Optimising the Use of Radio Spectrum by the Public Sector in the European Union

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Optimising Spectrum Use by the Public Sector

- Introduction: The project
- Why seek to improve public sector use?
- Different segments, different needs and opportunities
- Emerging approaches
  - Technological improvements
  - Improved administrative controls (à la Netherlands)
  - Market-inspired mechanisms (à la UK)
- Recommendations
- Concluding remarks

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Optimising Spectrum Use by the Public Sector

- WIK led a study on optimising spectrum use by the Public Sector for the European Commission.
- Many thanks to my colleagues:
  - Phillipa Marks, Plum
  - John Burns, Aegis
  - Frédéric Pujol, IDATE
  - Prof. Martin Cave

Optimising Spectrum Use by the Public Sector

- Materials from two workshops appear at: http://www.wik.org/content_e/initial%20public%20workshop/public_workshop_main.htm and http://www.wik.org/content/eu-workshop_10_08/program.htm
- In parallel, the Commission asked the Radio Spectrum Policy Group (RSPG) to study largely the same issues.
  - Substantial synergies between these two efforts.
  - The RSPG Public Use of Spectrum (PUS) report is now publicly available.

Optimising Spectrum Use by the Public Sector

- Commercial use of spectrum has been progressively modernised and improved in recent years.
  - Increasing emphasis on market-based mechanisms
    - Spectrum auctions
    - Spectrum leasing and trading
  - New technological options
    - Migration to digital
    - New possibilities for spectrum sharing (collective use)
- How much of this could be, or should be, applicable to the public sector?

Optimizing Spectrum Use by the Public Sector

- Public sector spectrum has usually been administratively assigned to date.
- Numerous constraints:
  - Important for the safety of life and property.
  - Harmful interference could be very detrimental.
  - International coordination often required.
  - Militarily sensitive information.
- Spectrum allocations to public agencies are often:
  - Unlimited in duration
  - Costless

Optimizing Spectrum Use by the Public Sector: Concerns that are increasingly raised

- Spectrum assignments may not be adequately tracked or recorded.
  - Public agencies do not always know what spectrum they are using.
  - Public agencies may not realise the value of the spectrum that they are using (leads to inefficient use).
- Public agencies have little incentive to return spectrum that is no longer (strongly) needed.
- Public agencies will tend to make poor procurement decisions because of misleading economic “signals”.

Optimizing Spectrum Use by the Public Sector

- Public sector use typically represents 30%-50% of all spectrum use, including in the valuable ranges below 6 GHz.
- This is a valuable resource!
- Increasing the efficiency of use could lead to:
  - Better service delivery in the public sector.
  - More spectrum available for private sector use.
- Any changes will require time and great care.
  - Criticality of applications in the public sector.
  - Long procurement cycles for many applications.

Different segments, needs and opportunities

- Defence
  - *Regional* frequency management (e.g. NATO, former Warsaw Pact) coexists with *national* frequency management.
  - Reflects possible need to interoperate regionally.
  - Voice and data communications and radars predominate.
- Emergency services
  - Small in spectrum used, large in importance
  - Substantial need for cross-border interoperability
    - Natural disasters such as tsunamis.
    - Terrorist incidents.
    - Normal day-to-day operations.
- Transport (aeronautical and maritime)
  - Requirements for global interoperability drive global management.
  - Radars, navigation, communication.
  - Spectrum sharing with defence is often workable.

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Optimising Spectrum Use

- Technological opportunities
  - Migration to digital technology (Digital Dividend).
  - Improved radar efficiency.
  - Spectrum sharing
    - Automated and/or dynamic “assignment” of spectrum
    - Cognitive radio (CR), software-defined radio (SDR)
    - Coordinated LAN use for emergency services
- Improved management and coordination
  - Spectrum audits (e.g. the UK, Netherlands, US)
  - Administrative justification (Netherlands)
  - Market-based mechanisms (UK)

Netherlands

- Ministry of Economic Affairs published their Radio Spectrum Policy Memorandum in 2005.
  - The frequencies should not be more than is needed for the exercise of the tasks.
  - The assignments to public interest tasks should be based on a needs justification plan (as public interest use often denies use to others).
  - Where spectrum reserved for public interest tasks is not in use all the time, third party access should be permitted where practically possible.
- Agencies submit justifications to the Ministry every three years.
- Assessed on the basis of the “effectiveness and efficiency of frequency use”.

The Netherlands

- First audit is complete.
  - Detailed information from the Ministry of Defence.
  - High level information from other agencies.
- Perceived benefits:
  - Government agencies are now aware that they use spectrum, and that spectrum is a scarce resource.
  - Agencies see benefit in developing plans for their future use, so that they can secure future spectrum access.
  - Benefits the national Radiocommunications Agency in international discussions.
  - Some frequencies (PMR) have been given back by the MoD.
  - Some sharing opportunities have been identified.

The UK

- The Cave Report (2005), an audit for the UK Treasury, established key economic and management principles:
  - New spectrum requirements of the public sector should be realised through the market.
  - Spectrum pricing should be introduced for (almost) all existing holdings.
  - Surplus public sector spectrum should be available for sale, lease or sharing.
  - The Government's UKSSC (Spectrum Strategy Committee) should produce a 'forward look' of public sector spectrum use every two years.
  - A demand forecast for all spectrum should be undertaken regularly.
  - More resources should be devoted to collecting information and managing public sector spectrum holdings.

The UK

- UK government has accepted the recommendations of the Cave Report.
- The first “forward look” was published in 2007.
- Extended pricing to most existing holdings.
- Established a legal instrument to trade public sector spectrum (recognised spectrum access – RSA).
- Committed to publishing more information on public sector spectrum to facilitate trade.
- Ofcom published an overall plan in 2008.
- The UK Ministry of Defence published a comprehensive consultation on their spectrum use in 2008.

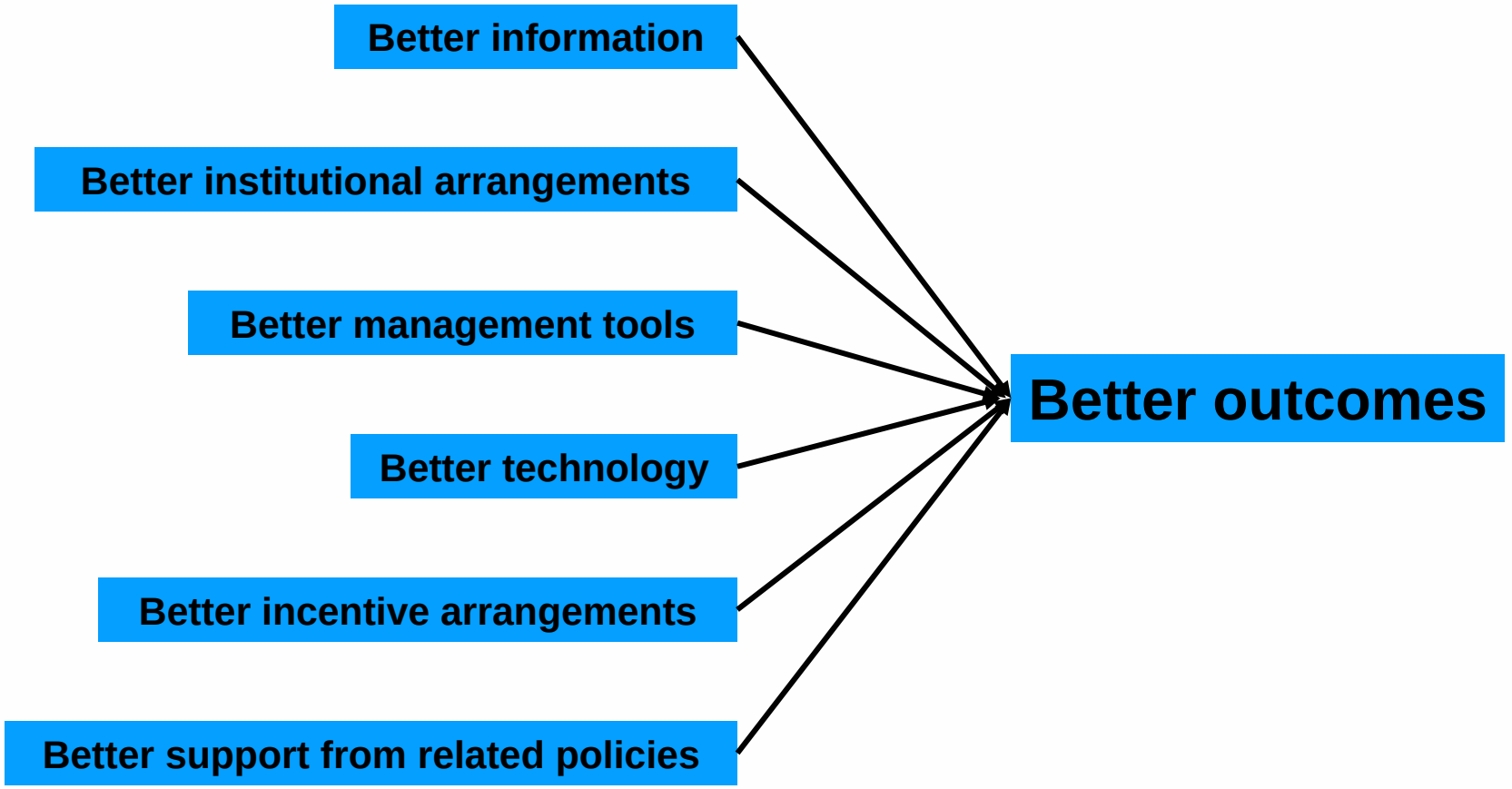
Sweden

- One process for armed forces.
  - Armed forces and the regulator develop a plan showing all the frequencies available to the armed forces on an exclusive or on a shared basis.
  - The regulator could “loan” frequencies to the private sector, on a short term or long term basis, subject to consultation with the armed forces.
- A different process for most other public agencies. Most public agencies pay licence fees based on the number of transmitters in use, just like private sector users.
- In an October 2007 report, the National Post and Telecom Agency (PTS) evaluated usage by the armed forces and found that in many cases it was not efficient. They intend to study ways to try to improve efficiency, including market mechanisms.

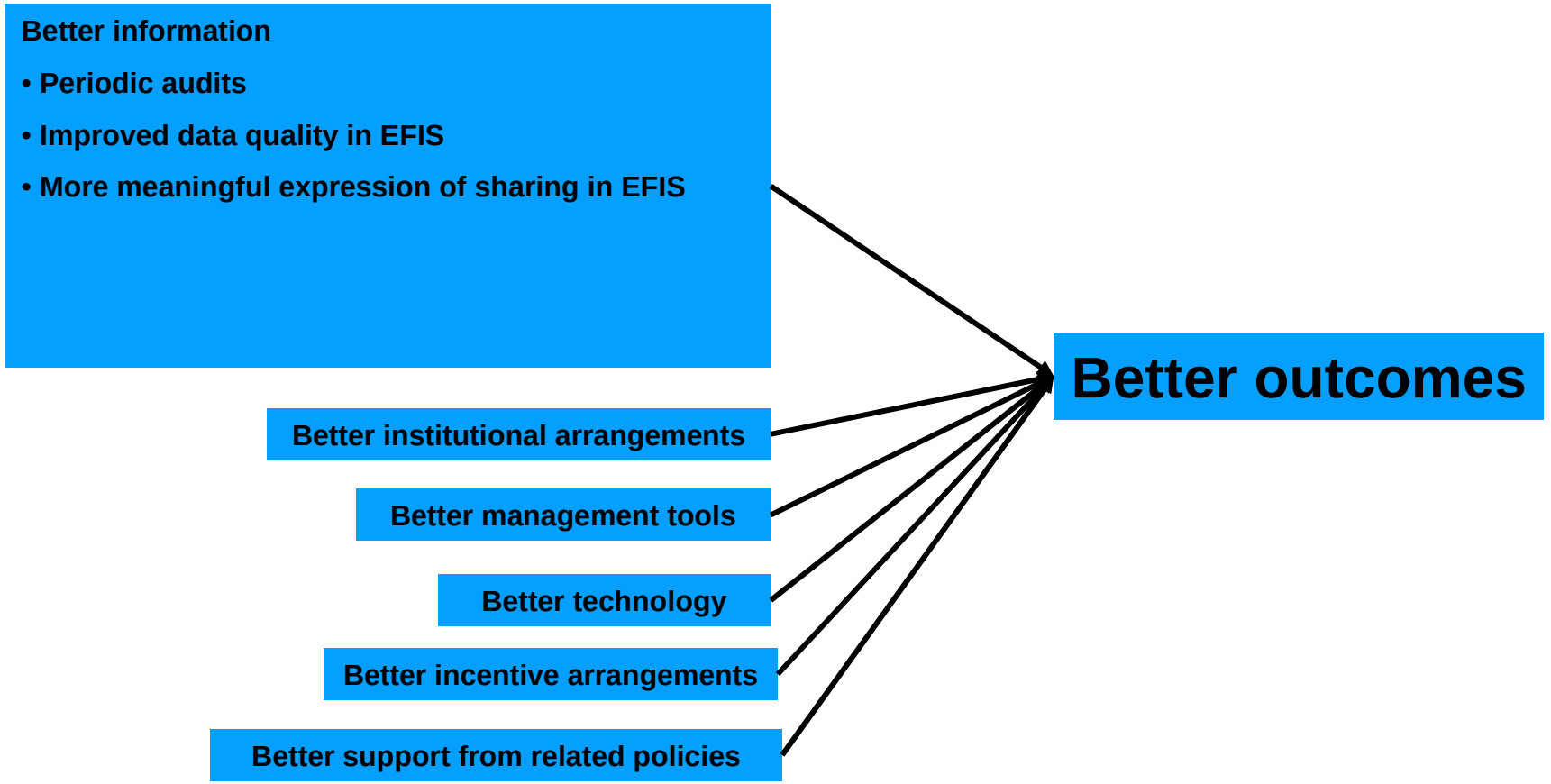
United States

- The NTIA manages spectrum used by the US government; the FCC manages all other spectrum use.
- NTIA just completed a comprehensive audit of spectrum use.
  - Extensive information about current spectrum use.
  - Only limited, high level information about future needs.
- The report expresses interest in automated planning tools, technological improvements, dynamic sharing, and the possible use in the longer term of market mechanisms.
- The report does not establish a clear strategic direction for improved spectrum efficiency on the part of the US government.

Recommendations



Recommendations

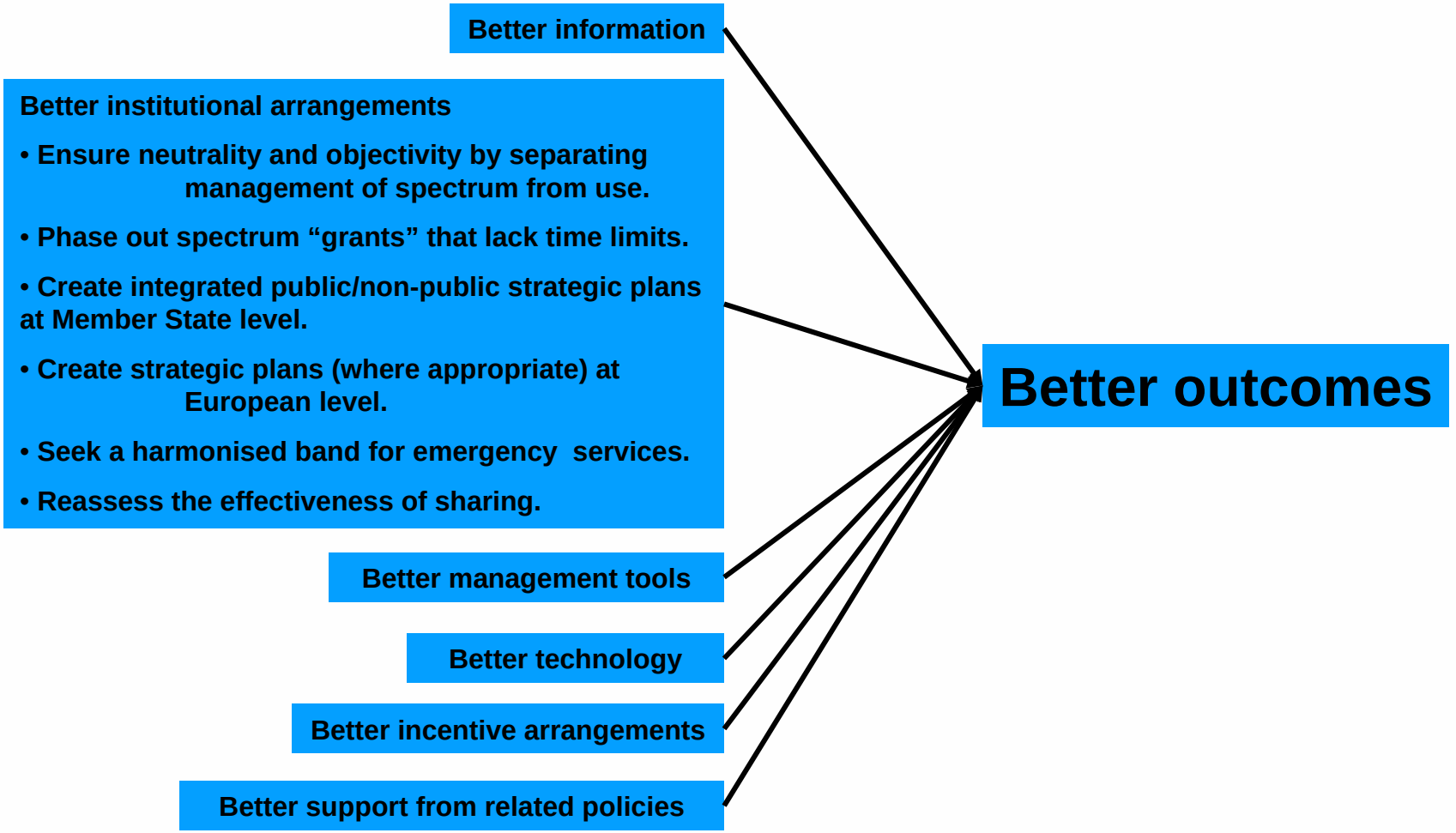


Better information

- **Member States**: Conduct periodic surveys of current spectrum use and evaluate future needs of the public sector.

- **RSPG and/or ERO**: Develop guidelines
  - to enhance the consistency of data in EFIS.
  - to more meaningfully express shared used in EFIS.

Recommendations



Better institutional arrangements

- **Member States**: Ensure appropriate institutional design to enable
  - integrated planning of public and non-public sector use.
  - impartial and objective decisions between public versus non-public use of specific spectrum bands

- **Spectrum Management Authorities**: Where feasible, phase out spectrum “grants” that do not have time limits.

Better institutional arrangements: Planning

- **Member States**: Develop long term integrated strategic plans for public sector and non-public sector spectrum allocations.

- **European Commission, supported as appropriate by RSPG, RSC, and/or CEPT**: Develop long term strategic plans for harmonised public sector allocations at European level. Justify with a rigorous impact assessment.

Better institutional arrangements: Planning

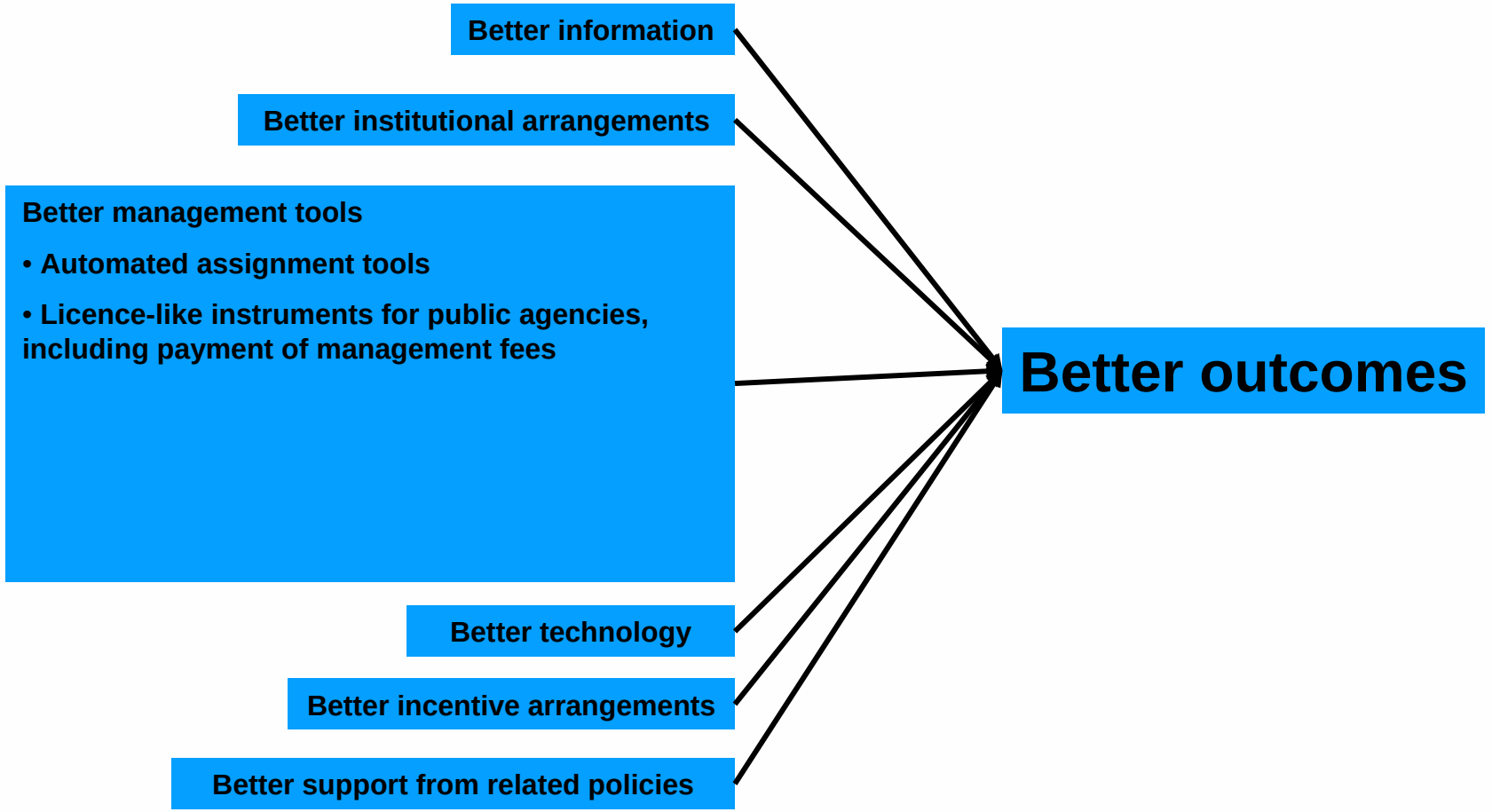
- **European Commission, supported as appropriate by RSPG, RSC, and/or CEPT**: Whenever larger blocks of spectrum become available (as is the case with the Digital Dividend), consider whether any proposals for harmonised bands for public sector use are warranted (i.e. perform an impact assessment).

Better institutional arrangements: Specific measures

- **European Commission, supported as appropriate by RSC and/or CEPT**: Determine where and how to implement a harmonised band or set of bands for mobile broadband use by emergency services.

- **Member States, including Spectrum Management Authorities**: Assess the effectiveness of existing arrangements for sharing public sector allocations (with public and non-public sector users). Consider preemptible use.

Recommendations



Better management tools

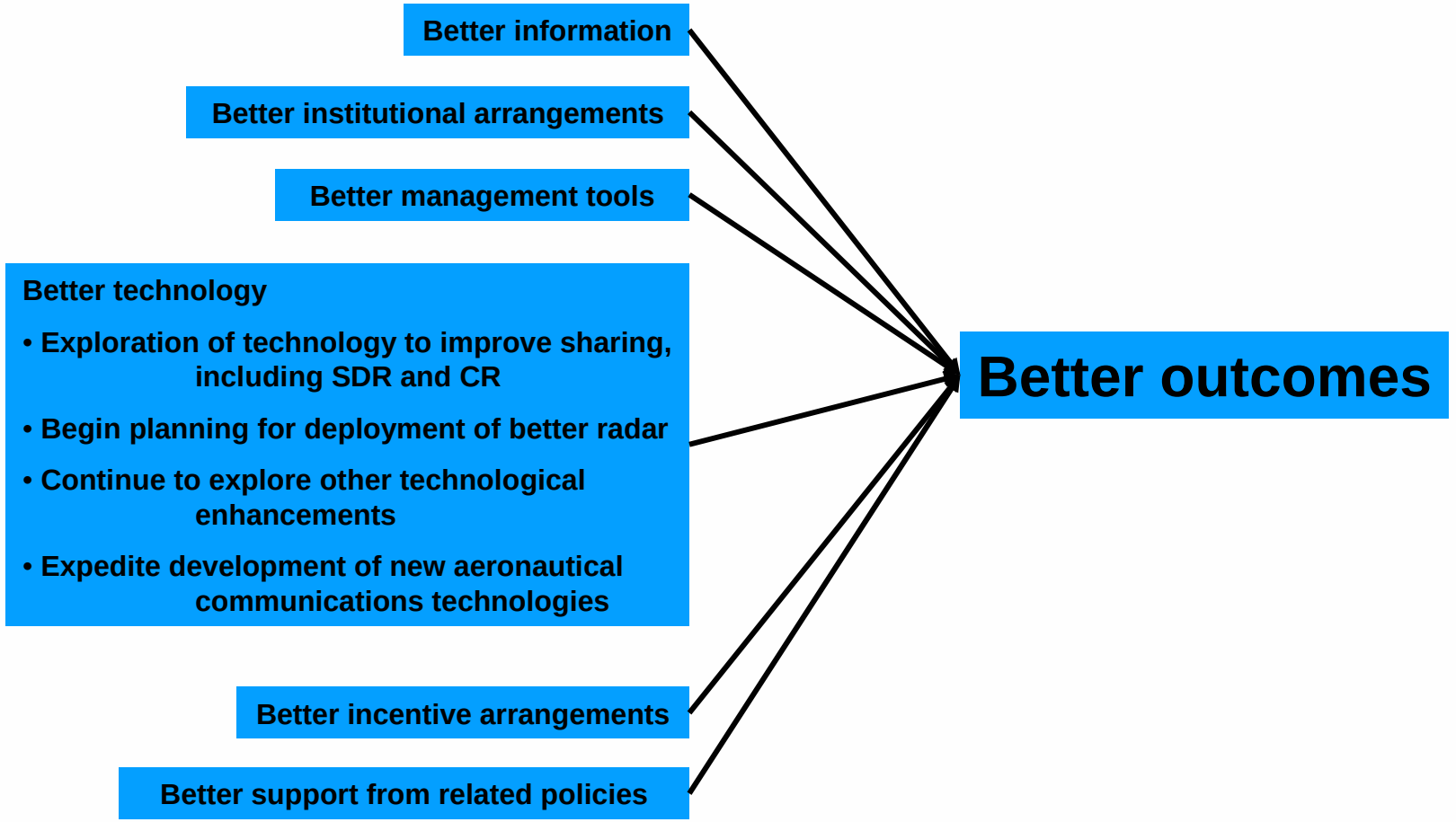
- **Member States**: Ensure that public sector agencies know what spectrum they are using and that assignments are recorded in centralised databases. Consider developing mechanisms (if they do not already exist) for “licensing” public sector use.

Better management tools

- **Commission and Member States**: Ongoing exploration of technological options (including assignment tools) to improve efficiency of public sector use.

- **Member States and other public sector entities (e.g. in the transport sector)**: The automated assignment tools in use in the aeronautical sector (SAFIRE) reflect a best practice; however, the applicability to other sectors is unclear.

Recommendations

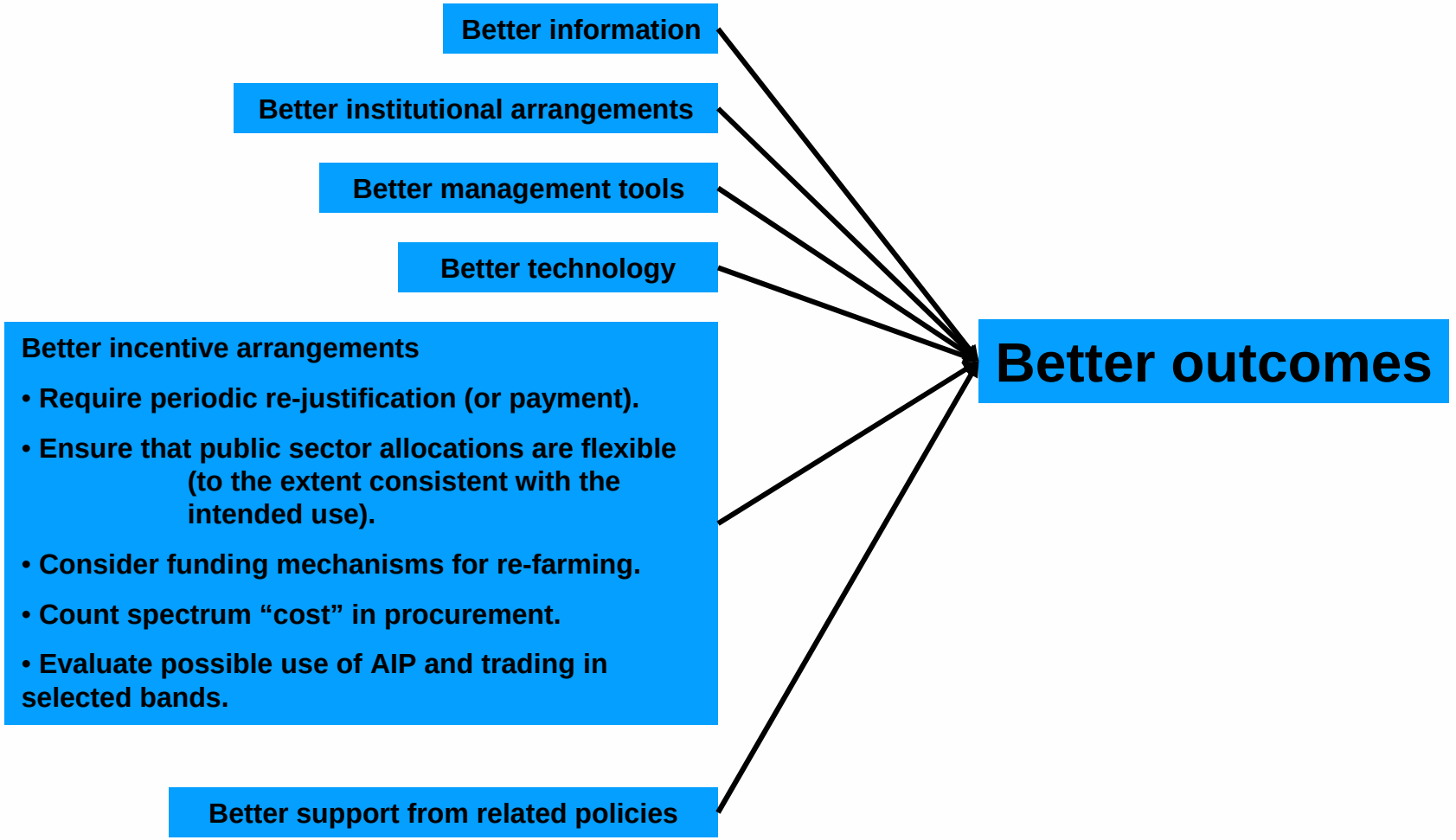


Better technology

- **Commission and Member States**: Ongoing exploration (entailing both technical and policy aspects) of automated and/or dynamic means such as SDR and CR to enhance sharing of spectrum allocated to the public sector.

- **Commission, Member States, and other public sector entities (e.g. in the transport sector)**: Begin coordinated planning for deployment of more spectrum efficient primary radar systems

Recommendations



Better incentive arrangements

- **Spectrum Management Authorities**: Evaluate allocations to the public sector to permit as much flexibility of use as is possible.

- **Member States**: Ensure that public sector users are
  - subject to a requirement for periodic rejustification of their allocations every few years, or
  - face the opportunity cost of spectrum e.g. through participation in an effective secondary market arrangement.

Better incentive arrangements

- **Member States**: Consider funding mechanisms for accelerating re-farming of bands allocated to the public sector when appropriate.

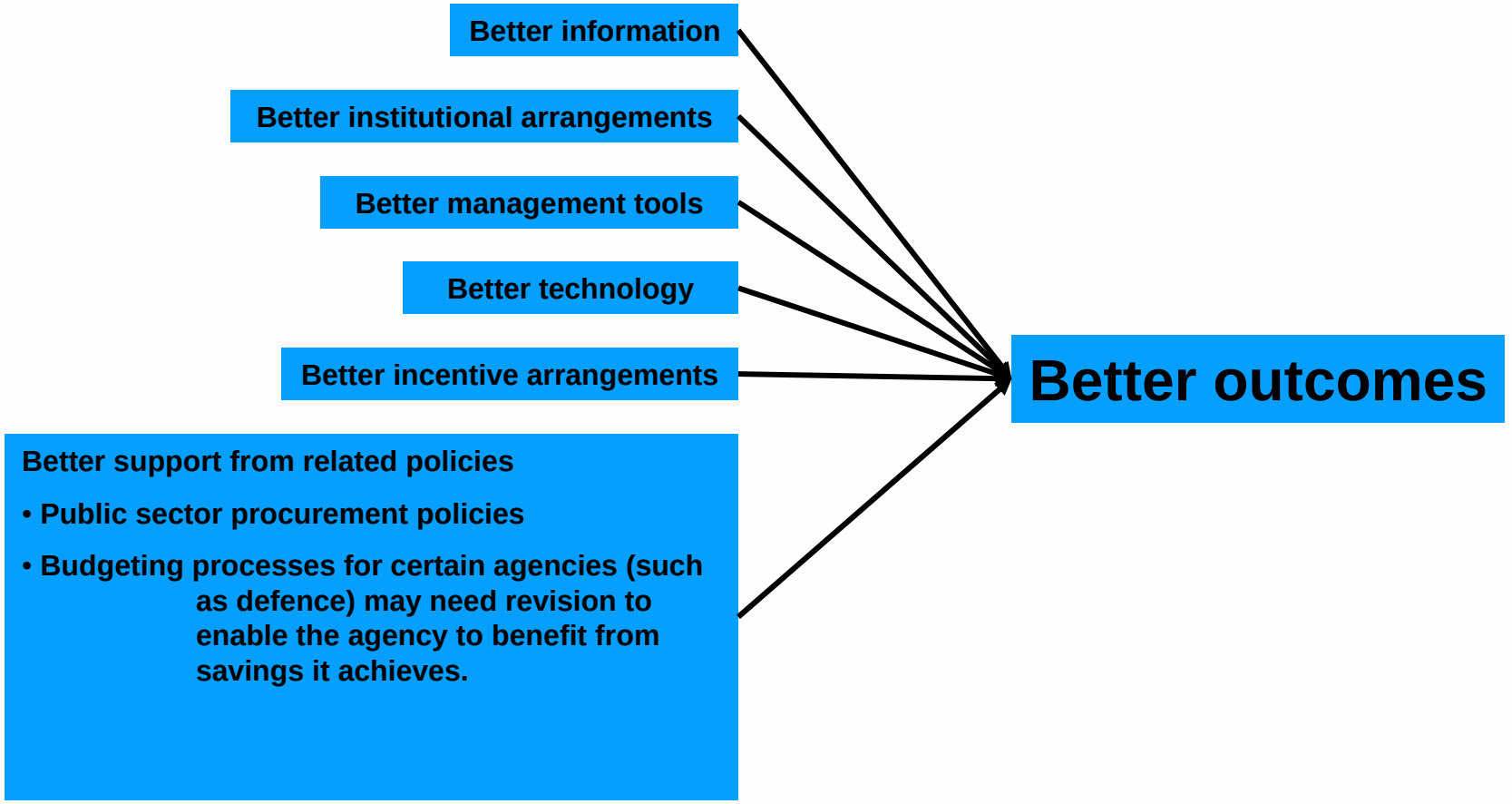
Better incentive arrangements

- **Member States**: Evaluate the potential additional benefits of the use of market-based mechanisms in selected bands (as a complement to administrative justification in other bands) to enhance the prospects for economically efficient use of spectrum. If market-based mechanisms are implemented in selected bands, ensure that the necessary prerequisites are in place, including:
  - establishing suitable means for determining prices (AIP) where appropriate;
  - putting in place arrangements that enable the public sector agencies to benefit from the economies achieved;
  - giving public agencies ability to participate in a secondary market for spectrum; and
  - providing enough flexibility in assignments to the public sector to make the market arrangements effective.

Better incentive arrangements

- Market-based mechanisms are very promising. They are likely to lead to greater socio-economic efficiency than administrative means alone.
  - Nonetheless, experience to date is limited, so costs and benefits are still uncertain.
  - Smaller Member States might find the administrative complexity daunting, at least initially.
- We see merit in expanding the cautious, selective implementation of market-based mechanisms.
- We hesitate to recommend overall adoption of market-based mechanisms today, but widespread adoption might be appropriate at some future date.

Recommendations



Better support from related policies

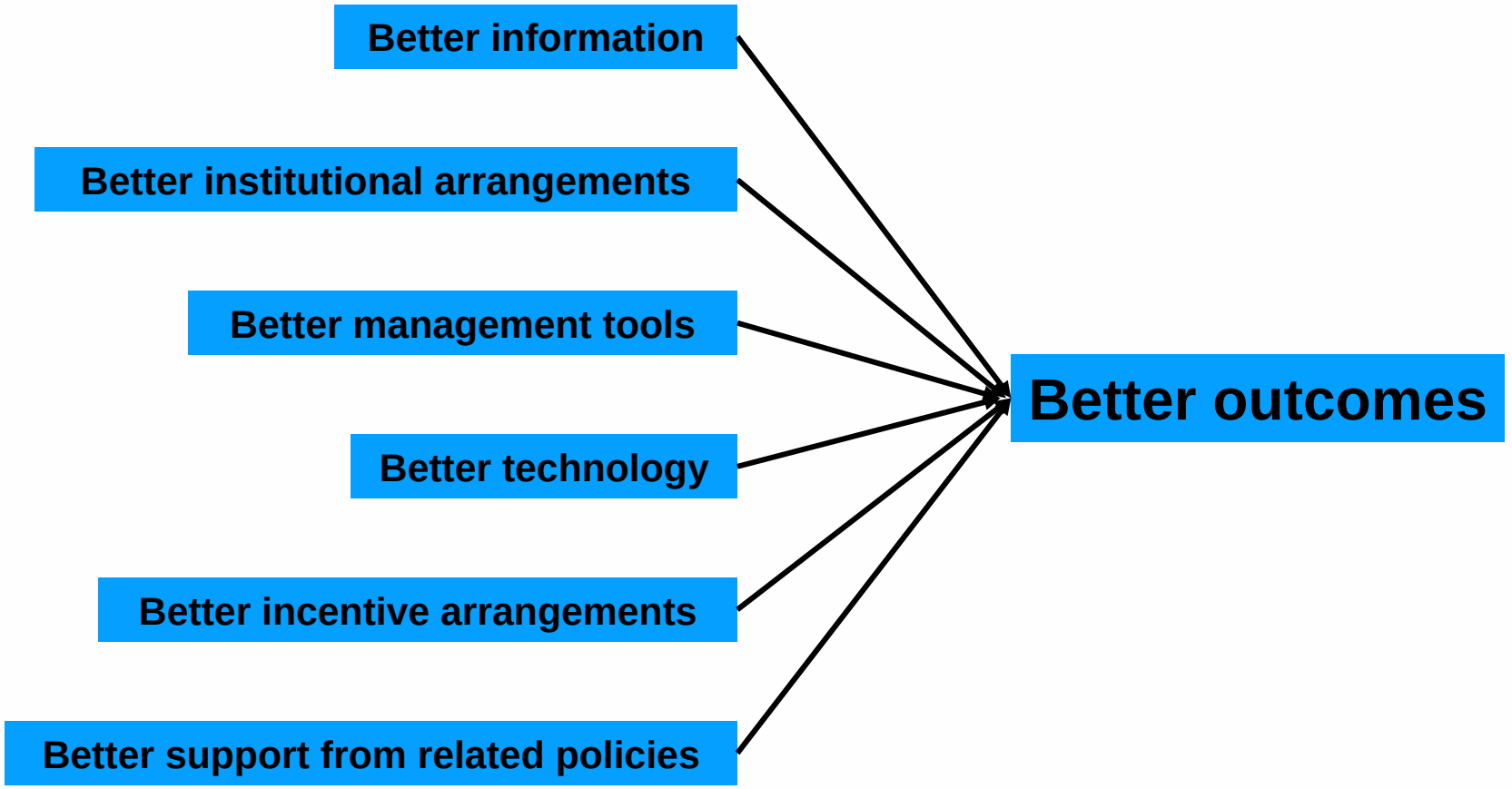
- **Member States**: Ensure that equipment procurement assessment in the public sector includes the opportunity cost of spectrum required.

- **Member States**: If market mechanisms are applied, revise budgeting processes to enable the public sector agency to benefit from the savings that it achieves.

Recommendations

- Things to do now include:
  - Implement audits.
  - Clarify rights of public sector spectrum holders.
  - Require periodic re-justification (wherever applicable).
  - Ensure that public sector allocations are as flexible as can be.
  - Consider the relevance of market-inspired mechanisms.
- Additional things to phase in if you choose to implement market-inspired mechanisms:
  - Implement budget processes that enable agencies to benefit from savings that they achieve.
  - Establish methodologies for determining an AIP.
  - Permit public agencies to participate in secondary markets.

Recommendations



Concluding Remarks

- A rigorous audit of spectrum use by the public sector is a key prerequisite to any improvements.
- Periodic re-justification seems to be appropriate for widespread use, and in many public sector bands.
- We do not see a fundamental conflict between the administrative (Netherlands) and market-inspired (UK) approaches.
  - Countries that seek to implement market-inspired mechanisms will need to improve administrative controls first anyway.
  - Market mechanisms are unlikely to apply to all countries, nor to all bands.
- For now, a one size fits all approach would appear to be premature. There is no “silver bullet”.

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