# 34. The Scope and Feasibility of the I2S Development Drive

Here I want to return to the point that there are thousands of research projects that can contribute concepts, methods and case examples applicable to I2S, as well as information for guides to relevant knowledge from outside the discipline. Because the germane material is currently scattered and often undocumented, compilation will require an intense, well-resourced I2S Development Drive to scour a wide range of relevant literatures and to find and write down currently unrecorded information. This chapter describes the scope of this effort and what is required to make the case for feasibility: establishing proof-of-concept and addressing countervailing forces. I conclude by returning to the theme of imperfection, highlighting its central importance for the Drive and I2S itself.

## Scope

Tables 34.1 and 34.2 summarise the materials to be compiled and demonstrate the extensive scale of the task.[1] It is not possible to determine at the outset how many relevant concepts and methods there are to be collected. Further, while there will be large numbers of pertinent case examples, again, it cannot be established ahead of time the extent of the variations they will illustrate and therefore how many case examples will need to be gathered.

While such open-endedness is a challenge for planning and seeking funding for the I2S Development Drive, it need not be an insurmountable obstacle. First, the I2S Development Drive does not need to compile absolutely all applicable material. Instead it has to gather enough significant, high-quality options from diverse sources to build a solid foundation—one that can continue to be extended. Second, one of the tasks of establishing proof-of-concept is to formulate feasible and efficient ways of proceeding.[2] Let us now move on to these feasibility issues.

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1 The beginnings of a compilation of relevant resources can be found at: <http://i2s.anu.edu.au/resources>

2 Once an I2S Development Drive was under way, it would probably gather its own momentum (especially if it was endorsed by groups powerful in determining research policy), making it likely that those who had developed relevant materials would seek to have them included. The focus of Drive activities could then move from finding materials to assessing and categorising them.

# Establishing Proof-of-Concept

Demonstrating the feasibility of the I2S Development Drive requires five key questions to be addressed

1. what are effective ways of finding and collecting I2S concepts, methods and case examples?
2. does the I2S structure (the domains and framework) have value for systematically documenting case examples?
3. can an appropriate peer group be identified and are they able to develop consensus-based classifications of I2S materials?
4. what are the best ways to engage discipline-based and other experts in developing guides to relevant knowledge from outside I2S?
5. will resulting compilations be widely used and valued?

What is needed to establish feasibility in each area is outlined below. Some early work pertinent to these considerations is also described.

## What Are Effective Ways Of Finding And Collecting I2S Concepts, Methods And Case Examples?

At this early stage, when there is considerable uncertainty about how best to proceed with the task of finding relevant materials, my preferred approach is to leap in and see what happens. In other words, gain some experience and then use that to develop a more systematic approach. Accordingly, I have been getting a feel for the issues by working with colleagues to gather together dialogue methods for knowledge synthesis.

In establishing this compilation, we are essentially using a two-step procedure. Step one concentrated on published literature and led to a book of 14 dialogue methods.[3] We looked for examples of how these techniques had been applied in four areas: the environment, public health, security and technological innovation.[4] It is worth noting that finding case examples was challenging. Most came from public health (seven examples), followed by the environment (five examples), technological innovation (three examples) and security (two examples). For 10 of the methods, we found only one example of application in any of these topic areas.[5]

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3 McDonald et al. (2009). It should also be pointed out that when the book was written, I was using the term 'integration' quite broadly. As described in Chapter 2, I now use 'synthesis' and 'integration' in specific ways.

4 The case examples included planning the future of a wetland, reducing the human and economic burdens of repetitive strain injuries, examining possible futures for a country's food supply chain and examining the future of the international airline industry.

5 The Delphi technique alone had examples in each of the four areas. For strategic assumption surfacing and testing and principled negotiation we could not find any examples of their use for knowledge synthesis. Only half of the cases were illustrative of integrative applied research; the others were more straightforward and did not involve a broad array of disciplines and stakeholders.

Step two is currently under way and involves testing how we can engage a broad range of relevant researchers to expand the collection of dialogue options and case examples. Identifying pertinent researchers is proving to be straightforward, as we began with those cited in the book. Even though we have found web tools for systematic searching,[6] so far we have been kept busy with referrals from our starting points. On the other hand, eliciting contributions has been more problematic and time-consuming. We developed a web-based forum to record contributions, but so far it has been difficult to get people to use it. On the positive side, when we phone them most are happy to tell us about their work and for us to make a contribution on their behalf.[7]

Although this project is not yet complete, it does suggest that there is value in producing a first-pass compilation as the starting point. This can be tailored to the time and money available and has the benefit of producing a concrete outcome relatively rapidly. The next step is harder. Not surprisingly, busy researchers are not likely to contribute to web-based forums, especially when these have little authorisation. Budgeting for interview-based data collection will probably be more productive. We still need to do more work on sampling issues. For example, although the snowball method is identifying researchers who use dialogue in their investigations, we have not yet assessed the quality and importance of their work and we have yet to compare snowball sampling with more systematic web-based sampling for identifying important lines of research that were missed in the literature review.

Nevertheless, this small study has given me confidence to proceed with investigations into the feasibility of the I2S Development Drive. Furthermore, it is worth exploring proof-of-concept approaches that will themselves yield valuable resources, as we achieved with our book of dialogue methods.

## Does The I2S Structure (The Domains And Framework) Have Value For Systematically Documenting Case Examples?

One of the arguments underpinning this book is that there are many examples of research on complex real-world problems where reports do not convey the salient knowledge about which concepts and methods were used and how, making it hard for others to learn from and emulate such studies, let alone for peers to evaluate them adequately. The structure provided by the three domains and five-question framework is designed to be useful for systematic documentation of case examples.

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6 E-research tools developed by the Virtual Observatory for the Study of Online Networks (VOSON) Project: <http://voson.anu.edu.au/> (accessed 15 December 2011).

7 See <http://i2s.anu.edu.au/projects/>

The structure's applicability now needs to be tested, especially as collecting case examples is a pivotal piece of the I2S Development Drive. A simple version of the framework was used successfully to provide brief case examples in the book on dialogue methods,[8] but the full framework has not yet been applied to a large, detailed case example in a way that illustrates and transmits information about the employment of relevant concepts and methods, as well as guides to knowledge from outside I2S.

## Can An Appropriate Peer Group Be Identified And Are They Able To Develop Consensus-Based Classifications Of I2S Materials?

The third key area for proof-of-concept moves beyond the bringing together of concepts and methods to developing consensus-based classifications of those collections. It concerns the work of organising the discipline. The issues here are twofold: 1) is it possible to identify an existing college of peers who are I2S specialists or at least specialists in particular areas of I2S, and 2) can they reach consensus on categorising and setting quality standards for the concepts and methods? This is essentially a follow-on activity to the first area of proof-of-concept research described above—namely '*What are effective ways of finding and collecting I2S concepts, methods and case examples?*'.

The process can be illustrated using the example of the compilation of dialogue methods. A primary ambition of our project is to identify a core group of people experienced in using a range of dialogue methods for knowledge synthesis. This will be followed by seeing if they can reach consensus on: 1) which dialogue methods are pertinent for bringing together disciplinary and stakeholder knowledge, 2) which are of an appropriate level of quality, and 3) how they can best be classified. It is not yet clear whether such a group can be formed. From the work we have done so far, the challenge seems to be identifying researchers with experience in a range of dialogue methods, as most tend to work with one technique or a limited selection.

Testing the ability to develop consensus-based classifications of I2S materials will be straightforward if there is a large enough peer group with broad experience in the relevant concepts and methods. But comparative analysis will be harder and more time-consuming if most practitioners focus on only one or a small number of theories and techniques.[9]

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8 McDonald et al. (2009).

9 This demonstrates the importance of feasibility examinations for effectively planning the I2S Development Drive. In the long-term development of I2S, such consensus-driven classification needs to occur on at least two levels. One is at the level of specific elements of I2S, such as knowledge synthesis methods based on dialogue, scoping unknowns or assessing authorisation for providing integrated research support for policy and practice change. The other is at the level of the overarching I2S discipline. While this book sets out to provide organising principles for I2S in the form of three domains and a five-question framework, the

## What Are The Best Ways To Engage Discipline-Based And Other Experts In Developing Guides To Relevant Knowledge From Outside I2S?

Let us begin with examination of Table 34.2, which shows that there are two broad types of guides: 1) those based on a single discipline or area of knowledge (or a small closely related group), and 2) those aiming to help navigate across a range of disciplines and other knowledge areas.

An example of the first is a guide to theories of government policy making, which is key to scoping policy arenas. This is predominantly based in political science. The feasibility question becomes: can a group of well-regarded political scientists be convened to create the guide?[10] An example of the second type of guide is one useful for scoping unknowns, which provides information on how various disciplines and practice areas deal with unknowns. The key step here is to develop a panel of experts in thinking about unknowns, representing a range of disciplines and stakeholders, as well as areas (like environmental sciences) that grapple with this issue.[11] In both types of guides, an additional task is to establish processes for continual updating.

## Will Resultant Compilations Be Widely Used And Valued?

The last dimension of proof-of-concept involves examining whether available compilations of concepts, methods and case examples, as well as guides to knowledge from outside I2S, will be widely used and valued in the conduct of future integrative applied research. For this to happen, the guides must be known about and accessible. Consideration should be given to a range of measures to assess uptake. This can include proxy measures such as sales, downloads and citations of the compilations, as well as more direct assessments such as surveys of pertinent research teams about the materials they use and examination of literature for changes in frequency of use of relevant concepts and methods.

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structure of the discipline itself needs to be discussed and endorsed (or modified) by I2S specialist peers. In terms of proof-of-concept, the starting point is to see if consensus-based classification can be achieved with something relatively straightforward like dialogue methods for knowledge synthesis, before moving on to the discipline itself.

10 This might start with one country, but eventually needs to be expanded to take different political systems into account. I have done some preliminary work with colleagues interested in bridging research and policy to get a sense of the available theories. See Ritter and Bammer (2010); and Bammer et al. (2007).

11 Some preliminary work has been undertaken through the symposium on uncertainty that I co-organised with Michael Smithson and Steve Dovers in 2005. We demonstrated that we could successfully engaged a diverse cross-section of discipline-based researchers and practitioners to scan the territory, with 17 participants representing different disciplinary and practice perspectives and three representing problems where unknowns are important: communicable disease outbreaks, environmental management and illicit drug use. The process we used is described in Bammer and The Goolabri Group (2007). The symposium produced the book Bammer and Smithson (2008).

## Countervailing Forces

To be realistic about the prospects of establishing I2S requires considering why it may be preferable not to progress this discipline. This is relevant not only to the I2S Development Drive, but to any method of advancing I2S. As the previous parts of this chapter have shown, making headway with I2S is a major enterprise, and although the aim is to substantially improve the conduct of integrative applied research, there are no guarantees that this will occur.[12]

Competition for resources, especially time, attention and person power, is a major countervailing force. Time and attention are relevant on at least two levels. First, the requirement to tackle complex real-world problems is urgent given their number and scale. It may be preferable to harness all available resources to address current complex social and environmental problems as best we can, rather than diverting time and energy to further develop I2S.

Second, on a project level, if integrative applied research teams are to fully incorporate I2S into their work, it will place new demands on teams to expand and upgrade the considerations given to knowledge synthesis, understanding and managing diverse unknowns and supporting policy and practice. In other words, these issues will require reallocation of resources. But will it be worth it? The hope is that it will increase the efficiency of the research being undertaken, making it faster and cheaper. This can occur if less time is lost, for example, in searching for useful ideas or applying concepts and methods that are suboptimal. But the worst-case scenario may be that incorporating I2S simply makes the studies more involved, so that they take longer and cost more with no measurable improvement in outcome.

In terms of person power, building I2S capacity requires bright researchers to be attracted into this discipline. Many of them may be drawn from the ranks of those currently involved in developing theory related to interdisciplinarity and related ventures. Others may come from practical projects that can be classed as integrative applied research or from the consultancy world.[13] Still others may be lured away from discipline-based endeavours—as in the case of Caryn de Silva in the hypothetical case in Chapter 31. As pointed out in Chapter 10, research

12 Here I have laid out the issues I can think of, but I do not respond to them. As well as being used to assess whether I2S and the I2S Development Drive should proceed, examining the counterarguments is important for identifying possible adverse consequences.

13 An issue here is whether sufficient existing researchers have broad enough expertise, a) across the three domains, and b) with a wide range of options for the various framework questions, to permit immediate establishment of a college of peers. An important role of the I2S Development Drive is to assess the existing baseline level of I2S expertise. This will determine whether the college of peers can be founded forthwith or if a process of building expertise is required. In the latter case, knowing the level of existing I2S expertise will help determine what this process will entail.

capacity will always be limited, so that competition for the most talented people is fierce. Again it may be preferable not to tamper with the status quo, as the implications for the rest of the research enterprise are unknown.

The current state of play also has its strengths and attractions. Some would suggest that the lack of a disciplinary structure allows more freedom for innovation, as new ideas are not stifled by a peer-review system. In other words, a wider range of possibilities can be opened up. There are certainly initiatives, as in implementation science[14] and in team science,[15] which are progressing apace without I2S.

It might also be argued that the market forces that partially drive the present system are more appropriate than a discipline-based structure. At present, the survival of many innovations relevant to integrative applied research seems to depend largely on whether someone is willing to pick them up and to pay for their application. Indeed it is striking that several of the existing concepts and methods that I2S proposes to gather together form the bases for consultancy businesses.[16] Some of these were founded by academics who could not get traction for their ideas within research organisations.

Working outside established academic structures also avoids entanglement with the growing bureaucratic forms of accountability such as quality assurance systems. Increasing prominence is being given, for example, to publication in journals that have high impact factors.[17] Certainly some journals that publish I2S-related work fall into that category, but many others do not. While one of the aims of establishing I2S is to develop the critical mass to enable effective participation in this quality-driven environment, it can also be argued that there are advantages in staying away from it.

Both the current reliance on market forces and the distance from quality assurance mechanisms help avoid the danger that I2S becomes self-referential rather than engaged. What I refer to here is the risk that I2S specialists will research and write for each other on ever more arcane aspects of the I2S discipline rather than being part of integrative applied research teams addressing complex real-

14 See, for example, the (US) National Implementation Research Network: <http://www.fpg.unc.edu/~nirn/default.cfm> (accessed 15 December 2011).

15 See, for example, the Science of Team Science: <http://scienceofteamscience.northwestern.edu/> (accessed 15 December 2011).

16 As described in Chapter 31. It is worth noting though that these generally target the policy and practice, rather than the research, communities.

17 Examples of quality assurance systems are the Excellence in Research for Australia (ERA) initiative <http://www.arc.gov.au/era/> (accessed 15 December 2011) and the United Kingdom's Research Excellence Framework <http://www.hefce.ac.uk/research/ref/> (accessed 15 December 2011).

world problems. It is too early to say which kind of development the quality assurance mechanisms will foster, but there is certainly concern that they will be counterproductive for research implementation.

In considering the establishment of I2S, such countervailing forces need to be kept in mind. On the other hand, the fact that I2S has potential problems and faces opposition does not necessarily mean that it should be abandoned. Expecting a perfect solution or unanimous support for I2S is unrealistic, as all major initiatives have limitations and detractors.[18] Overall, whether to proceed is a major decision yet to be made.

## Implications of Imperfection for I2S and the I2S Development Drive

The importance of imperfection was introduced in Chapter 10 as a consequence of the inevitability of unknowns, and was further teased out in several subsequent chapters relating to different dimensions of I2S, especially

1. understanding that all systems views are partial and that the whole system cannot be effectively taken into account
2. the need to set boundaries to define what can be done with the available resources of time, money and personnel, and that having enough resources to do everything will be a rare occurrence
3. the significance of values in determining what research is undertaken, along with inevitable downplaying of some values
4. appreciation that context (the influence on the research of the real world in all its complexity and unpredictability) cannot be fully taken into account in planning and conducting integrative applied research
5. awareness of the general unpredictability of policy making and practice change, along with inability to be certain of research impacts, the possibility of incompatibility between what the research finds and what action is possible, and that many forces compete with research for influence.[19]

18 Even the now widely lauded Human Genome Project initially struggled to gain acceptance; see Lambright (2002).

19 There is value in providing a guide to different kinds of knowledge about imperfection and this is included in Table 34.2.

It is also worth reiterating the challenges raised by imperfection for integrative applied research and I2S that were discussed in Chapter 10—namely avoiding: 1) overconfidence and hubris, 2) nihilism and despair, 3) hindsight bias in evaluation, and 4) the sanctioning of incompetence and corruption.

These circumstances signal that an important task for the I2S Development Drive is to gather together ways of thinking about and managing imperfection. One example is adaptive management, discussed in Chapter 13. Another is the capacity to effectively recognise and manage hindsight bias, which is particularly important for the evaluation of I2S. Building on existing approaches and developing new ones are critical in the further evolution of I2S.

Let us also examine the implications of imperfection for how I2S is evaluated. As described in Chapter 29, assessment of I2S has to steer a path between two precipices. On one side, there will always be identifiable limitations to an integrative applied research project, making it easy to castigate the project for these inevitable deficiencies. But this is not a fair or productive appraisal process. The challenge instead is to judge whether the decisions taken by an integrative applied research team are defensible in light of the inescapable restrictions. Peers who have been in the same situation are likely to be best placed to undertake such review. A further complication is that genuine mistakes are also inevitable. Sometimes the wrong choice will be made—for example, about which dialogue method to use, where boundaries are set or which policy makers or practitioners to target. Again, peers are likely to be best placed to take mistakes into account and to differentiate them from a history of sloppiness or incompetence.

The other precipice to be avoided is allowing imperfection to be an excuse for 'anything goes'. Given that every I2S concept and method has strengths and weaknesses, it can be tempting not to worry about finding the most suitable. This can play out in various ways, such as considering only a very limited repertoire of options, continuing to use substandard concepts and methods when significantly improved versions are available, and employing the latest fad regardless of its suitability. A commitment to excellence and effective peer review are necessary to counteract these trends. This requires a realistic appraisal of what I2S can offer and what an excellent integrative applied research project looks like in light of inevitable limitations.

Imperfection is inescapable in dealing with complex real-world problems, but in order to manage it, much current research sidelines key issues, especially unknowns and context. A core assumption of this book is that this marginalisation is no longer tenable and that imperfection has to be faced head-on. Grappling with imperfection and communicating its importance are central challenges for I2S.

**Table 34.1 I2S Concepts, Methods and Case Examples, as well as Guides to Relevant Knowledge from Outside I2S, to be Collected in the I2S Development Drive**

| Framework question | I2S Development Drive tasks | I2S Development Drive involves compiling: | | | |
|---|---|---|---|---|---|
| | | Concepts | Methods | Case examples | Guides |
| 1. For what and for whom | **Domains 1–3**<br>Compile case examples demonstrating: a) different ways of describing the purpose (knowledge synthesis, thinking expansively about unknowns, providing integrated research support for policy and practice change); b) the contribution to the overarching research aims; and c) the beneficiaries (that is, which perspectives were included). | | | √ | |
| | **Domain 2 addition**<br>Compile case examples demonstrating how the inevitability of imperfection was incorporated. | | | | |
| | **Domain 3 addition**<br>In case examples describing purpose, include cases where there were strong views about the desired impact of the research and cases where there were not. | | | | |
| | **I2S as a Whole**<br>Compile case examples illustrating different ways in which integrative applied research teams approached aims for addressing the problem as a whole. Particularly valuable will be information on how they identified and dealt with inconsistencies in aims and beneficiaries across the domains and within the team. | | | | |

| Framework question | I2S Development Drive tasks | I2S Development Drive involves compiling: | | | |
|---|---|---|---|---|---|
| | | Concepts | Methods | Case examples | Guides |
| **2. Which knowledge, unknowns and aspects of policy and practice:** Systems view | **Domains 1–2**<br>Collect case examples illustrating how different systems approaches are useful for describing a complex problem, as well as for bringing together discipline-based and stakeholder knowledge and dealing with diverse unknowns.<br><br>Produce a guide to the broad range of systems approaches to a complex problem, emphasising the different ways they bring together discipline-based and stakeholder knowledge and provide for understanding and management of diverse unknowns. | | | √ | √ |
| | **Domain 3**<br>Collect case examples of various ways of considering the major arenas for implementation (government, business and civil society) as systems, showing the organisational structures and processes for decision making and action, as well as the interactions between them.<br><br>Produce a guide for systems approaches to each of the major arenas of implementation (government, business and civil society), showing the organisational structures and processes for decision making and action, as well as the interactions between them. | | | | |
| | **I2S as a Whole**<br>Collect case examples illustrating ways to combine various systems approaches to the problem (which may differ for the knowledge synthesis and unknowns aspects) and the policy and practice arenas.<br><br>Produce a guide for combining different systems approaches to the problem and the policy and practice arenas. | | | | |

| Framework question | I2S Development Drive tasks | I2S Development Drive involves compiling: | | | |
|---|---|---|---|---|---|
| | | Concepts | Methods | Case examples | Guides |
| Scoping | **Domains 1–3**<br>Gather together literature and undocumented practical experience providing<br>• concepts for scoping each of: a) knowledge, b) unknowns, and c) the roles of government, business and civil society, along with key individuals and groups, and specific sub-processes, within each systems view<br>• methods for such scoping<br>• illustrative case examples.<br><br>Produce guides to<br>a) all the potential contributions of different disciplines and stakeholders, focusing on generic issues rather than specifics<br>b) all the potential ways of considering diverse unknowns including taxonomies, different approaches of disciplines and stakeholders, and unknowns that would be banished in discipline-based research<br>c) the roles of government, business and civil society that can help teams understand where action is possible. | √ | √ | √ | √ |
| | **I2S as a Whole**<br>Gather together and develop useful concepts, methods and case examples for managing the vast amount of information that is inevitably involved when the three domains are combined.<br><br>Collect case examples to investigate the intersection between 'stakeholders' and 'policy makers and practitioners', especially limits on what is possible for scoping and how these can be overcome. | | | | |

| Framework question | I2S Development Drive tasks | I2S Development Drive involves compiling: | | | |
|---|---|---|---|---|---|
| | | Concepts | Methods | Case examples | Guides |
| Boundary setting | **Domains 1–3**<br>Collate published and unpublished concepts and methods for boundary setting, along with case examples that emphasise how and why decisions were made. | √ | √ | √ | |
| | **Domain 2 addition**<br>Develop boundary-setting methods to allow the most significant unknowns to be identified. | | | | |
| | **Domain 3 addition**<br>Collate case examples demonstrating how special advantages of teams (such as long-established relationships with particular policy makers) were taken into account. | | | | |
| | **I2S as a Whole**<br>Collate case examples relevant to interactions between the domains in boundary setting, such as: a) ensuring relatively equal coverage of each domain; b) congruence between how knowledge synthesis, unknowns and providing integrated research support were approached; and c) not allowing congruence to be too limiting, especially in restricting coverage of key aspects of the approach to the problem or the potential for change. | | | | |

| Framework question | I2S Development Drive tasks | I2S Development Drive involves compiling: | | | |
|---|---|---|---|---|---|
| | | Concepts | Methods | Case examples | Guides |
| Framing | **Domains 1–3**<br>Draw together useful concepts and practical methods for framing, along with case examples of when it has worked well and when it has failed. | √ | √ | √ | |
| | **Domain 2 addition**<br>Develop new ways of framing unknowns that signal their importance and potential for achieving better outcomes on complex real-world problems. | | | | |
| | **Domain 3 addition**<br>Framing is also relevant to the findings of the integrated research.<br><br>Collect case examples of competition between framings trying to influence policy or practice change. | | | | |
| | **I2S as a Whole**<br>Draw together case examples of the relationships between the frames used in the three domains—for example, when these were the same or different framings, as well as assessments of how well these worked.<br><br>Collect case examples of accurate and inaccurate framings for the position of integrative applied research teams on controversial issues. | | | | |
| Values | **Domains 1–3 and I2S as a Whole**<br>Compile case examples that illustrate different experiences of bringing values into play and their consequences for the integrative applied research.<br><br>Produce a guide to concepts and methods for understanding and responding to the various dimensions of values. | | | √ | √ |
| | **Domain 3 and I2S as a Whole addition**<br>Compile case examples examining congruence in values across the three domains, as well as assessing integrity. The latter includes gauging independence from government, business and civil society pressures, as well as commitment to the provision of 'public value'. | | | | |

| Framework question | I2S Development Drive tasks | I2S Development Drive involves compiling: | | | |
|---|---|---|---|---|---|
| | | Concepts | Methods | Case examples | Guides |
| Harnessing and managing differences | **Domains 1–3**<br>Gather together concepts and methods for understanding differences, as well as for harnessing and managing them, along with illustrative case examples. | √ | √ | √ | |
| | **I2S as a Whole**<br>Gather together case examples to: a) ascertain how the same differences play out across all three domains, b) examine how management strategies fare across the domains, and c) figure out when best to apply methods for managing differences (proactively or reactively). | | | | |
| Iteration | **Domains 1–3**<br>Compile case examples of how iterative processes between the six categories of concepts and methods played out. | | | √ | |
| | **I2S as a Whole**<br>Compile case examples of how iteration occurred across the three domains, particularly whether the processes were independent for each domain or if there were interactions between the iterative processes across the three domains.<br><br>Compile case examples of choices made and judgment exercised (that is, imperfection) in dealing with the six categories. | | | | |

| Framework question | I2S Development Drive tasks | I2S Development Drive involves compiling: | | | |
|---|---|---|---|---|---|
| | | Concepts | Methods | Case examples | Guides |
| **3. How**<br>Methods | **Domains 1–3**<br>Identify and catalogue the full range of methods that has been used for: a) knowledge synthesis, b) understanding and managing diverse unknowns, and c) providing integrated research support for policy and practice change, as well as their conceptual bases and case examples of their application. Update and improve existing compilations. | √ | √ | √ | |
| | **Domain 2 addition**<br>Develop new methods for understanding and managing unknowns, including for reduction (beyond methods used in the disciplines), acceptance, surrender, exploitation and denial.<br><br>Draw together understandings of how stakeholders might use strategies like surrender, exploitation and denial in furthering their agendas, so that these can be taken into account in understanding and responding to complex real-world problems.<br><br>Pull together concepts, methods and cases that will assist in appreciating and dealing with the complexities involved in understanding and managing diverse unknowns (for example, that the same strategy can be adaptive or maladaptive depending on the circumstances). | | | | |
| | **Domain 3 addition**<br>This includes taking a broad view of communication (such as effectiveness at different stages of the policy cycle), identifying and assessing the value of brokering agencies, and developing rules of thumb for when methods for generating fresh thinking on complex problems are likely to be useful. | | | | |
| | **I2S as a Whole**<br>Collect methods (and underpinning concepts) that can be used across two or all three domains, along with illustrative case examples.<br><br>Identify which methods can productively be used together, as well as which methods are likely to be incompatible. Explore other issues affecting congruence. Compile case examples that illustrate the range of issues involved.<br><br>Further explore the nature and value of an overarching classification based on options for reciprocity and action-orientation. | | | | |

| Framework question | I2S Development Drive tasks | I2S Development Drive involves compiling: | | | |
|---|---|---|---|---|---|
| | | Concepts | Methods | Case examples | Guides |
| By whom and when | **Domains 1–3**<br>Collect case examples of implementation of different options for who undertook: a) the knowledge synthesis, b) comprehensive consideration of diverse unknowns, and c) provision of integrated research support for policy and practice change, and when in the research process this occurred. | | | √ | |
| | **Domain 3 addition**<br>Take into account the options for policy and practice recipients and the timing issues that are relevant for them. | | | | |
| | **I2S as a Whole**<br>Collect case examples looking at the congruence of 'who' and 'when' across the three domains. | | | | |
| **4. Context** Overall | **Domains 1–3**<br>Collect case examples dealing with overall context relevant to: a) the knowledge synthesis, b) considering diverse unknowns, and c) the government, business and civil society arenas.<br><br>Produce guides for how context can be taken into account. | | | √ | √ |
| | **I2S as a Whole**<br>Collect case examples of how: a) the requisite agility to deal with the inevitable unpredictability was fostered, b) interacting influences between the three domains were managed, and c) the inevitability of incongruence and the likely imperfection of solutions were taken into account.<br><br>Produce a guide for combining considerations of context in the three domains. | | | | |

| Framework question | I2S Development Drive tasks | I2S Development Drive involves compiling: | | | |
|---|---|---|---|---|---|
| | | Concepts | Methods | Case examples | Guides |
| Authorisation | **Domains 1–3**<br>Gather case examples describing funding, endorsement and other forms of authorisation, along with any restrictions on knowledge synthesis, understanding and management of diverse unknowns and providing integrated research support for policy and practice change. | | | √ | |
| | **Domain 2 addition**<br>Examine whether provision of untied funding enhances the ability to explore unknowns in less traditional ways. | | | | |
| | **I2S as a Whole**<br>Gather case examples of how integrative applied research teams managed congruence in terms of different restrictions, different interests and other consequences of authorisation. | | | | |
| Organisational barriers and facilitators | **Domains 1–3**<br>Compile case examples describing the diversity and impact of organisational barriers and facilitators. | | | √ | |
| | **Domain 3 addition**<br>Examine the policy and practice organisations as well as the research organisations. | | | | |
| | **I2S as a Whole**<br>Compile case examples examining interactions and congruence in organisational barriers and facilitators within and between research bodies and policy and practice institutions. | | | | |

| Framework question | I2S Development Drive tasks | I2S Development Drive involves compiling: | | | |
|---|---|---|---|---|---|
| | | Concepts | Methods | Case examples | Guides |
| 5. Outcomes | **Domains 1–3**<br>Gather and analyse case examples of evaluation both to improve the list of assessment questions and to develop more detailed guidelines for reviewers. | | | √ | |
| | **Domain 3 addition**<br>Gather and review case examples that examine complexities arising from: a) opposition by vested interests, b) the requirement for multiple viewpoints to understand impact, and c) the inability to predict impact. | | | | |
| | **I2S as a Whole**<br>Compile case examples about, and assess the effectiveness of, peer-review processes in integrative applied research.<br><br>Compile case examples illustrating whether the integrative applied research required prerequisite conditions, especially resources for project development, communication mechanisms, translation and conflict-resolution processes, 'database' development and funding mechanisms, from which exemplars can be highlighted and general rules proposed.<br><br>Compile case examples about how imperfection was managed in the assessment process. | | | | |

**Table 34.2 Summary of Guides to Relevant Knowledge from Outside I2S**

| Type of guide | Experts to be convened | Purpose for I2S |
|---|---|---|
| Systems approaches to complex real-world problems | Experts in systems thinking and in using systems approaches | Provide different systems approaches that can be used to consider the elements of a problem and their interrelationships, in terms of both knowledge and unknowns. |
| Systems approaches to the policy and practice arenas<br><br>Separate guides for<br>1. government<br>2. business<br>3. civil society | Respectively: political scientists, business analysts, experts in civil society | Provide understanding of organisation structures, as well as theories that deliver insights into government, business and civil society processes, to inform how integrated research can provide support. |
| Combining different systems approaches | Experts in systems thinking and in combining systems approaches | Demonstrate which systems approaches can be combined productively and which cannot. This includes bringing together different approaches to the problem (which may be used for knowledge synthesis and dealing with unknowns), as well as merging systems approaches to the problem and those for the policy and practice arenas. |
| Scoping guide to knowledge | Discipline and stakeholder experts | Provide a general overview of the knowledge contributions different disciplines and stakeholders can make to understanding complex real-world problems. |
| Scoping guide to unknowns | Experts in thinking about unknowns and discipline and stakeholder experts interested in unknowns | Provide a more complete picture of unknowns, including<br>1. different taxonomies and other classification systems, and<br>2. an overview of different discipline and stakeholder perspectives in terms of: a) approach to unknowns and how these map onto taxonomies, b) the terrain they cover, c) additional considerations they highlight that cannot be covered by taxonomies, d) unknowns disciplines would normally banish from consideration, and e) unknowns at the intersection of disciplines. |

| Type of guide | Experts to be convened | Purpose for I2S |
|---|---|---|
| Scoping guide to supporting policy and practice change | Political scientists, public policy experts, business analysts and experts in civil society processes | Provide general overviews of possibilities for providing research support for policy and practice change, describing the roles of government, business and civil society (within particular systems views), as well as how to identify key individuals and sub-processes. |
| Values | Applied philosophers and other experts in thinking about values (such as those developing and using the concept of 'public value') | Provide an overview of the different dimensions of values, congruence between different values, how they can be taken into account, and the consequences for understanding and acting on the problem. |
| Overall context | Social scientists | Provide an overview of considerations relevant to gaining broad background understanding about specific complex real-world problems, relevant to: a) how the problem manifests and is understood, b) the unknowns considered to be pertinent, and c) the possibilities for acting on the problem and hence where integrated research support might best be targeted. |
| Guide to imperfection | Range of experts (for example, on adaptive management and on hindsight bias) | Provide an overview of ways of thinking about and managing imperfection. This includes positive strategies as well as those to avoid. |

This text is taken from *Disciplining Interdisciplinarity: Integration and Implementation Sciences for Researching Complex Real-World Problems*, by Gabriele Bammer, published 2013 by ANU E Press, The Australian National University, Canberra, Australia.