Technological Investment Decision-making and the 'Anomaly of Practice' in Internet Banking Assessment[1]

Georgios Samakovitis*+ and James Fleck**
***The University of Edinburgh Management School, Edinburgh, UK**
****The Open University Business School, Milton Keynes, UK**
+ Corresponding Author
Georgios.Samakovitis@ed.ac.uk and J.fleck@open.ac.uk

Introduction: the Anomaly of Practice in UK banks.

This paper discusses the problematic relationship between the valuation of new technologies and the actual decision-making activity that leads to technological choice and implementation. It is based on an investigation of technological investment decision-making (henceforth TIDM) in UK financial institutions with respect to Internet Banking. Conventional wisdom in both academia and industry suggests a direct relationship: the decision is informed by *ex ante* appraisal in a process where candidate technologies are prioritised, screened and evaluated. Our empirical evidence indicates the contrary: valuation assumes a role of political justification and becomes less relevant to the direct economic assessment that it is formally assigned to. This broad disparity between valuation and assessment is summarised in the following statement:

> *"According to the empirical data, the techniques of formal economic assessment, documented in the literature and embedded in practitioners' handbooks, are rarely applied in full, while banks' decisions to invest in IT are made, more often than not, on purely political grounds. However, and despite not following the rational theoretical grounds of TIDM techniques, TIDM practice is often very successful. However, it has not been possible for formal procedures to capture or emulate that unconventional, 'anarchic' (but yet successful) practice into newer and more 'complete' techniques."*

We use the term 'anomaly of practice' for this proposition. This reflects (1) the seemingly paradoxical lack of practical use of the numerous IT-assessment techniques available in the literature (Irani et al, 1997; Acolla, 1994; Lefley, 1997; Renkema, 2000), (2) the inadvertent misuse of financial valuation tools and (3) the absence of processes for translating 'best practice' into formal assessment tools. To explore this anomaly 30 semi-structured interviews were conducted with participants from 10 UK financial institutions. Interviewees were chosen from a diverse range of educational and professional backgrounds, and all held positions in middle and higher management at the time of the investigation. Additional documentary material was provided by the respondents' organisations. Both documentary material and interviews were treated in full confidentiality, due to their sensitive nature.

The results of the investigation were organised into themes that were subsequently structured into systematic frameworks to explore how and why the Anomaly of Practice occurs. In conclusion, we suggest that to improve TIDM and resolve some of the ambiguities of technological valuation, attention should be turned away from seeking ever-increasing measurement precision in valuation models. Instead, integrated approaches that take explicit account of the informed perceptions of interested parties in the evaluation processes need to be developed.

[1] This article is based on the doctoral research carried out by G. Samakovitis at The University of Edinburgh Management School, advised and supervised by Prof. James Fleck (Samakovitis, 2006).

The Analytical Framework

The Anomaly of Practice essentially arises from the question of whether the value of technology is fully measurable and, ultimately, whether TIDM is made in agreement with valuation. Many authors do in fact argue that the impacts of new technology *can* be fully assessed, given adequately-detailed methodologies, and thus improvement of assessment techniques should be sought to that end. We use the term *improvable measurement* to denote this viewpoint. On the other hand, in this paper we argue that improved measures are local to academic disciplines or research strands, and thus can only optimise measurement within specific borders defined by particular theoretical principles, interests and research agendas. We call this viewpoint *perception-contingent measurement*. The resulting dichotomy is illustrated in Figure 1:*The ambiguity of normative quantitative assessment*.

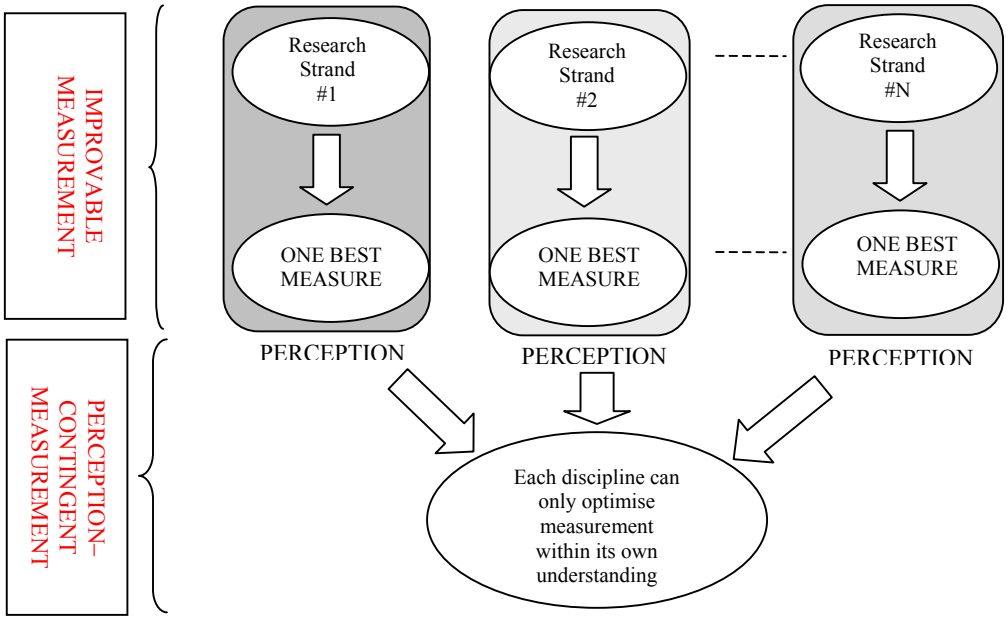

Figure 1: ***The ambiguity of normative quantitative assessment.***

Specific research strands tend to operate under the assumption of *'improvable measurement'*. They are grounded in different academic disciplines and address different interests. Technological value is seen, in each case, as something that can be ascertained by quantitative or qualitative measures that allow meaningful comparisons between competing technologies. Each distinct approach adopts methodologies that accommodate a particular understanding of technological value. In contrast, '*perception-contingent measurement'* recognises that research strands are distinguished by different agendas, have different interests and views about the TIDM problem and, thus, treat it in mutually distinct ways. The approaches are disparate, not because they disagree over the *correctness* of the methods *per se*, but because they conceive of TIDM in different ways. Moreover, they tend to evolve along different paths and are extremely difficult to complement or otherwise synthesise, even where attempts are made to do so. This *perception-contingent* character of technological valuation forms the foundation for our treatment of the Anomaly of Practice: the lack of wider consensus on any one best way for technological valuation implies a strong role for perceptions and political advocacy, which underpins the ambiguity in TIDM.

This framework recognises that the TIDM problem is *socially constructed*[2] (rather than externally addressed) by experts who either participate directly in decision-making or,

[2] The concept of 'social construction of reality' was first introduced in the seminal work of Berger and Luckman (1967).

alternatively, contribute to developing relevant methodologies. TIDM is ultimately defined by the disparate perceptions of the problem that different interested parties, or "actors", assume. Three classes of actors can be distinguished: (1) *Practitioners*, namely expert professionals in Financial Institutions, (2) *Observers*, primarily academic researchers, consultants and government bodies, and (3) a collective actor, the *Community of Received Wisdom*, reflecting commonly understood views on what TIDM is and how it should be made.

According to our framework, the overall shape of the TIDM problem results from constant negotiations between a range of actors' viewpoints, in the light of expert power positions, political advocacy and fitness to the prevailing TIDM paradigms. These viewpoints are by default informed by experts' academic and professional backgrounds, which strongly influence both the received understanding of the TIDM problem, and the perceptions of practitioner and research experts. The overall approach we term Actor-based Informed Grounded Theory (IGT). It is largely based on the principles of Grounded Theory (Glaser & Strauss, 1967), but offers a variant that recognises the necessarily theory-laden nature of data (Coombs, 1964).

Actor-based IGT offers a coherent and realistic model for incorporating the less tangible aspects of TIDM. In particular (1) It recognises explicitly that different, and often opposing, views and interests exist in TIDM, and that actual outcomes are the result of their interplay; (2) It proposes—perhaps in contrast to Actor-Network Theory (Callon, 1986)—that the reality of TIDM is socially constructed by human Actors who use any artefact or process as negotiational devices for promoting their views and interests; and (3) it provides a framework for explaining the Anomaly of Practice and thus helps to develop newer and broader approaches to TIDM.

Methodology and Data

The investigation was based on a set of case studies of 10 major financial institutions, all of which were engaged in the implementation of Internet Banking. The study was carried out during the period 2001 – 2004, when all participating firms had already established their Internet Banking presence. This was timely with regard to the visibility of the outcomes of implementation and the perceived impacts of the technology to the banks. The sample of firms was selected to cover three classes of Internet Banking players: (1) *incumbents*, established players who developed Internet Banking as a complementary service; (2) *related entrants*, financial institutions that used Internet Banking as a mode of entry for offering banking services; and (3) *unrelated entrants,* non-financial firms that used Internet Banking as a means of capitalising on their broad customer base and reputation.

The cases focused on the firms rather than on particular projects, in order to access the appropriate level where decision making took place. This helped to retain a focus on the experts' views of the TIDM itself, instead of concentrating on the intricacies of each particular project. Two organisations were used as primary cases, with the remaining eight in a secondary role. The primary cases provided an in-depth view of experts' perceptions of TIDM and extensive detail on the underlying processes, rationales and attitudes (Yin, 1989). This picture was then complemented and a measure of generalisation achieved through insights derived from secondary cases. (We term this the *outrigger approach*, as metaphorically the secondary cases help to balance the main body of evidence—the primary cases.)

The interviews followed a semi-structured format (Easterby-Smith et al, 1996) that allowed the research to begin from a set of initial research questions and evolve organically as more information became available and a clearer understanding of the problem was developed. Interview findings were then organised by themes and recorded in a matrix. The themes were completed and adjusted at each stage as the discussion became more focused and new findings emerged. The overall process is depicted in **Figure 2**. The design of the interviews themselves was dynamically adjusted after each interview, in the light of identified flaws in the process and new directions offered by respondents.

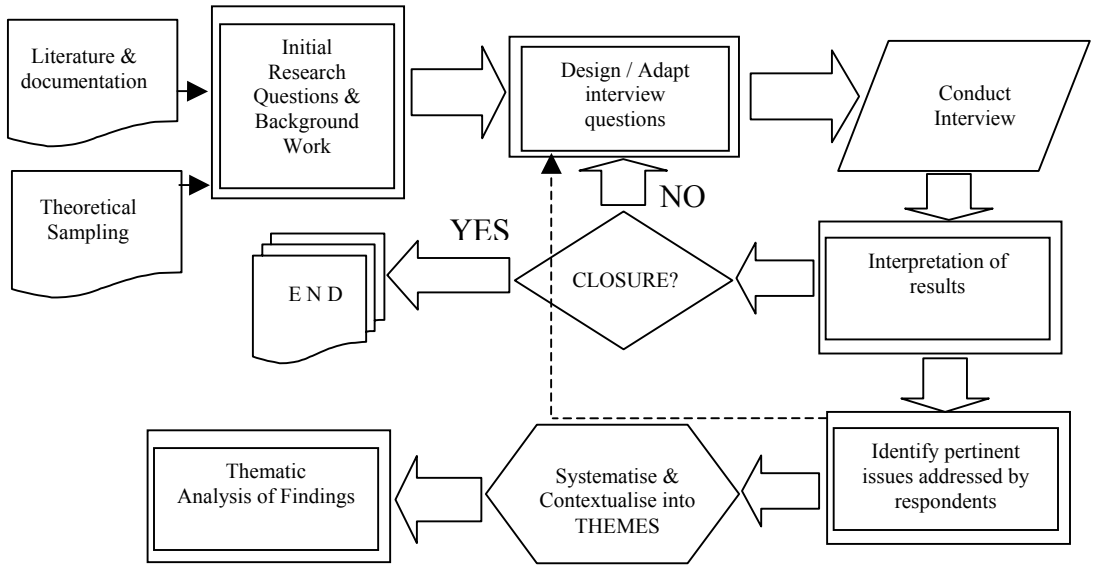

Figure 2: ***The design and optimisation of interviews.*** *The iterative process for identifying what respondents consider to be the pertinent issues in TIDM, has the dual function of (1) improving interview design and (2) developing the final themes.*

Because the investigation aimed to identify the role of expert perceptions about the value of technology, interviewees were chosen to cover a wide variety of specialisations and job descriptions. This assisted in (1) the construction of a complete picture of views about TIDM and (2) the identification of commonalities among practitioners with similar educational and professional backgrounds.

The overall process of recording and analysis produced six themes to organise the empirical observations and deliver an analytical framework for addressing the Anomaly of Practice These themes are summarised in **Table 1**. They also provided insights which helped in distinguishing the roles of Practitioners and Observers in the TIDM process according to the Actor-based IGT framework

Analysis and Results

The empirical evidence in the context of the Actor-based IGT framework provides a broad understanding of the social construction of TIDM for both Practitioners and Observers. The analysis comprised two strands: The first addressed the technological investment appraisal methodologies, as disclosed in academic and industry research; these reflect the role of Observers. The second considered the prescribed processes for TIDM relative to the respective established practice, as disclosed in interview and documentary material. These in turn reflect the role of Practitioners. The third Actor class, the Community of Received Wisdom, is incorporated as the wider social, political and economic *context* within which both Observers and Practitioners develop their perceptions about TIDM. The thematic analysis provided in **Table 1** yielded the following key findings:

a) Although they share a common practical understanding about their organisation's objectives, practitioners entertain disparate views about the right way for performing technological investment decisions, ultimately relevant to their expertise, educational background and past professional training.

Table 1: Thematic analysis of key research findings.

	Theme 1	Theme 2	Theme 3	Theme 4	Theme 5	Theme 6
	Establishment of TIDM processes and their applicability	**The perceived importance of technological implementation**	**The development and dynamics of expert groups**	**Organisational structure and built-in hierarchies for decision-making**	**The influence of wider economic cycles**	**The role of knowledge and learning in TIDM**
Conclusion points	Decisions mostly carried out on Strategic grounds	Financial Appraisal is done on standardised assumptions, largely based on business predictions	Expertise largely driven still from traditional banking culture.	Large organisations are more hierarchical - slower decisions	Changed perceptions of IT valuation since the 2000 decline.	Knowledge management is seen as something that needn't be formalised
	Documented processes are complex and highly detailed	Uncertainty is treated as risk - simply built in as a necessary evil	Customer-end expertise considered most pertinent	Silo approach is most often visible in TIDM procedures	Finance has upgraded role since dot-com bust, but more as justification	Post implementation review not a learning device but simple checking mechanism
	Processes involve Finance as one of the key elements	IT investment is treated differently from different experts	IT expertise not that pertinent anymore due to outsourcing capability	Finance often used as bottleneck for candidate technology	More rigour used as persuasive argument after the dot-com bust.	Codification of knowledge considered important but active KM is far from reality.
	Processes follow group-wide directives	Spillover effects are not taken into account in measurement	Prevalence of new hybrid Marketing and IT-savvy, business-minded experts	Structures in pure-plays much flatter & technology – centric	Reporting drives appraisal at the Profit-Loss Account level.	Reporting knowledge assets is seen less important at the moment
	Processes also serve Reporting structures	No IT-specific methodologies are used	The evolution of expertise is dynamic due to job mobility	Hierarchical levels dominated mainly by traditional quantitative experts	Rationalised no-brainers through more rigorous processes and accountability	
	Processes for project prioritisation driven by Finance	No attempt to use more sophisticated Financial or other quantitative techniques			Changed perception of IT significance towards milder expectations	
	Support from the top is *the* crucial factor	IT largely used as instrument for political advocacy through TIDM.				
	Business sponsor accountability used as safeguard					
	Post implementation review rarely done (firm does not devote resource)					

b) Despite the existence of a rich body of literature on decision-making (Huczynski, 2004; Mintzberg, 1989; Pettigrew, 1973), empirical research has only rarely addressed the TIDM problem *per se*. In these few cases, (Graham and Harvey, 2001; Brounen et at., 2004; Pike, 1996; Payne at al. 1999) research was limited to examining the extent to which particular methodologies were being used in practice, and did not explore beyond that point.
c) Despite the large number of methods proposed for IT valuation[3] (Renkema 2000, Irani *et al.,* 1997) most were hardly ever used or even acknowledged by the practitioners interviewed.
d) Financial valuation techniques are most often used to favour particular decisions which are advocated mainly on political or strategic grounds. Finance therefore assumes a role of *justification* as opposed to *assessment*.
e) The role of the Finance function in TIDM has historically shifted in importance during different economic cycles. This was vividly demonstrated in the 'dot-com boom' era where IT investment was perceived as a necessary strategic activity; in sharp contrast, during the period that followed, economic justification resumed its prevalence.

To address the Anomaly of Practice, we begin by focusing on the Practitioners' space, where the phenomenon is genuinely observed. The connection with the Observers' space follows to complete the explanatory model.

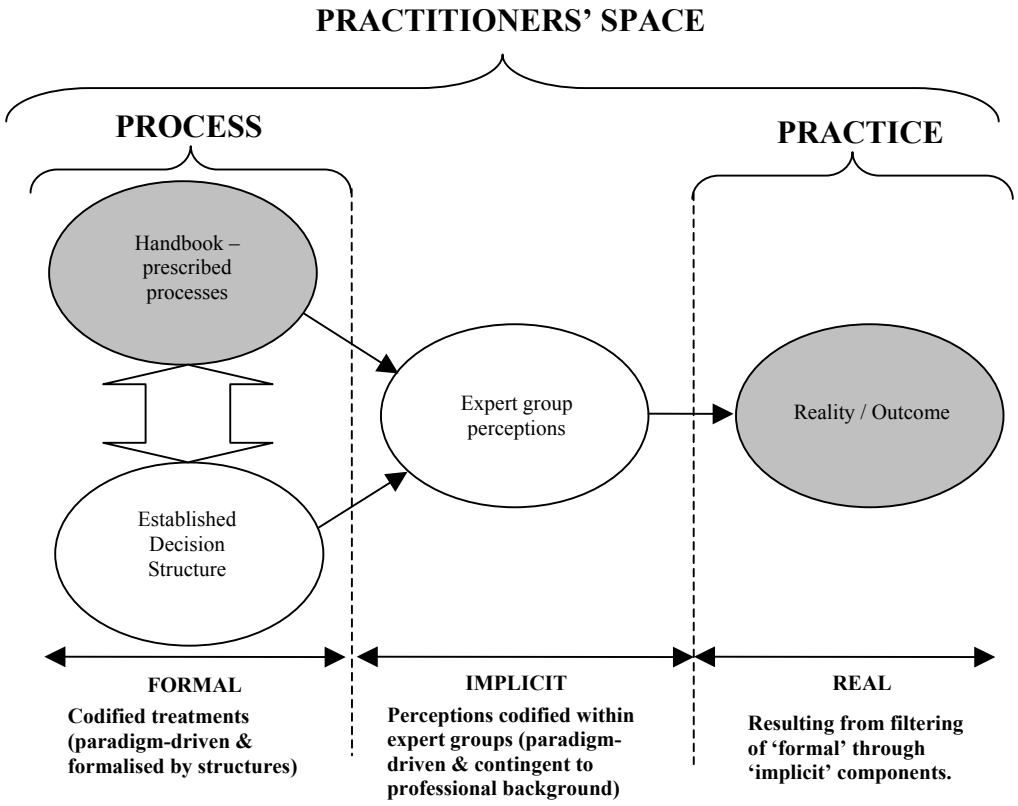

Figure 3: ***The three components of TIDM****: Established Decision Structures and Handbook-Prescribed Processes are 'filtered' through perceptions to deliver the reality of TIDM. The two extremes represent the process-practice dichotomy.*

[3] This research identified approximately 80 methods and variants reported in Finance, Economics, Accounting, IS/IT and Technology Assessment literatures.

The Anomaly of Practice is initially observed in the Practitioners' space. **Figure 3** portrays the reality of TIDM as it emerges in the Practitioners' space, as the outcome of the interaction between three components: (1) Handbook-Prescribed Processes, (2) the Established Decision Structure and (3) Expert Group Perceptions. First, *Handbook-Prescribed Processes* are standardised organisational-specific approaches usually documented in corporate handbooks. These are often templates outlining decision procedures or providing detailed checklists. Second, the *Established Decision Structure* for TIDM involves the organisational hierarchy and the formal relationships between personnel adopted by the organisation in order to ensure control over decisions. Finally, *Expert Group Perceptions* constitute the raw viewpoints of practitioner experts. They are implicit in nature because they are not disclosed as straightforward positions, but are rather evidenced as interests that inform the opinions of respondents. These were typically expressed in interviews as convictions about the role of Finance, the value of technology, the assessment of intangibles and the power of expert groups.

Figure 3 suggests that TIDM as it really happens is the result of filtering the 'formal' elements (i.e. Handbook Processes and Decision Structure) through the 'implicit' element of Expert Group Perceptions. The two extremes of the diagram ('formal' and 'real') effectively represent the *process* and *practice* of TIDM respectively; their relationship reflects a *process-practice dichotomy* that lies at the core of the Anomaly of Practice: TIDM is socially constructed by professionals using formal tools (Handbook–Prescribed Processes) within formal configurations (Established Decision Structures). TIDM therefore is reached *through* accommodating the experts' group or individual interests, rather than *in spite* of them. The model suggests that the dichotomy between the formal prescribed processes and actual TIDM practice may be explained by the role of expert group perceptions. Accordingly, TIDM may be seen as the outcome of a political rather than a normative process. This explanation addresses the Anomaly in its broader dimensions: formal processes documented in corporate handbooks are in place to ensure control over technological decisions and to set standards of comparability between competing technologies. However, as the history of UK banking technologies illustrates, technological decisions are determined by dominant perceptions of expert decision-makers about the value of new technology.

The disparity of viewpoints in the Observers' space is rendered most clearly visible through academic disciplines. The viewpoints of Observer-experts are driven by the academic disciplines that inform their background. They are also conditioned by the mobilisation of their expert knowledge for developing methodologies, as is routinely expected in their professional space (academia, government or consultancy). Therefore, unlike Practitioners, different Observers view TIDM in dissimilar ways not only because of their different educational backgrounds and specialisations, but also because of their disparate organisational and individual aims.

Observer experts also subscribe to organisational goals, although these differ from those of Practitioners. Observers' organisational goals are typically scientific or professional publication, or the development of techniques as marketable outputs. The process through which the reality of TIDM is formulated by each Observer group is similar to the one applying to Practitioners, as illustrated in **Figure 4**.

This model shows how Observer–experts' perceptions of their organisation's research agenda and established research processes operate to deliver the reality of TIDM. Notably, the TIDM problem in the Observers' space takes the shape of techniques for assessing technological investments or recommended solutions (as often happens in the case of consultants). Valuation techniques—the output of experts' activity—are again socially constructed by researcher-experts' particular educational background. Not uncommonly, academic researchers of different backgrounds address technological investment valuation with different mindsets, even when they originate from the same academic discipline or research strand.

An important distinction is evident between expert perceptions in the Observers' vs. the Practitioners' spaces. *Perception* in the Observers' world (academia, in particular) is typically embedded within the rigorous frameworks of academic disciplines, leaving researchers with restricted interpretive freedom. Furthermore, TIDM as seen by Observers is not the pressing issue in need of immediate practical solution that it is for Practitioners; the Observers' role is essentially advisory. For them, TIDM is a field of study rather than an immediate practice.

Consequently, the perceptual boundaries of Observers are naturally more limited to interpreting rules and accurately following research processes than actually making decisions.

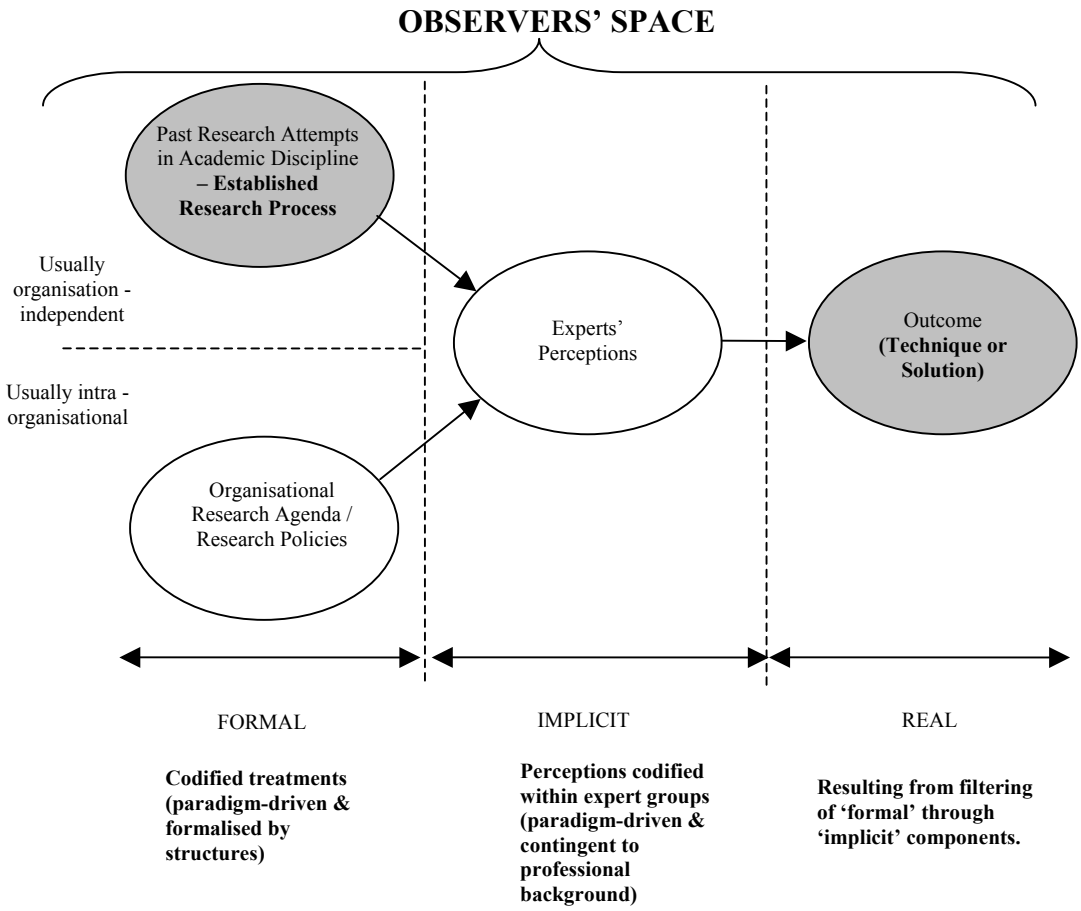

Figure 4: ***The formulation of the reality of TIDM by each expert group in the Observer space****: Observers are 'practitioners' in organisations of the Observer space (Universities, Government bodies, Consultancies). Their perceptions about TIDM operate as a filter of (1) the established research processes for addressing TIDM and (2) the research agenda of their employing organisations.*

The Anomaly of Practice can be analysed in terms of three cognitive activities: (1) the development of assessment techniques, (2) the development of formal control processes in the firm and (3) the decision-making activity. This is depicted in **Figure 5.**

Observers develop technological valuation techniques in an attempt to provide scientifically justified approaches for assessing the value (usually pecuniary) of new technologies[4]. In this respect, 'effective assessment' is defined in terms of the Observers' perceptions of the TIDM problem. And 'effectiveness' is defined in the research-driven culture of Observers' organisations by the degree of rigour, level of detail and compliance with postulates and assumptions of the academic traditions underlying the technique development process. This

[4] This research identified approximately 80 methods and variants reported in Finance, Economics, Accounting, IS/IT and Technology Assessment literatures.

stance is, in turn, underpinned by the mission of Observer organisations, and the ways in which experts within them operate to deliver valuation techniques.

This contrasts with the development of handbook processes in Practitioner organisations. The scientifically efficient valuation techniques developed by Observers may be practically useful as benchmarking instruments. But the essence of handbook processes for TIDM is to control the stages of technological decision making, not only with a view to tracking erroneous actions but to ensure that the appropriate hierarchical levels of management agree and sign-off the progress of decisions. In this setting, valuation techniques are peripheral: handbook processes do include them, but their design implicitly imposes the preferences (and thus perceptions) of powerful experts residing in the relevant hierarchical levels. Practitioner-expert knowledge of valuation techniques *informs* handbook processes through the experts' familiarity with the Observers' space via their educational background, access to academic or trade publications or consultancy.

Finally, the practical activity of technological investment decision-making is obliged to make use of handbook processes because these are used to *prescribe* the desired process of decision-making. Handbook processes work more as a restrictive framework of operation during decision-making, rather than a guideline for delivering effective results. Decision stages, as prescribed by handbook processes, are therefore adhered to in order to ensure compliance with formal rules. However, the purpose of the cognitive activity of actual decision-making in practice is the delivery of a usable, informed agreement on technological choice. This is rather different from the goal of controlling the process of TIDM that handbook processes serve.

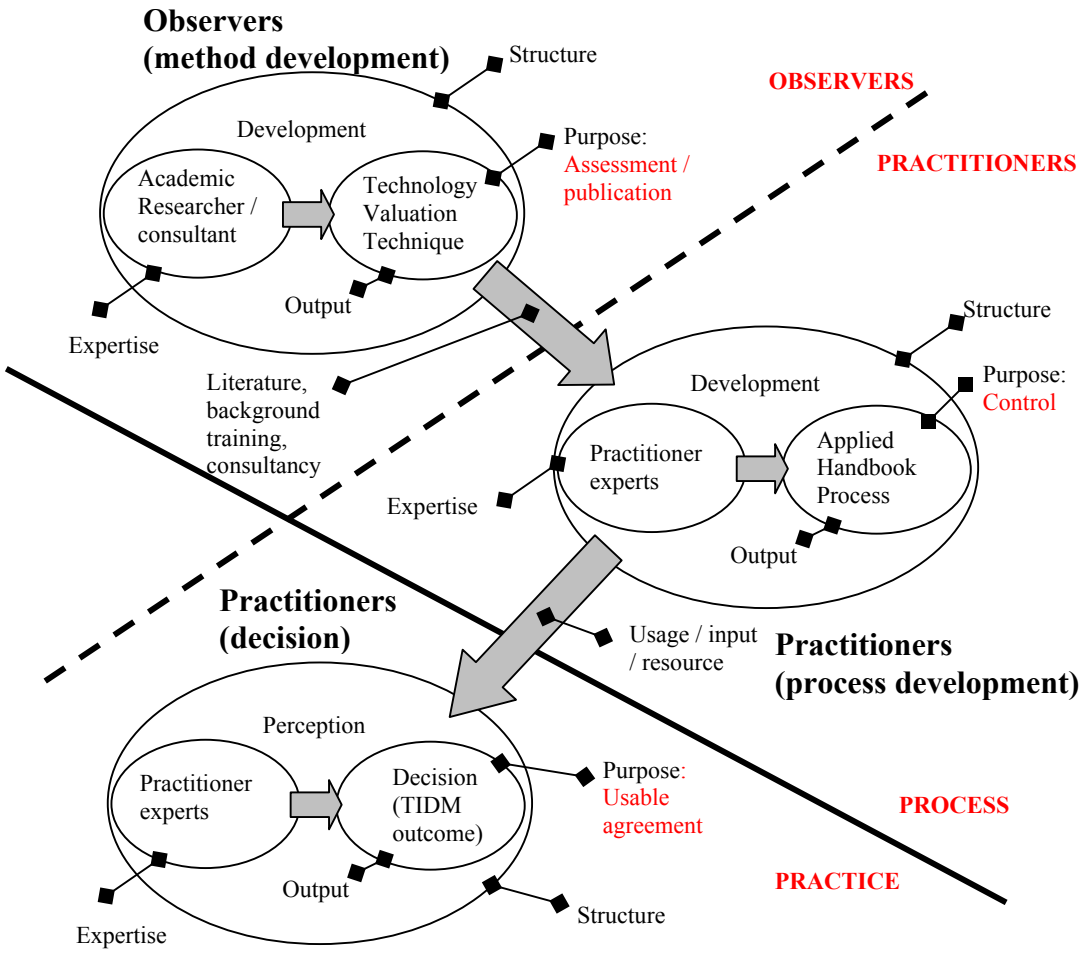

Figure 5: ***Disparities between the three cognitive activities.***

The depiction in **Figure 5** is helpful for addressing the Anomaly of Practice at a more detailed level: The development of an ever-increasing number of technological investment valuation techniques in the Observers' space does not guarantee their direct migration to the Practitioners' space. Methods are developed in research settings (Universities, consultancy firms, government bodies etc.) with respective research agendas in mind (academic publication, policy formulation or commercial exploitation). But handbook processes, however informed by valuation methodologies, serve as internal control mechanisms and do not focus on the accurate assessment of new technologies. This disparity of interests helps to explain the limited usage of technological investment appraisal techniques by Practitioners. More important, in regard to the use of financial techniques for justifying decisions (as opposed to assessing technological investments), empirical evidence indicates that managers most often form their preferences for specific technological investments on the basis of (1) their subject-matter knowledge, (2) their political position in relation to the competing projects and (3) their short-term interests and incentives. Managers tend to adjust their technical assumptions to use formal assessment mechanisms in advocacy for their preferences.

For related reasons, successful technological decisions are rarely systematically recorded in improved handbook processes. Three empirical observations are relevant here. First, post-implementation reviews (PIRs) were found to be restricted to locating and documenting implementation errors, rather than recording successful practice. In successful cases, the typical assumption is that success results from efficient use of the handbook processes. However logical, this assumption is contradicted by evidence that there is little cause-effect obtaining between *process* and *practice*. Second, according to the same empirical evidence, practical decisions are taken and handbook processes are developed with different interests in mind. The relationship between them is defined by experts' perceptions (as **Figure 3** illustrated) which act as a 'buffer' between the two that cannot be reversed to retranslate practice into process. Finally, it is important to note that uncertainty in technological implementation is a key factor that militates against successful implementation being translated back into valuation instruments. This is because—as empirical research has often demonstrated (Primrose et al, 1985; Freeman and Soete, 1997; Hayes and Garvin, 1982) - the benefits of technology often take so long to materialise that typically the reasons associated with success are irrelevant to the reasons that led to the particular decision. Because technological implementation is inherently uncertain, it is practically impossible to systematise the actual parameters into reusable frameworks or assessment tools.

Conclusions

Our empirical research gave rise to an explanatory framework for the Anomaly of Practice by linking three elements: (1) technological investment valuation methods, (2) TIDM processes documented in corporate handbooks and (3) the established practice of TIDM. To clarify the relationship, the framework distinguished between the Observers' space, where valuation methods are developed, and the Practitioners' space, where TIDM is performed in practice. The Anomaly of Practice was thus explained at three levels: (1) one concerning the practice of decision-making relevant to the processes dictated in corporate handbooks, (2) one linking the practical usage of valuation methods with the actual decision-making activity and, (3) one addressing the inability to translate successful practice back into normative methodologies or handbook processes.

The anomaly may be largely explained by explicitly recognising the role of expert group *perceptions*. These determine how TIDM is ultimately performed. At the same time, they act as a buffer between formal processes and actual practice. That role is used to explain both the misalignment between handbook processes and practice, as well as the inability to embed successful practice into normative process. Moreover, the limited use of valuation methods in the Practitioner space is explained by the disparate agendas that characterise the development of valuation techniques, on the one hand, and actual technological decision-making activity, on the other.

We conclude that the development of valuation methodologies within the *improvable measurement* paradigm is largely inconclusive in improving practical technological decision-

making. This is because any attempt to reach measurement precision to address valuation ambiguities merely reflects the partial perceptions of the TIDM problem that different disciplines convey. Development of valuation methods follows the rules of professional reward by peer-reviewed publishing (Merton, 1973; Gaston, 1978; Giere, 1988), rather than the practical implementation of techniques within organisations. In this respect, the objective of developing techniques for TIDM is, in essence, very different from that of TIDM practice: Efforts within specific research strands aim to improve measures of technological value, either by introducing more rigorous valuation models, or by developing frameworks that take more complete account of valuation parameters. This typically involves the *aggregation* of existing techniques into broader models or their adaptation to specific valuation circumstances. However, we would argue that the problem of TIDM calls for the development of techniques through *integration*. In contrast to the aggregation approach, we propose that the problem of technological value should be addressed by recognising the role of Actors and pursuing the appraisal of technological investments by *explicitly* identifying the interested parties, their political positions, and the existence of differently-informed perceptions of reality. This approach explicitly recognises conflict across both disciplines and practitioner expert groups and underlines the importance of political negotiation in decision-making practice. The development of such integrated approaches will attack the very core of the problem of technology investment decision making.

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