

Integrated ICTs for Water Basins Management in Southern Africa: Systematic Review and Meta-analyses for Perceived Relevance Criteria

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Plan

- Introduction
- Methodology
- Results and discussions
- Conclusion

Introduction

Introduction.

Characteristics of water resources in Southern Africa:

- >90% are trans-boundary.
- Challenged by:
 - i. Inadequate participation of stakeholders.*
 - ii. Poor coordination of decision and policy processes.*
 - iii. Inadequate control including enforcement of the laws, rules and regulations.*

Introduction..

- Technological tools to solve some of these challenges have been embraced.
- ICTs are among them. Examples:
 - i. The use of radio networked with remote sensors; possibility of combining robots with sensors and other software platforms;*
 - ii. The Internet web-portals and mobile phones; or*
 - iii. The internet web-portals, remote sensors and the higher end mobile phones.*

Introduction..

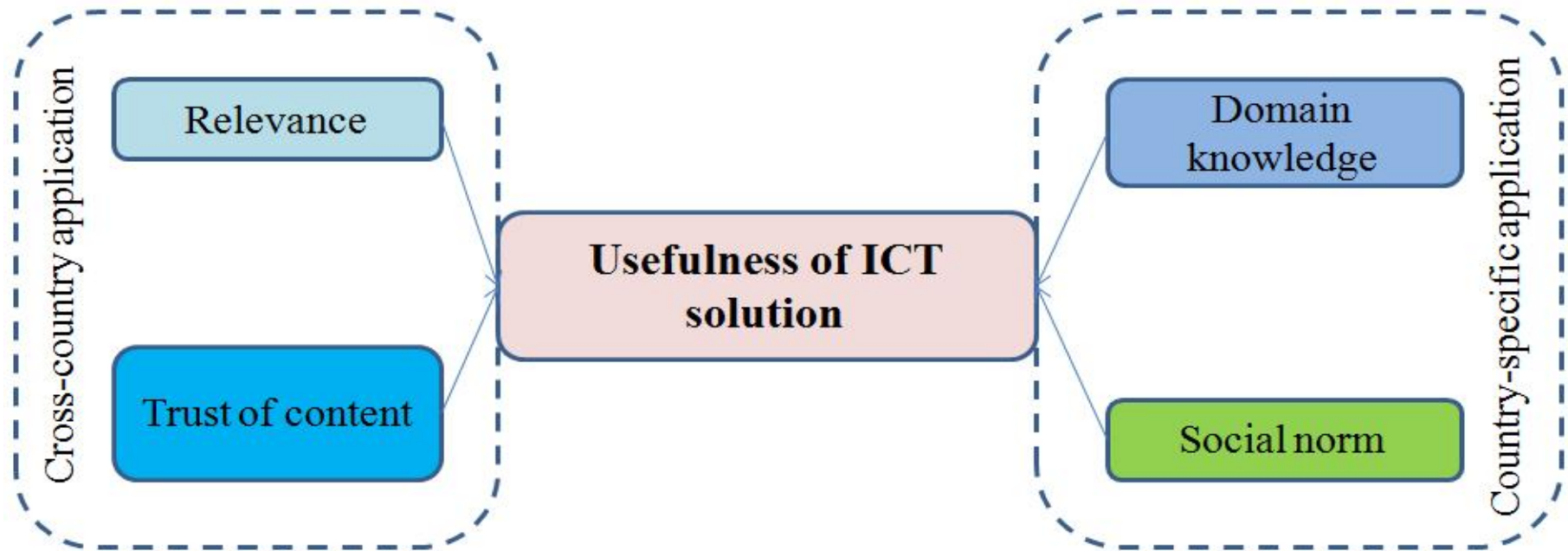
- They specific solutions to water basins including:
 - i. Data collection,*
 - ii. Information creation through processed data,*
 - iii. Information dissemination,*
 - iv. Knowledge creation, and*
 - v. Knowledge transformation into impactful actions*

Introduction..

- However, there is generally underperformance of ICT-related interventions in Africa, including Southern Africa. The reasons often mentioned are:
 - i. Inadequate involvement of users and thereby not incorporating their needs during design and implementation*
 - ii. Interventions that are donor dependent and thereby lacking sustainability*
 - iii. Inadequate support from management teams where such interventions are implemented*

Introduction..

- Further studies on TAM revealed that PU was more important than PeoU in determining the users acceptance of a Technology.
- Factors considered in the study were for comparison of within and between nations



Introduction..

- Again, in this study relevance appeared important in determining acceptance of a technology across nations.
- This paper identifies the trend and aggregation nature of relevance criteria that have been developed and used in ICT interventions for water basins of Southern Africa

Methodology

Methodology..

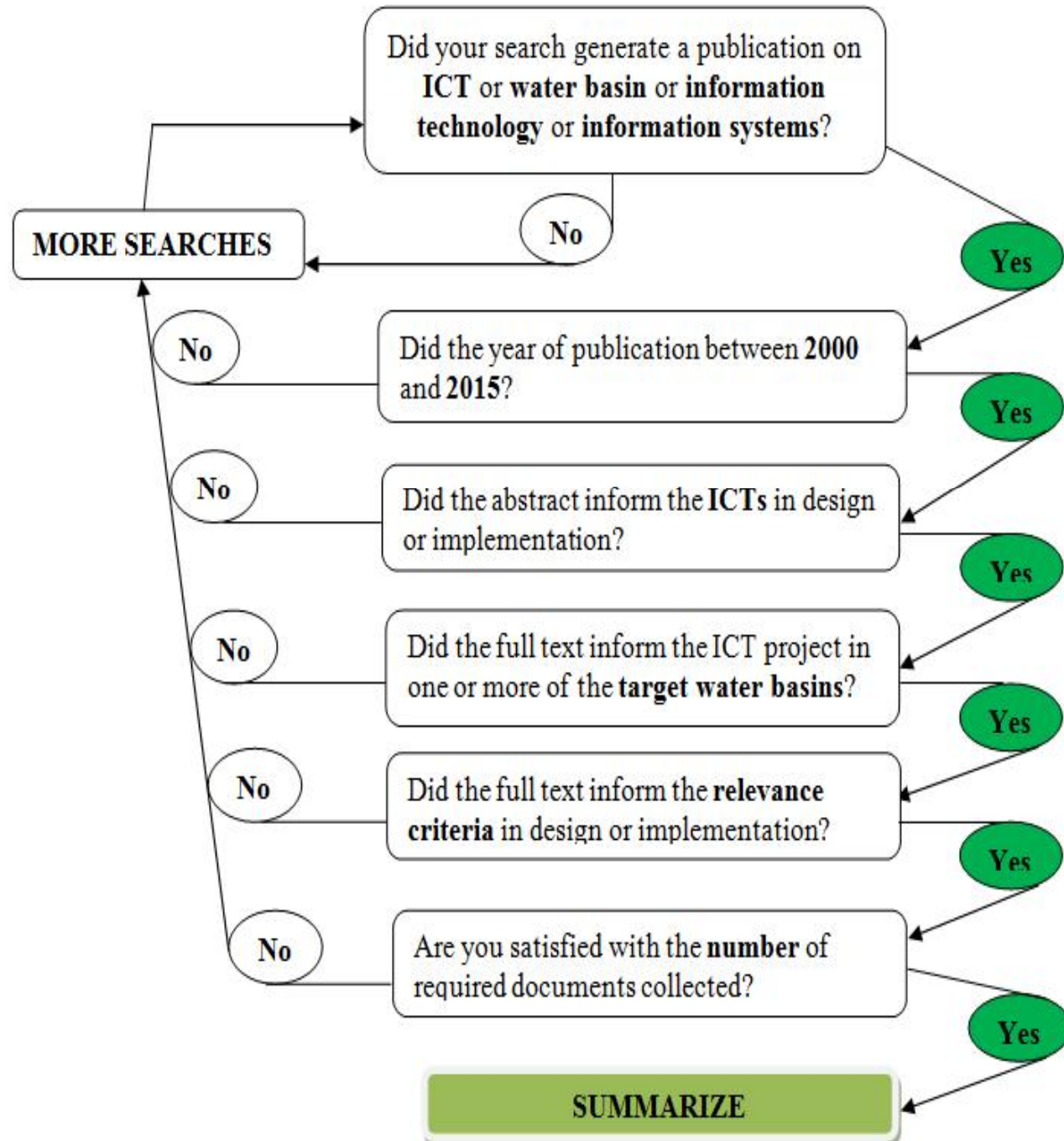
The study area (Five water basins of Southern Africa):



Source: SADC website

Methodology...

- The paper adopts systematic reviews and meta-analysis approaches to data collection and analysis
- The data collection flow chart was a search strategy designed for literature from 2000 and 2015



Methodology...

- Technology Acceptance Model (TAM) provides a framework for understanding how users get to accept a technology.

Attribute of relevance	Explanation	Examples
Tool	ICT tool developed to support water basin management activities	Web-based tools, tools based on mobile devices, tools combined with radio etc
Activity	Water basin management activity supported by the tool	Data collection, data processing, data storage, information dissemination etc
Results	Immediate, intermediate and long term effects on water basin management	Enhanced information sharing, Reduced conflicts on water allocation, eco-equity sustainability

Methodology...

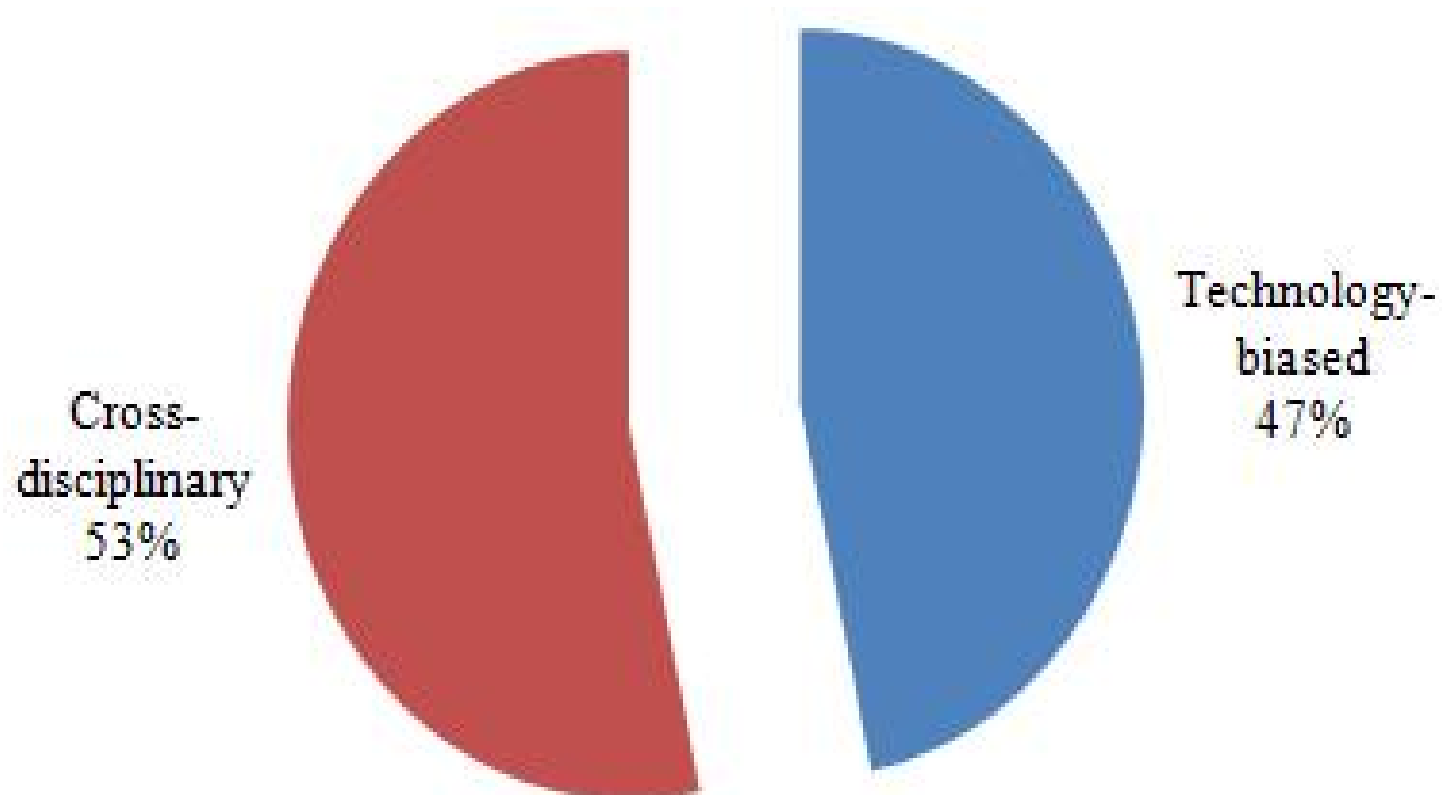
Classification of literature reviewed was done in four different classes:

- i. By domain - technology-based domain (ICT/IS/IT) and cross-disciplinary domain.
- ii. By three waves each with different socio-technical characteristics.
- iii. By basin - with cross-basin and specific basin based literature.
- iv. By sources, focusing on either mainstream IS journals/books or other sources.

Results and discussions

Results and discussions...

Classification of literature reviewed by domain



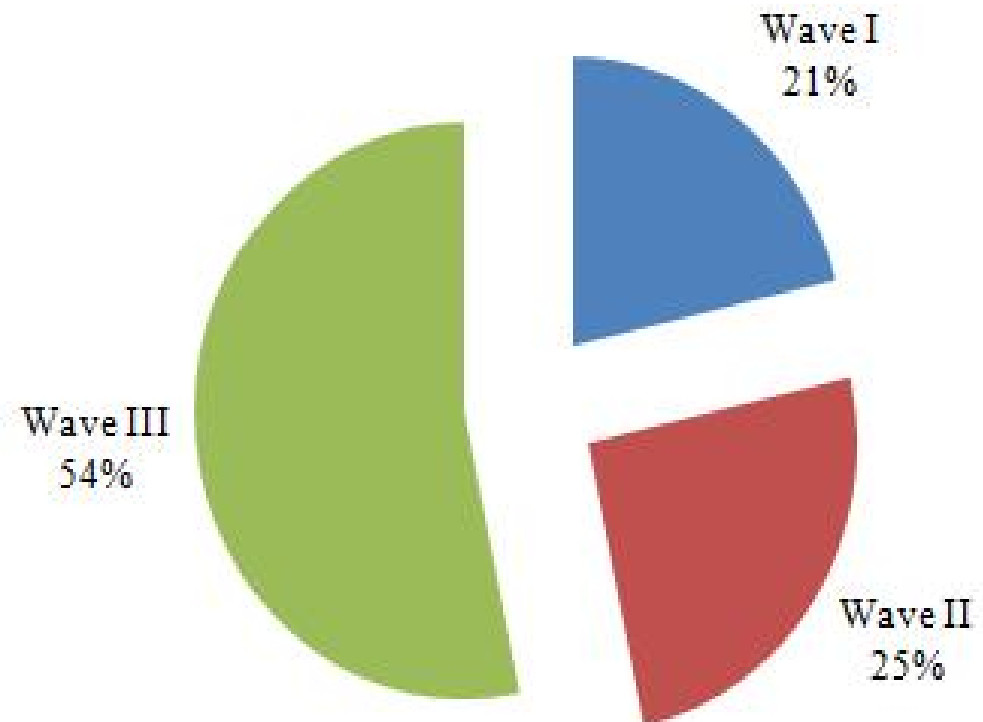
Results and discussions...

Classification of literature reviewed by waves

The first wave from 2000/01 to 2004/05 was characterized by establishment or strengthening formal organizations to address challenges of shared water resources in the region.

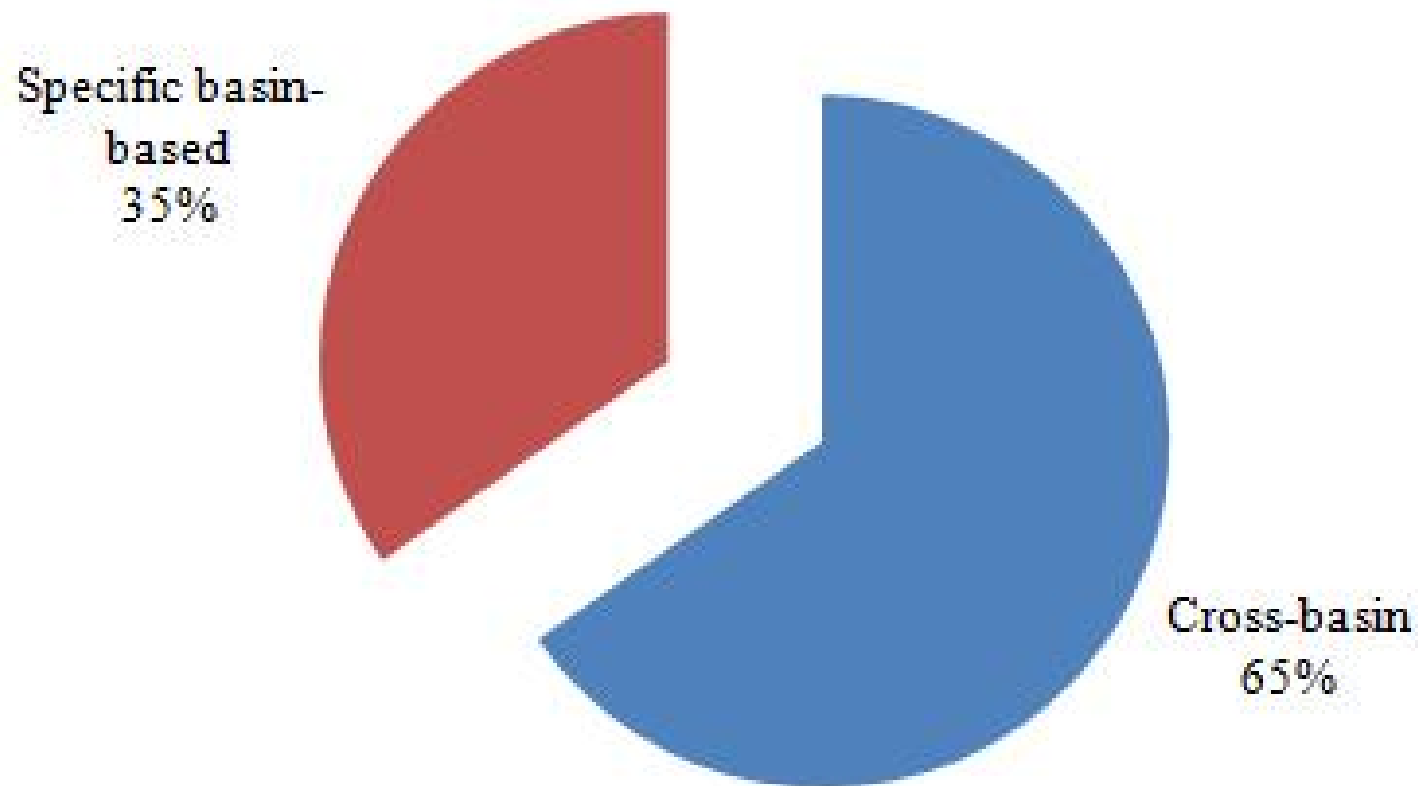
The second wave from 2004/05 to 2009/10 was characterized by increasing **computational power**, booming **mobile hardware** and **networks** as well as emphasis towards more participatory ICT tools design and development.

The third wave from 2010/11 to 2014/15 was characterized by even more advanced and accessible **computing power**, mobile hardware and networks.



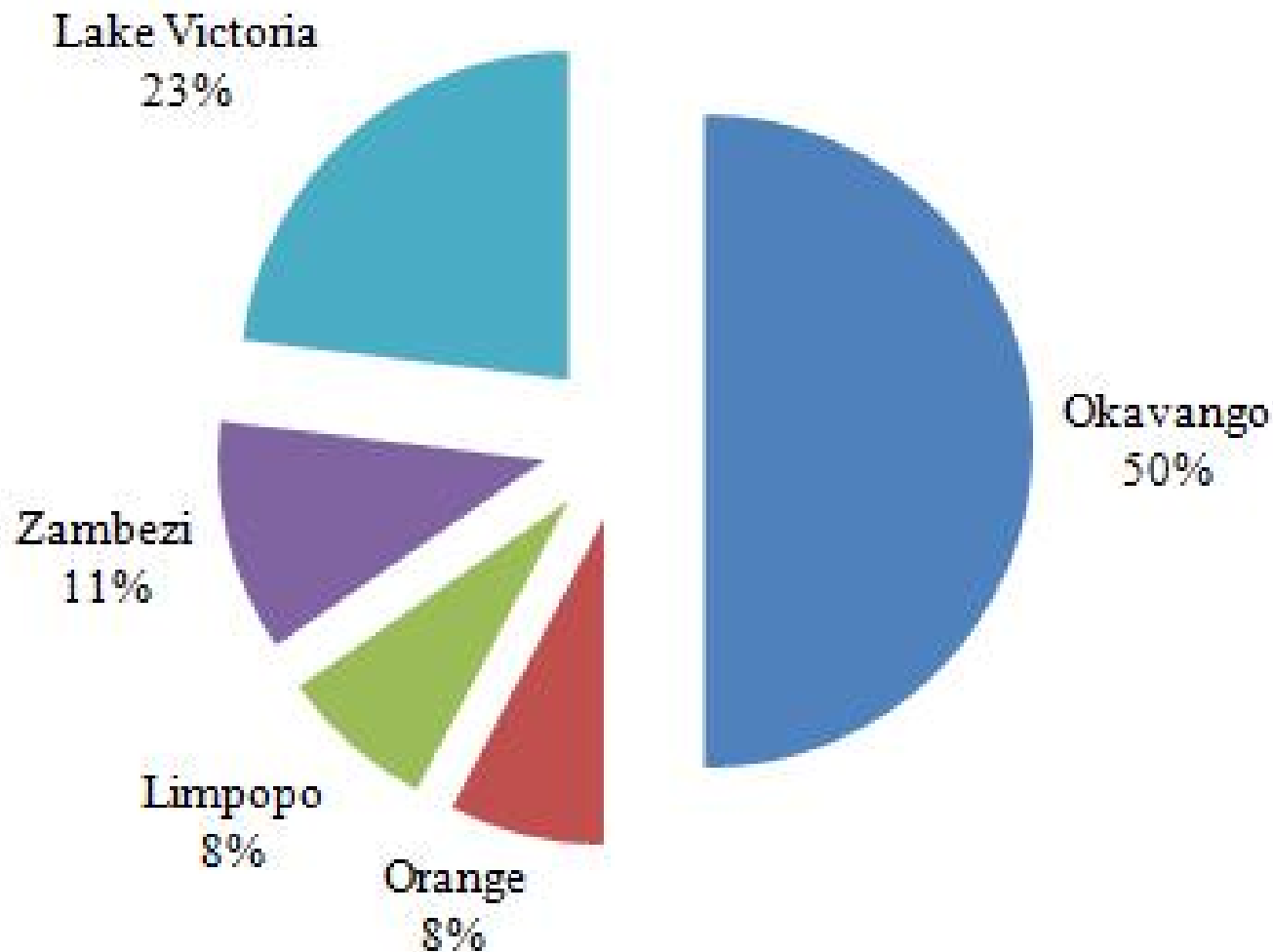
Results and discussions...

Classification of literature reviewed by basin



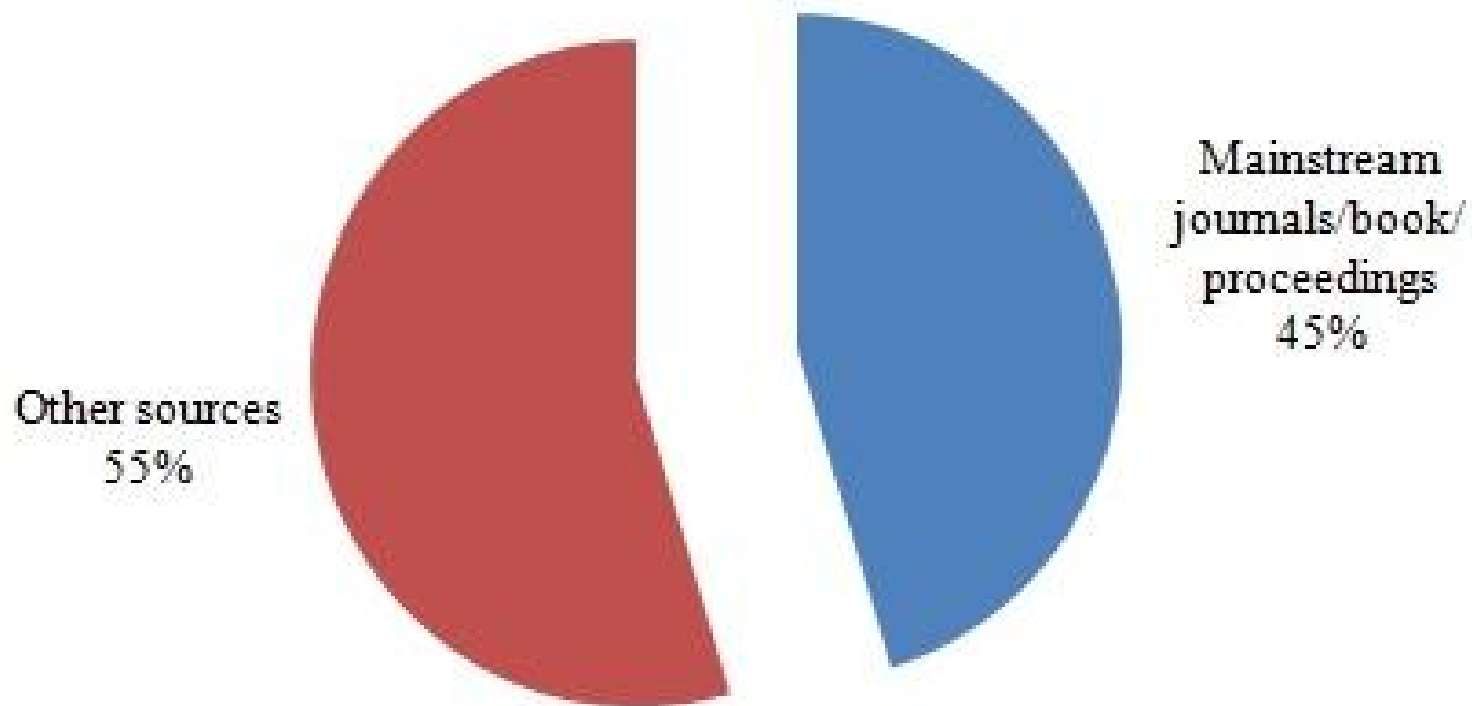
Results and discussions...

Classification of literature reviewed by specific basin



Results and discussions...

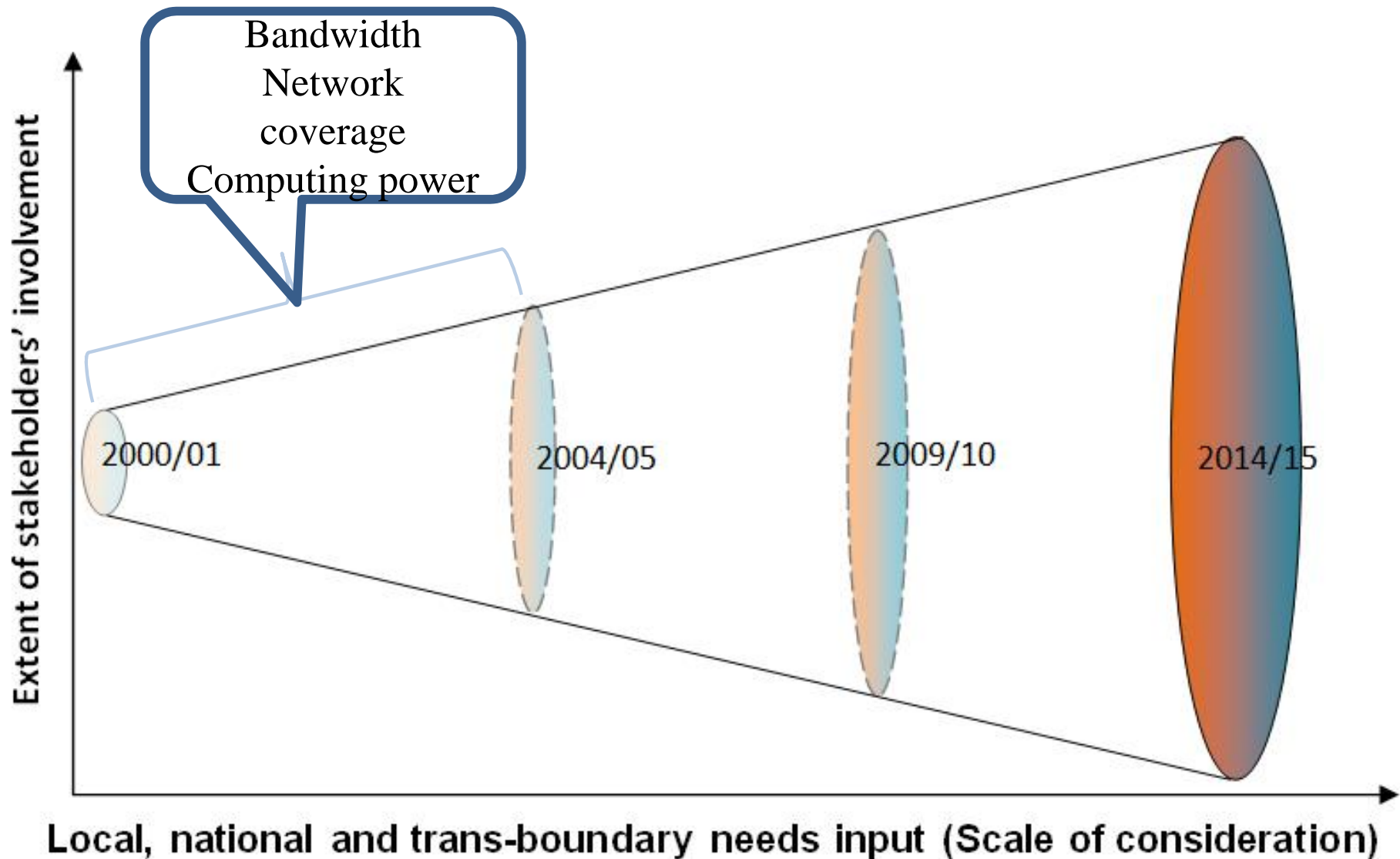
Classification of literature reviewed by sources



Results and discussions...

- Relevance of ICT for water resources management across the waves was determined by both social and technical criteria.
- During wave I, ICT solutions in the study area were predominantly desktop. Web-based solutions were limited by bandwidth and network coverage.
- Cost effectiveness was a therefore a major criterion. Karim (2003) argue that accessibility to information during this time was constrained by escalating costs, where access to web-based information was limited to elites and above average earners.

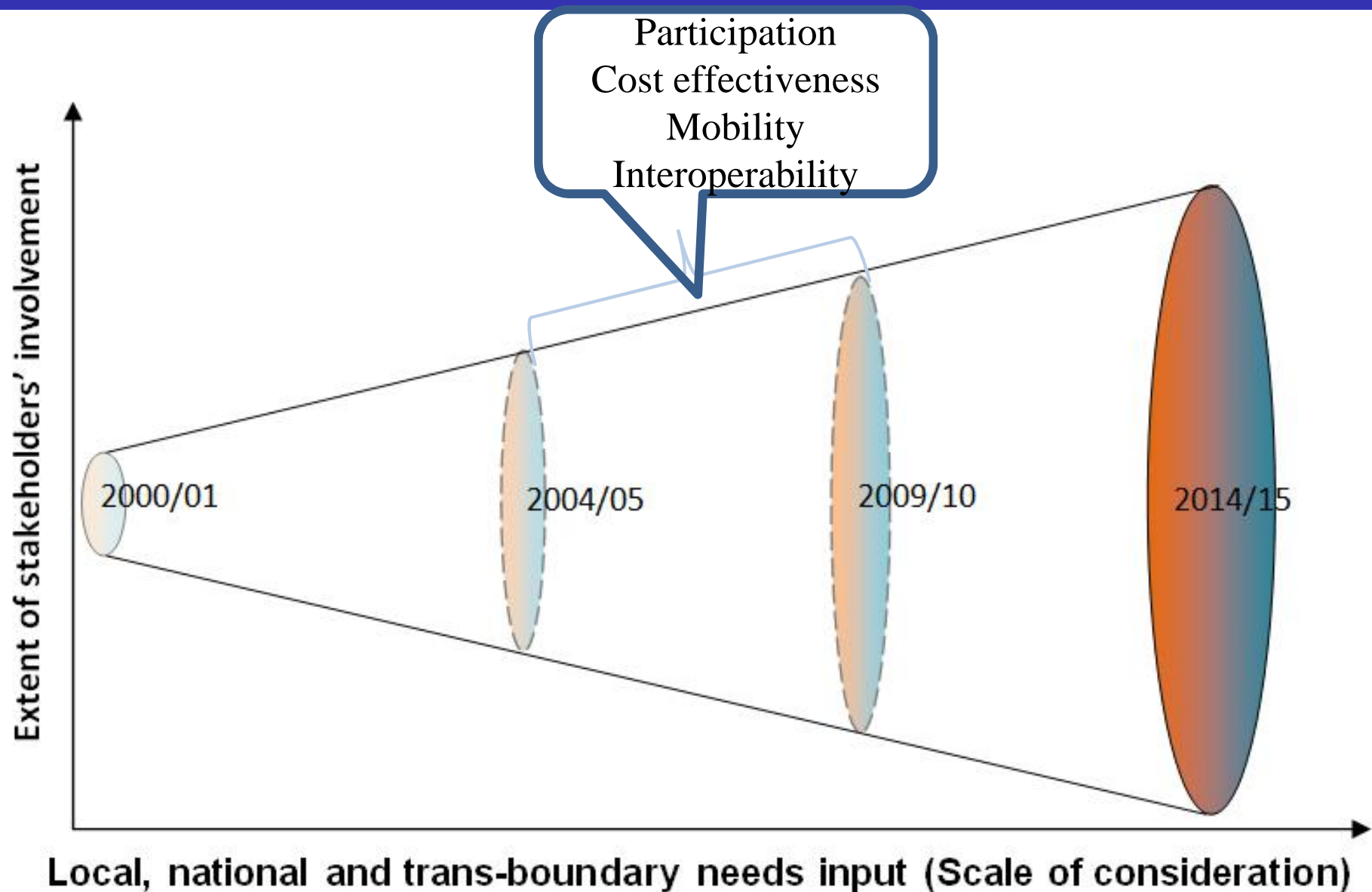
Results and discussions...



Results and discussions...

- Advancement of ICT in terms of hardware, software and networks changed the emphasis on relevance criteria towards more participatory ones.
- Mobile devices including laptops, mobile phones and Personal Digital Assistants (PDAs) as well as improved mobile networks created environment for ICT to support wide spectrum of stakeholders in the water basin management.
- Also increase in processing power and storage capacity which improved the desktop-based solutions

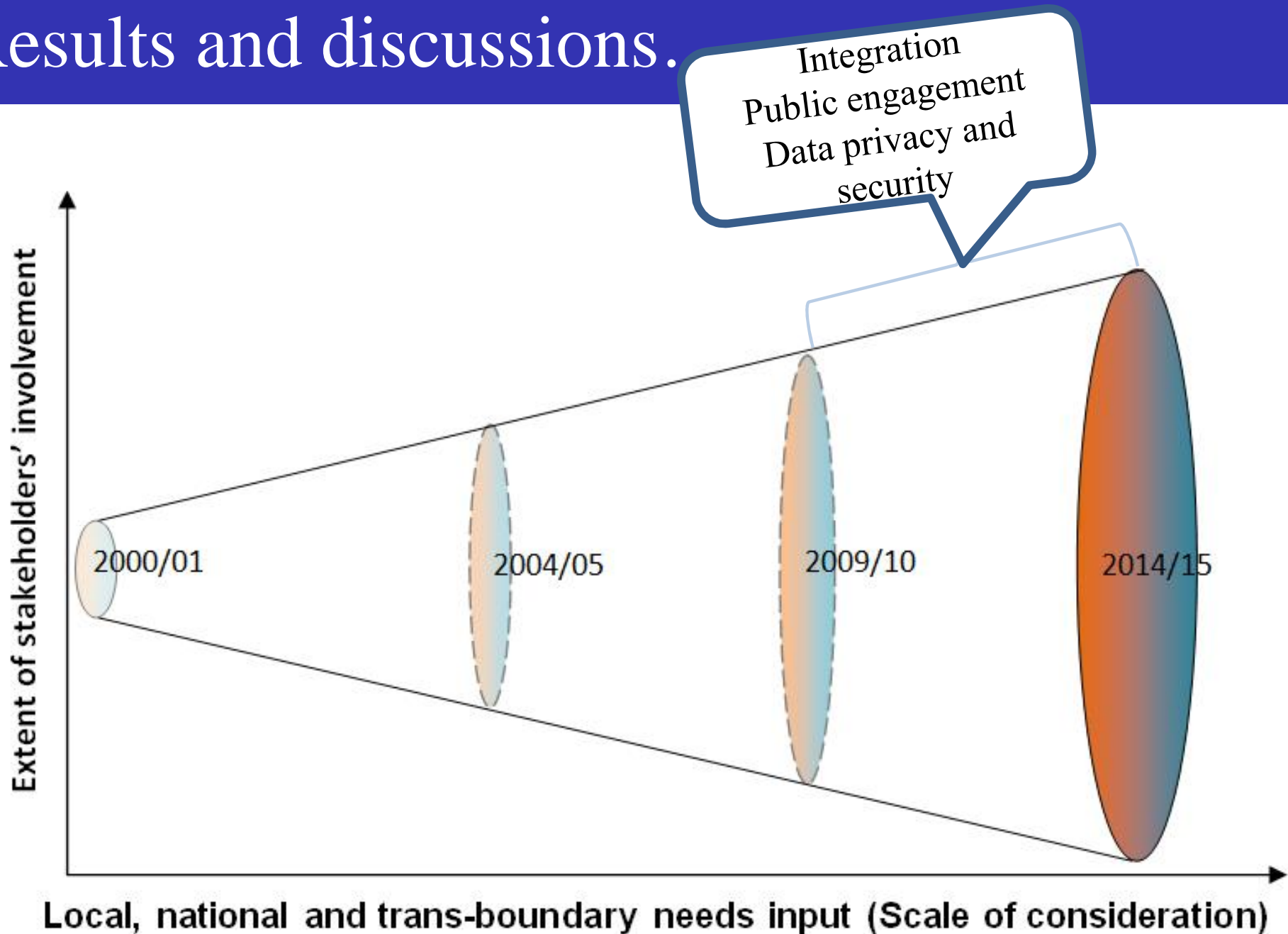
Results and discussions...



Results and discussions...

- The most recent wave suggests relevance criteria that are more inclusive in terms of solving societal challenges using the technology.
- Computing power continues to increase, portable and fast hardware that supports big data storage becomes affordable, software including mobile applications and open source increasingly becomes available and networks coverage and costs becomes more inclusive.
- Relevance criteria in this phase are those which support public engagement, where more actors are included in efforts to solve the water basin problems.

Results and discussions.



Conclusion

Conclusion

- Systematic reviews and meta-analysis are techniques that enhance both focus and consolidation of findings that have been done over a wide area, for a long time or with different approaches.
- Application of systematic review and meta-analysis has revealed changes driven by technological advancement and societal challenges.
- There has been a shift from more technological oriented criteria to socio-technical criteria often with engagement of the public beyond stakeholders. .

Thank you

Merci

Danke

Asante