportunities**, and respect local and national **constraints** – or preferably find creative and acceptable ways to overcome them
  - Confers increased **resilience and adaptability** over how we do things now and how we will need to do things in the future
- Innovative initiatives must go through a multi-stage **development process**:
  - Research
  - Design, including experimentation, pilot testing and improvement
  - Dissemination
  - Evaluation
- Those who implement an initiative must put indicators in place to ensure it is **measurable**
- What was done must be described **systematically in detail** so the knowledge of practice can be **consolidated**, **transferred** & **intelligently customised** to other sites

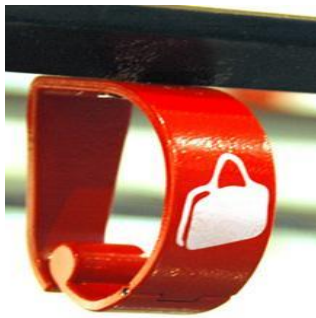
Innovation and Anticipation

- When is it best to innovate? Can either
  - Spot and quickly **react** to **emergent problems**
    - Need an **information system** to collect, interpret and share information
  - **Anticipate upcoming problems** and develop solutions ready for when needed
    - **Crime Impact Assessments** of new products, new places, new services… even Brexit
    - **Horizon-scanning/ foresight** exercises – e.g. work of the Dawes Centre for Future Crimes looking ahead over various timescales
  - Need **both** reaction and anticipation – different strengths and weaknesses

How important are human/ social factors in innovation?

- Even the most technological of innovations has human and social dimensions which can cause it to succeed or fail
  - **CCTV** – someone has to monitor it and make decisions, initiate action – performance factors e.g. attention span are vital
  - **Door locking systems on public housing** – different individuals, organisations or companies must specify, buy, fit, operate and maintain them
  - **Anti-stab kitchen knife** – technically clever
    - But imagine giving this as a wedding present!

  - **Anti-bag theft clips for tables in bars** – worked in Barcelona but not in some British pubs
    - The supporting attitude/behaviour of bar personnel was vital in getting people to use them



  - In **crime** and even **terrorism**, social factors are important in innovation too
    - **Timing device for bombs** – the engineers of the Provisional IRA invented a new timer which relied on acid eating its way through a condom
    - This worked perfectly but none of the operatives would use it in case their Catholic mothers or aunties found the box of contraceptives

What is *social* innovation?

- **EU definition**
  - New ideas that meet **social needs**, create **social relationships** and form new **collaborations**
  - These innovations can be **products, services** or **models addressing unmet needs** more effectively
- In practice, most innovations will be a **mix** of **social, material and cyber** technology

Example of technological/ social innovation in urban security

- Project in Kvadraturen district, Oslo
- Location was under-used, some fear of crime
- Major output was development of the ‘eBenk’ www.ebenk.no
  - Aimed to increase links between people and area
  - To generate connected, safe and people-centred street experiences via mechanisms ranging from informal surveillance to placemaking
  - Technically, by offering multiple sitting positions, free on-street wifi, free charging for mobile devices, ambient lighting and an electricity point to supply public activities
  - In a pilot test, number of users and uses per hour increased between 150-250%

- Project was an example of **reframing**
  - Reframing of the **problem**
    - Started out seeking **less of** crime, disorder, fear; moved on to include **more of** vibrancy
  - Also reframing of the **framework** used to analyse the problem and generate solutions
    - **Security Function Framework** > **Vibrant Secure Function Framework**
    - Marcus Willcocks, Paul Ekblom and Adam Thorpe (2019) ‘Less crime, more vibrancy, by design’, in Rachel Armitage and Paul Ekblom (Eds), *Rebuilding Crime Prevention Through Environmental Design: Strengthening the Links with Crime Science.* Taylor and Francis.

What are the tactical challenges of innovation in urban security?

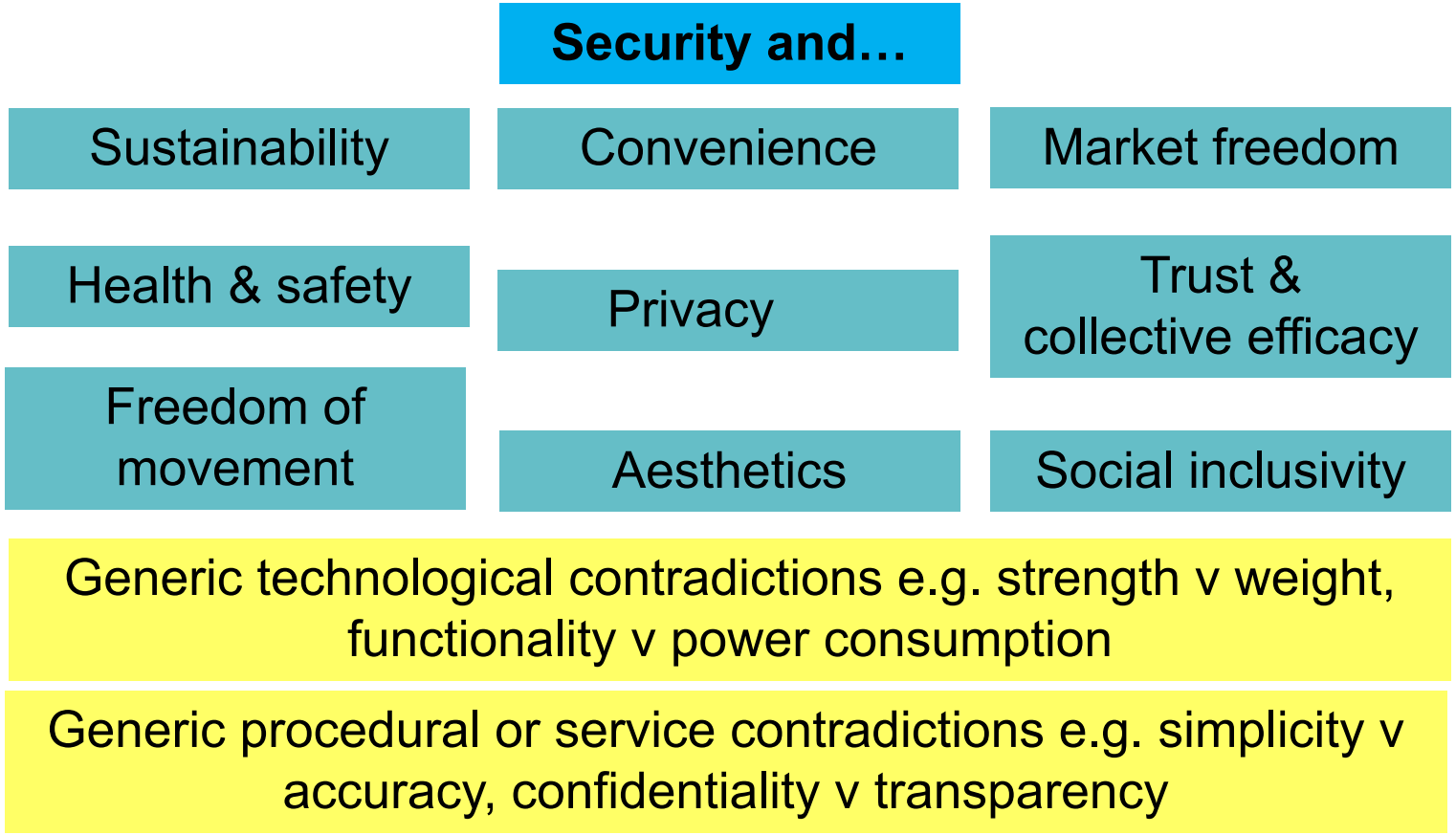
- We can identify **tactical 'script clashes'** between offenders and security

Wield force v resist (Damage v protect, Injure v keep intact)	Take v keep	Snoop v maintain privacy
Act at will v control misbehaviour	Confront v avoid	Pursue v escape
Conceal traces and tracks v detect	Surprise/ ambush v be alert	Trap v elude
	Challenge suspect v give plausible response	Conceal criminal intent v detect
	Surveill v conceal	

- These clashes
  - Influence **criminal plans and outcomes**
  - are **generic and perennial** – will always need to be faced
- Innovations elsewhere in society – e.g. the cordless electric drill, the camera on the smartphone – can **disrupt the balance** of these clashes, and favour one side over other
- We must design things to **advantage the good side**
- Approaches to **inventiveness** like TRIZ highlight these contradictions, and also identify **evolutionary trends in invention**

What are the broader challenges that innovation in urban security must address?

- Various broader **design contradictions** can hold back exploitation of current/future technologies by the security side (offenders are less constrained):



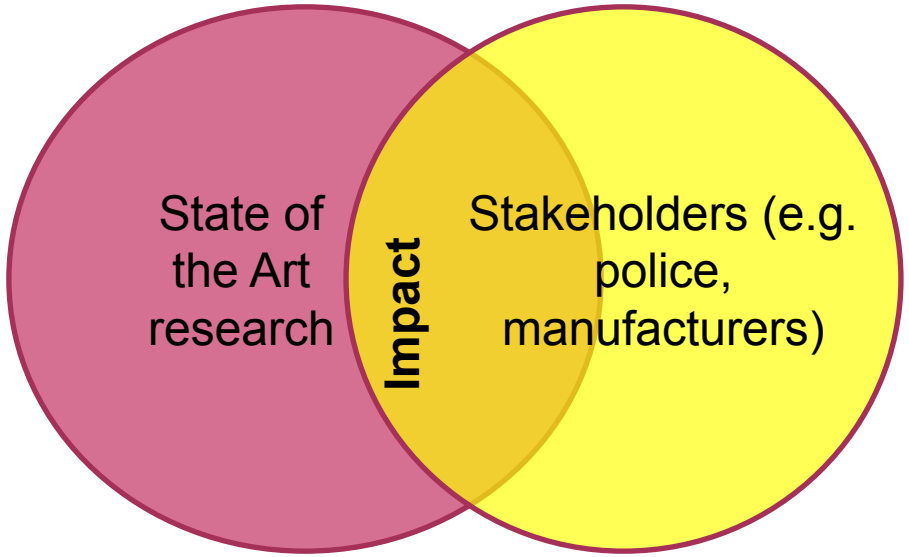
- Will innovations relax, bypass, or tighten these contradictions?
- Can we steer them in beneficial directions, or at least be ready with mitigations?

How can we support innovation in urban security by local governments and others?

- Given changing social/ technological context, adaptive offenders and co-evolutionary arms races, **the strategic requirement is for us to develop the capacity to out-innovate them and disseminate it**
  - Encouraging **variety** of solutions – **design freedom** and related approaches e.g. **performance standards**
  - **Plausibility** – using tested theory and practical knowledge to **generate** candidate innovations and boost the chance that they will work first time or with only minor adjustments
  - **Systematic approach to capturing knowledge**
    - **Modular** – enables elements of successful action to be **recombined** (e.g. a failed burglary project may have developed good methods of mobilising residents, which are **transferrable** to other projects)
    - **Process-oriented** – e.g. **5Is** (Intelligence, Intervention, Implementation, Involvement, Impact) – we can innovate under each of these crime prevention tasks
  - Making **resources** available for experiments, iterative improvements – difficult under austerity, but necessary
  - **More tolerant attitude to risk/failure** – organisational subculture, media strategy…
  - **Open innovation** (but beware aiding offenders)
  - **Involvement** of wide range of **stakeholders** including private sector, civil society organisations and researchers – **consulted** and indeed included in **co-design, co-development and co-production** of security
- **Anticipation** of new problems, constraints, possibilities or contexts – **horizon-scanning**, **crime-proofing** of designs of new products and places, **crime impact assessments** of new services…

Dawes Centre for Future Crime at UCL

- The Dawes Centre for Future Crime at UCL was set up following a £3.7M grant from the Dawes Trust (5yrs). It aims to:
  - Develop a global presence, fund and generate cutting-edge, application-focused research designed to meet the challenges of the changing nature of crime
  - Bring together experts across scientific domains *and* stakeholders to identify, understand and propose solutions to problems



Dawes Centre Projects

Phase 1: Scoping

10 projects (~2 per year)

Phase 2: Original research and teaching

10 Dawes Research Fellows
(6 months)

Dawes International Exchange

5 Dawes Impact Research Fellows
(12 months)

10 Dawes PhD studentships
Masters module in horizon scanning for crime/security

Phase 1 Projects

Developing technologies

Future crime opportunities arising from AI

Advanced materials to combat crime

Recent and future trends in counterfeit goods

Crime, place and the internet

Cryptocurrency & Fraud

?

?

?

?

UCL Jill Dando Institute of Crime Science

Phase 2 Projects

IoT and Crime

Bitcoin?

Bluetooth beacons to reduce DA?

?

?

?

?

?

?

?

UCL Jill Dando Institute of Crime Science

PhD Projects

- Crime, place and the internet ◄
- Biocrime ◄
- Cybercrime risks to London's future street infrastructure ◄
- The effects of cyberweapons ◄
- Detecting emerging crimes using data science techniques ◄
- Addressing Probable Child Sexual Abusers and Victim Profile Characteristics on Instagram ◄
- Identifying opportunities for crime prevention in smart cities and evaluating their social acceptability ◄
- Low energy X-ray backscatter imaging for non-destructive evidence harvesting ◄
- Guarding against Adversarial Perturbation in Automated Security Algorithms ◄
- Horizon scanning through computer-automated information prioritisation ◄
- Refugee flows and instability ◄

Example future trends of interest to crime/security – Dawes Centre

Applications

- Drones
- Autonomous vehicles
- Smart rail signalling systems
- Non-GPS navigation
- Blockchain
- Brainwave reading/ control
- Smart lighting
- Performance-enhancing prosthetics
- Instructional technology
- Script kiddies

Generic technologies

- Hyperconnectivity
- AI
- Robotics/ Nanobots
- Quantum computing
- SCADA
- 3D printing
- Mass customisation
- Portable, renewable power
- Wearable ICT
- Smart materials
- Stealth technologies
- Sensors, sensor fusion
- IoT
- Pharma
- Chemical synthesis
- GM/ CRISPR
- Advanced optics
- Hacking (both senses)

Background changes

- Climate change
  - Temperature
  - Sea level/ acidification
  - Water, food shortage
- Mass migration
- Antimicrobial resistance
- Commodity scarcities
- Commodity substitution e.g. Mo for Pt catalysts
- Circular economy
- Universal wage
- New finance/ banking models
- New working patterns
- New transport/ movement patterns
- Any concentration or dispersal of value, anywhere in the value chain