

**Decision- Making and Quality in the Patent Examination
Process: An Australian Exploration**

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Decision - Making and Quality in the Patent Examination Process: An Australian Exploration

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Abstract

The quality of patents granted by national patent offices is currently the focus of significant investigation worldwide. The vast majority of this work examines the quality of the end-product of the examination process – the patents themselves. This Working Paper is founded upon the perception that it is equally important to explore the quality of the process that precedes the patent grant – the examination of patent applications by patent office examiners.

The Paper argues that an effective way to assess the quality of the process is to consider the decision-making practices adopted by examiners. This perspective rests on the recognition of the importance of decision-making in the patent examination process – decisions made range from establishing search strategies for prior art to the final assessments with respect to novelty and inventive step. This aspect of the process is considered here in the context of work on decision-making theories found in psychology. Various models of decision-making are explored in this Paper that may be applied to the patent examination process in order to deepen our understanding of the granting of patents.

This Paper represents the start of a decision-focused approach to assessing the quality of the patent system. The models presented here provide a grounding for future, empirical, research into the minutiae of the examination process. A number of approaches for such research rounds out this Paper. Although the discussion of is founded on a description of the processes within IP Australia, any research based on this work will contribute to the optimisation of the patent system globally.

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Decision-Making and Quality in the Patent Examination Process: An Australian	
Exploration.....	1
Abstract.....	2
1 - Introduction	4
2 - Current Practice and Understandings	5
(a) Patent Examination Process in Australia.....	6
(b) Understandings of Quality at IP Australia	7
(c) Understandings of Quality in Economic Analyses of Patents.....	10
(d) Quality and Process.....	14
3 - Theoretical Understandings of Decision-Making.....	15
(a) Bounded Rationality	17
(b) Incrementalism	19
(c) Naturalistic Decision-Making	21
(d) Game Theory.....	23
(e) Decision-Making Theory Summary	24
4 – Assessing the Quality of Decision-Making in Patent Examination Process.....	27
(a) Proposed methods for assessing decisions in patent examination.....	27
(b) Proposed research into patent examination decision-making	28
5 - Conclusion	30

1 - Introduction

The quality of patents is the subject of much debate in Australia and around the world. A great deal of work has been carried out by academics that has been aimed at assessing and improving the quality of patents granted by Patent Offices. The focus of this research has been on the quality of the end-product. Economists, for example, have examined the rate at which patents are improperly granted by Patent Offices. The picture of quality gained from an exclusive investigation of granted patents is likely, however, to be incomplete. This Paper argues that there is also the capacity, and need, to assess the examination process that precedes the granting of patents in many jurisdictions in order to broaden our understanding of patent quality.

The examination process is a set of actions performed by examiners in accordance with Patent Office procedure. Many of these actions include decisions – for example, about search strategies for prior art. The central argument of this Paper is that an assessment of the decision-making processes of examiners may be an important tool for the investigation of the “quality” of the examination phase of the patent application procedure.

In order to assess decision-making, there needs to be a clearer understanding of how decisions are made. Theories of decision-making have been current in disciplines such as psychology for decades. This Paper explores a number of these theories and how they apply to decisions made by patent examiners. The purpose is not to establish which theory is most relevant to the decisions that underlie the patent examination process, but to provide a broader understanding of the decisions in order to gain a more complete picture of the granting of patents.

One significant advantage that comes with a focus on process is that the research may provide insights into methods for the improvement of the patent system. An emphasis on the end-product of the process may highlight instances where patents are not of a suitable quality, however, such a result does not offer guidance as how any problem may be overcome (inasmuch as the examination of applications is treated as an unknown “black box” procedure). An exploration of the quality of the examination process is, however, more likely to offer examples of specific areas where examination practices may be modified in order to enhance the quality of the examination and, therefore, of the end product.

This understanding of the process can only be accessed through communication with people involved in the patent examination process. This Working Paper is seen as the first stage of an empirical research project into the detail of the patent granting procedure. The intention is that the second stage will include a survey of patent examiners and patent attorneys (through the use of both questionnaires and in-depth interviews). The theories described in this Paper draw out important aspects of decision-making that will inform the questions asked of the respondents. The perspectives included here are fundamental to gaining a more complete understanding of the examination process and therefore are integral to any assessment of the quality of the procedures and of the granted patents themselves.

To begin the Paper, and to provide a practical grounding to the theory to follow, there will be a description of the patent examination process as it occurs in Australia. There will also be a discussion of how quality is currently considered, in the context of patents, at IP Australia.¹ The last section of the next part will examine how the quality of patents is currently assessed by economists, here and internationally. The following part of the Paper will explore the theory of decision-making in psychology and related disciplines. The final part will link the theory with the practical aspects of patent examination and propose alternative methods for understanding and assessing the quality of patents and the examination process in patent offices in Australia and internationally.

2 - Current Practice and Understandings

This part of the Paper examines current patent examination practice and ideas of quality in IP Australia and notions of the quality of patents by economists. The first section will describe, in detail, the stages in the examination of a patent application undertaken by a patent examiner in Australia.² The second section will explore quality management processes in place here. This description of Australian practice is not meant to limit the scope of the application of the decision-making theory or any future empirical research. The Australian practice is included only as an example of current patent examination procedures. This part, therefore, is to provide a practical basis

¹ IP Australia is the Australian Patent Office – the federal governmental organisation that examines and grants patents in Australia.

² The language used throughout this paper will focus on the processes involved in the examination of standard patent applications. Examination procedures may also be used for the processing of innovation patent applications where the applicant requests an examination. To avoid repetition and to streamline the expression, reference will only be made to the former.

upon which to ground, not only the theoretical understandings of decision-making and quality assessment considered in the next part, but also the methods of patent examination quality assessments to be proposed in the final part of this Paper.

(a) Patent Examination Process in Australia

In order to produce an understanding of the quality of patents and the patent examination process, there needs to be a description of both patents and of the process itself. For the purposes of this Working Paper, a patent may be briefly described as an instrument providing ‘the exclusive right to exploit an invention for a limited period, in return for which the patentee must publish details of the invention’.³ This exclusive right is granted by an agency of the executive branch of government. A patent, then, is a legal monopoly granted after a patent application has been examined in order to ensure that it complies with the requirements of the relevant statute – in Australia, the *Patents Act 1990* (Cth).

An outline of the steps involved in the patent examination procedure is given in Annex A to Part 12 of the Australian Patent Office *Manual of Practice and Procedure*, Volume 2.⁴ The steps undertaken by examiners in the Office included in the Manual are:

- Determine the type of application, check the application is in force and that a request for examination has been made;
- Check the case file for matters pertaining to examination, the request form and the notice of entitlement to ensure the documents are complete;
- Check formal requirements and whether amendments have been filed;
- Read the claims to determine whether they define a manner of manufacture;
- Read the description for the admitted prior art, the problem to be overcome, the inventive concept and whether it fully describes the invention;
- Construe the claims, determine their scope and note whether they define one invention;
- Review classification;

³ J. McKeough, A. Stewart and P. Griffith, *Intellectual Property in Australia*, 3rd ed, LexisNexis Butterworths, Sydney, 2004, 9.

⁴ An examination of a patent application will only take place after a request for examination has been made.

- Determine search strategy and conduct the search considering novelty and inventive step;
- Check if any material has been filed under section 27 and for multiple applications claiming the same invention;
- Complete the Search Information Statement;⁵ and
- Prepare the report, ensuring that all important objections, in conformity with the Quality Standards for Patent Examination,⁶ are raised. Do not raise objections which would not warrant refusal of the application. Submit the report for supervision, where necessary.

This list of requirements (the order of which is not strict) illustrates that there are a number of steps that provide relative inflexibility on the part of the examiner (for example, ensuring that documents fulfil requirements) and others where the examiner needs to make specific decisions (for example, establishing a search strategy and assessing whether the level of inventiveness evident in the invention is sufficient).⁷

One relatively straight-forward method for assessing quality in the process, then, would be to consider whether the examiners fulfilled the required elements of the examination.⁸ What is more problematic is the assessment of the discretionary aspects of the process. For that, a deeper understanding of the operation of the decision-making process is needed, and this will be addressed in the following part of this Paper. First, however, there needs to be an exploration of how quality is already considered in IP Australia.

(b) Understandings of Quality at IP Australia

This section will examine the understandings of quality as used by IP Australia. That quality is important to the institution is evident in the last dot point on the above list

⁵ The ‘Search Information Statement is used as a definitive record of the search undertaken or relied on during national examination, including when and where a search was conducted and what related art was found and/or relied on’: Australian Patent Office *Manual of Practice and Procedure*, Volume 2, 2003, Para 12.9.8.

⁶ The Quality Standards of patent examination at IP Australia are highlighted below.

⁷ This list is necessarily broadly descriptive. Each item on the list may be expanded to more fully detail the examination procedure. The requirement relating to prior art searches, for example, covers searches of either abstracts or full text databases depending on the application.

⁸ It may also be noted that the process described here is not always that of a single examiner. Search strategies, for example, are developed by a three person “search strategy team”. The team involves the ‘search examiner’ and two ‘consultant examiners ... drawn from examiners experienced in the relevant technology’: Australian Patent Office *Manual of Practice and Procedure*, Volume 2, 2003, Para 12.9.2.3.

of steps in the Australian patent examination procedure; that dot point includes reference to the quality standards in place at IP Australia. These quality standards will be described in this section.⁹

Part 0 of the IP Australia Manual details the organisation's 'Quality Policy' and 'Quality Standards'. The Policy is contained in a statement from the Commissioner of Patents that links quality with the service the organisation provides: 'we strive to develop a competitive edge based on the quality of our service'. The characteristics of the service were listed as 'being accessible, responsive, open, consistent, fair, timely, tailored to individual customer needs [and] value for money'. Implicit in this statement is that quality service requires the provision of a quality product¹⁰ – a patent that complies with the *Patents Act 1990* and provides the patentee with an effective capacity to protect the fruits of their invention.¹¹

Quality is, however, not defined in the section on standards. A paragraph in the introduction to that section, however, reads:

The Australian Patent Office recognises that the services it provides must comply with the requirements of the Patents Act, and meet the expectations of its customers. To ensure that customers' expectations are met, a set of quality standards for patent examination have been developed...¹²

From the policy statement and this introduction, it may be inferred that there are, in effect, two foci of quality assessment for IP Australia – compliance with the Act and the satisfaction of patent applicants.

The Quality Standards themselves are detailed in three groups – standards applicable to national examination, standards applicable to international search and examination, and general standards applicable to national and international search and examination. A sample of the standards applicable to the examination processes is: only important objections are taken; objections are taken consistently; examination reports are

⁹ There are also quality assurance practices that are conducted within IP Australia. For example, the Search Information Statements are, amongst other things, 'required for internal QA processes': Australian Patent Office *Manual of Practice and Procedure*, Volume 2, 2003, Para 12.9.8. The detail of these internal processes are not publicly available.

¹⁰ This focus on product is evident in the internal quality compliance analysis conducted by IP Australia where a sample of granted patents is checked for compliance with the quality standards.

¹¹ The Standards highlight that it is important to ensure that the 'way we conduct our business with our customers does not put at risk their IP rights': Australian Patent Office *Manual of Practice and Procedure*, Volume 2, 2003, Para 0.1.

¹² *Ibid*, Para 0.2.

comprehensive; all objections are informative; a correct search strategy is adopted; all actions are completed within the required times; and staff are helpful.

Each of the standards is discussed in more detail. For example, the standard relating to national examination search strategies is explained by the following:

A correct search strategy is one that is carried out in the most economical way while ensuring a high probability of finding the relevant prior art, and takes account of the preferred embodiments (“inventive concept”), not just the broadest claims. It is thus possible that a correct search will not find all prior art that fully anticipates a broad claim that is unsupported by the embodiments. Examiners should use their judgment as to whether or not they carry out any additional search at a subsequent report stage. Normally such additional searches would only be considered where the scope of the claims has changed significantly or an opinion is no longer reserved.¹³

This explanation highlights that completeness is not necessarily the goal of the search, but that economy, or efficiency, is. That is, there needs to be cost effectiveness in terms of the time spent on the search. It may be noted, however, that examiners do not have to consider search strategies *ab initio* in all cases: ‘Search results, usually supplied by the applicant or prepared by an overseas office, are available on most applications that have requested examination’.¹⁴ Examiners still have to ‘use their judgement’ when they consider how the results supplied are to be utilised.¹⁵

Variation between examiners is also explicitly catered to in the Manual. Under the standard relating to the consistency of objections, it is stated that:

It does not matter if different examiners who recognise the same issue employ different objection strategies derived from different statutory basis that may apply to the same issue, so long as the nature of the issue is adequately communicated. Nonetheless, wrong objections should not be taken.¹⁶

The end result, that only appropriate objections are made to applications, is the important factor here, rather than variations in the use of strategies by patent examiners.

¹³ Ibid, Para 0.2.7.

¹⁴ Ibid, Para 0.2.7.1.

¹⁵ If search results are provided, however, ‘examiners should not conduct further searches unless, in light of their knowledge of the art, it is likely that better art would be found that would invalidate the claimed subject matter not anticipated by the search results on file’: *ibid*.

¹⁶ Ibid, Para 0.2.3.1.

The customer, the patent applicant,¹⁷ is, as highlighted above, important to IP Australia's quality management. In addition to the implicit references above, Para 0.2.14 includes, as an explanation to the quality standard "Staff are helpful", specific reference to the organisation's Customer Service Charter. The linking of quality assessment with customer satisfaction is consistent with the approach taken by other patent offices overseas.¹⁸ The United Kingdom Patent Office, for example, has achieved ISO certification (ISO 9001:2000) for its patent granting process. According to the Office, central to their 'approach to patent processing is the level of customer service ... [the] primary criterion for any step in the process, and for the overall result, is therefore whether the applicant has received good service from the office'.¹⁹

(c) Understandings of Quality in Economic Analyses of Patents

In recent years there has been an increase in the amount of research conducted into the quality of patents by economists. The emphasis of their work is on the assessment of the outcome of the patent examination and appeal processes – the validity of the patents themselves. This section will consider a number of the significant publications in this area and will summarise the understandings of the notion of "patent quality" that underpin this area of economic research.

Much of the patent literature is not clear about what constitutes quality in a patent,²⁰ even to the extent that it has been acknowledged that 'patent quality is, to some

¹⁷ It is not clear, however, from the documentation whether the applicant is taken to mean the potential owner of the patent right or the patent attorneys who are likely to be the people who interact with IP Australia staff. This may present a concern for quality management processes which focus on "customer" satisfaction – who should be satisfied, the potential right-holder or the attorney who represents the potential right-holder? It is likely that, in most circumstances, the interests of the two classes of customer are the same. There is the potential, though, for a divergence of interest – a potential that may be usefully explored in future research.

¹⁸ Many of the significant patent offices around the world, however, do not privilege matters of quality control to the same extent. For example, the Manual of Patent Examining Procedure, 8th edition, of the USPTO does not have a specific section on quality policy. The USPTO does, however, have a Quality Review Program. This program provides for the monitoring of patent application examinations 'to improve quality and increase the likelihood of patents being found valid': § 1308.03. The Canadian approach to quality is even less obvious. The Canadian Patent Office Manual of Patent Office Practice uses the word "quality" once – with respect to the Patent Rules stipulating the quality of paper to be used for applications (p 9-1).

¹⁹ Accessed from <http://www.patent.gov.uk/patent/quality/qassurance.htm> 6 July 2005.

²⁰ Some commentators do not write of the quality of patents directly, but examine "good" and "bad" patents. For example, Jensen and Webster consider that an economically desirable or "good" patent has three properties: it must represent an invention which incurred significant costs to create since a costless invention would have been invented in the absence of a patent system; it must create social benefits when used; and it must be able to be defined without trespassing on existing property rights.

extent, in the eye of the beholder'.²¹ One patent lawyer implies that patent quality and patent value are closely linked.²² Another intimates that patents for trivial inventions are low quality patents.²³ Some of the key contributions in this area, however, provide a more detailed picture of what is meant by patent quality, at least in economic terms.

One of the first articles in the current debate on quality in patents is Robert Merges' 'As Many as Six Impossible Patents before Breakfast'.²⁴ Merges does not define, in detail, what he means by a bad quality patent. He does, however, refer to 'improperly granted patents'.²⁵ Further, he suggests, with disapproval, that patents are 'routinely issued which overlook clearly anticipating prior art',²⁶ with the result that 'error rate for these patents is likely to be quite high'.²⁷ Another descriptor linked to Merges' assessment of patent quality is a reference to past experience with biotechnology patents, where the United States Patent and Trademark Office (USPTO) was 'allowing too many overly broad patents'.²⁸ He also applies the phrase 'socially wasteful'²⁹ to patents that the Patent Office should be rejecting – the 'issuance of an invalid patent results in some social costs that could have been avoided'.³⁰

P. Jensen and E. Webster, 'Achieving the Optimal Power of Patent Rights' Intellectual Property Research Institute of Australia, Working Paper 15/04, (2004), 6.

²¹ A. Jaffe and J. Lerner, *Innovation and Its Discontents: How Our Broken Patent System is Endangering Innovation and Progress, and What to do about it*, Princeton University Press, Princeton, 2004, 171.

²² The article 'describes a purely objective approach for comparatively assessing and rating patent quality based on reported abandonment rates of patents sharing statistically similar attributes ... ratings may be used for comparative patent analysis of as a general guide in conducting patent valuation analysis': J. Barney, 'Comparative Patent Quality Analysis: A Statistical Approach for Rating and Valuing Patent Assets' (2001), accessed from www.patentsratings.com/001/nacv_white_paper.pdf, 21 June 2005. Another economist links patent quality, as represented by forward citations and prior art references, with patent value: S. Nagaoka, 'Patent Quality, Cumulative Innovation and Market Value: Evidence from Japanese Firm Level Panel Data', Institute of Innovation Research, Hitotsubashi University, Working Paper 05-06, (2005), 2.

²³ 'Issuing patents on previous or trivial inventions confers market power to restrict access and raise prices and it enables the patent holder to use litigation as a competitive weapon without any offsetting benefits in terms of incentives for making genuine advances': S. Merrill, 'Improving Patent Quality: Connecting Economic Research and Policy' in *Patents, Innovation and Economic Performance*, OECD Conference Proceedings, 2004, 112-3.

²⁴ 'As Many as Six Impossible Patents before Breakfast: Property Rights for Business Concepts and Patent System Reform' (1999) 14 *Berkeley Technology Law Journal* 577. The main thrust of this piece is the potential for problems to arise from the granting of patents over business methods.

²⁵ *Ibid*, 588.

²⁶ *Ibid*, 589.

²⁷ *Ibid*, 590.

²⁸ *Ibid*.

²⁹ *Ibid*, 591.

³⁰ *Ibid*, 592.

Another significant article in the debate is by Mark Lemley, ‘Rational Ignorance at the Patent Office’.³¹ Lemley does not discuss the nature of “quality” patents, but does highlight the costs associated with “bad” patents. The relevance of the article to this Paper lies in his assessment that, as the vast majority of patents are not commercially valuable, it is not necessarily efficient to expend increased amounts of money on patent examination. His conclusion – ‘we should resign ourselves to living with a system in which “bad” patents do slip through the PTO undetected’,³² litigation is a better method for ensuring that scarce resources are spent only on those patents that are worth fighting over.³³

Both Merges and Lemley appear to reinforce the statement of one commentator: ‘quality patents are, in short, valid patents’.³⁴ For Thomas, these are quality patents because they

may be reliably enforced in court, consistently expected to surmount validity challenges, and dependably employed as a technology transfer tool. Quality patents fortify private rights by making their proprietary uses, and therefore their value, more predictable. They also clarify the extent to which others may approach the protected invention without infringing. These traits in turn strengthen the incentives of private actors to engage in value-maximising activities such as innovation or commercial transactions.³⁵

These characteristics provide a greater degree of certainty to patent holders. Patentees may utilise the technology with greater confidence (or use the grant as a source of capital) if there is an improved chance that the grant will be enforceable in a court. This understanding seems to link both foci of patent office assessments of quality – validity and customer satisfaction.

³¹ (2001) 95 *Northwestern University Law Review* 1495.

³² *Ibid*, 1531-2.

³³ Lemley’s article produced significant discussion amongst commentators, for example, see S. Ghosh and J. Kesan, ‘What do Patents Purchase? In Search of Optimal Ignorance in the Patent Office’ (2004) 40 *Houston Law Review* 1219. Ghosh and Kesan use the concept of bounded rationality, discussed above, to challenge Lemley’s assumption of the USPTO’s “rational ignorance”.

³⁴ J. Thomas, ‘The Responsibility of the Rule-maker: Comparative Approaches to Patent Administration Reform’ (2002) 17 *Berkeley Technology Law Journal* 727, 730. The Federal Trade Commission stated that that a ‘poor quality or questionable patent is one that is likely invalid or contains claims that are likely overly broad’, *To Promote Innovation: A Proper Balance of Competition and Patent Law and Policy*, Report, 2003, 8. Further, the Commission argued that to increase patent quality meant to reduce the ‘error rate’ associated with the grant of patents: *ibid*, 7.

³⁵ Thomas, above n 34, 730-1.

Other economists have cast the net wider and argued that there are multiple aspects to a “high quality” patent.³⁶ Such patents are those

- ‘which describe an invention that is truly “new”, rather than an invention that is already in widespread use but not yet patented’;³⁷
- which ‘enable those “skilled in the art” to comprehend the invention well enough to use the patent documentation for implementation of the described invention’;³⁸ and
- where there are ‘relatively little uncertainty over the breadth of its claims, ie, over what specific features of a technical advance are claimed under the terms of the patent’.³⁹

Dietmar Harhoff has argued that there are four aspects to patent quality:

- High evaluation standards;
- Rigorous implementation of standards by patent offices and courts;
- Clearly delineated, non-overlapping patent rights; and
- Minimum inventive step standard rigorously applied.⁴⁰

In addition to issues of validity and patentee satisfaction, these understandings include the effect of patents on the competitors of patent holders. Harhoff’s requirement for delineated rights reinforces Hall, et al’s desire for the lack of uncertainty over the breadth of claims. Both indicate a recognition that certainty with respect to the extent of the granted monopoly rights makes it easier for competitors to be clear which behaviour, on their part, would infringe a granted patent.

³⁶ A number of these aspects reflect the legal requirements for a valid patent, and therefore, the economists who measure these factors are assessing more specific elements of the enforceability of a granted patent.

³⁷ B. Hall et al, ‘Prospects for Improving US Patent Quality via Post-Grant Opposition’, National Bureau of Economic Research, Working Paper 9731 (2003), 2.

³⁸ Ibid, 3. This aspect may be seen to be similar to the standard of validity, however, this aspect emphasises the educative role of the patent system. That is, one fundamental reason for granting of legal protection for the exploitation of the patented subject matter is only that the information about the subject matter is made public. In other words, it is a ‘general objective of the patent system that the *teaching* of the specification should be made available to the public’: J. McKeough, A. Stewart and P. Griffith, *Intellectual Property in Australia*, 3rd ed., LexisNexis Butterworths, Sydney, 2004, 316, emphasis added

³⁹ Hall et al, above n 37, 3.

⁴⁰ ‘The Demand for Patents and the Evolution of Patent Quality’, paper presented to Advancing Knowledge and the Knowledge Economy Conference, National Academy of Sciences, January 11, 2005.

There are three aspects to a quality patent that may be gleaned from this discussion – validity (compliance with the letter of the national statutes), patentee satisfaction and the certainty of competitors.⁴¹ These three aspects do not always coincide. The literature, for example, suggests that a patent applicant may have a variety of reasons for pursuing protection. These include a desire to create ‘retaliatory power against competitors; create ‘better possibilities of selling licences’; provide ‘motivation for employees to invent’; provide a ‘measure of R & D productivity’; and improve the ‘corporate image’.⁴² Assessing the quality of a patent in terms of the interests of the applicant may not, therefore, reflect the public purpose of the patent system – the encouragement of innovative activity. An alternative, then, is to examine the quality of a patent in terms of the process that produced it.

(d) Quality and Process

One of the dominant themes in the preceding discussion is the assumed importance, by other researchers, of the end product in assessing quality. Management theory commentators allow for a broader view. For example, one article describes four understandings of the idea of “quality”. These perspectives were ‘quality is excellence’, ‘quality is value’, ‘quality is conformance to specifications’ and ‘quality is meeting and/or exceeding customers’ expectations’.⁴³ While the article that raised the four aspects has a focus on quality in products, it is possible to apply the standard to a process.⁴⁴ Instead of, or in addition to, measuring the excellence of a product, an assessment may be made of the conduct of the process.

If the quality of the process is considered, then, the next step is to examine how a process is to be looked at. A central element of the process is the body of patent examiners. Their importance is reinforced by research examining the variations in

⁴¹ There are links between the outcome focus of economists and quality management discipline in management theory. Total Quality Management (a quality management method), when applied to the public sector, needs to be (1) ‘customer-driven’ and (2) ‘strategically focussed on outcomes and processes’: C. Morgan and S. Murgatroyd, *Total Quality Management in the Public Sector: An International Perspective*, Open University Press, Buckingham, 1994, 190. I thank Mitch Casselman for introducing me to ideas in quality management theory.

⁴² O. Granstrand, *The Economics and Management of Intellectual Property: Towards Intellectual Capitalism*, Edward Elgar, Cheltenham, 1999, 78.

⁴³ C. Reeves and D. Bednar, ‘Defining Quality: Alternatives and Implications’ (1994) 19 *Academy of Management Review* 419, 420-3. The penultimate aspect, quality as “conformance to specifications”, may be seen to align with previously highlighted understandings of quality patents as those that comply with the *Patents Act*; and the final aspect may be seen to reflect the customer focus of patent quality discussed above.

⁴⁴ The first aspect, quality as “excellence” is problematic because it does not appear to provide any usable metric for assessment: *ibid*, 428.

granted patents based on variations in examiners, which suggested that ‘there may be as many patent offices as patent examiners’.⁴⁵ This work assessed patent indicators and litigation rates in terms of individual examiners – the finding:

Though the examination process is relatively structured, and USPTO devotes considerable resources to quality control, substantial discretion is provided to examiners in how they deal with applications, and the extent to which they exercise this discretion can vary substantially across examiners.⁴⁶

This research suggests that there may not be any absolute test of quality of the patent examination procedure, but quality could best be defined with respect to the limitations that exist in the environment of groups of examiners.

This is not to suggest that bad patents should be blamed on bad examiners. The purpose of this Working Paper is to focus, in the abstract, on one aspect of the work of examiners. It also may be noted that the purpose of this exploration of the potential use for decision-making theories is intended to complement, not replace, the research that has been carried out into the quality of the granted patents. It is at least arguable that a quality process will necessarily produce a quality product, whereas it may be more luck that will allow a quality product from a poor process. One potential method of assessing the process is to understand the decision-making aspects of the examination of patent applications. This approach will be the focus of the rest of this Paper.

3 - Theoretical Understandings of Decision-Making

Decisions are central to many academic and professional endeavours, ranging from politics to economics to psychology and law.⁴⁷ A significant body of work has developed to improve the understandings of decision-making processes. These models include “incrementalism”, “bounded rationality”, “naturalistic decision-making” and “game” theories.⁴⁸ The value of this discussion is to draw out those aspects of the

⁴⁵ I. Cockburn, S. Kortum and S. Stern, ‘Are All Patent Examiners Equal? The Impact of Characteristics on Patent Statistics and Litigation Outcomes’ (2002) *National Bureau of Economic Research Working Paper*, 8980, 2.

⁴⁶ *Ibid*, 9.

⁴⁷ There is significant discussion within the jurisprudence literature on the manner in which judges “make” decisions. See, for example, R. Dworkin, ‘Hard Cases’ in *Taking Rights Seriously*.

⁴⁸ These are by no means the only approaches in the literature. For example, a ‘mixed scanning’ model was proposed to address perceived shortcomings of the rational choice and incrementalist theories: A. Etzioni, ‘Mixed-Scanning: A “Third” Approach to Decision-Making’ (1967) 27 *Public Administration Review* 385. The mixed scanning understanding incorporates a perception that a decision-maker needs to assess the “big picture” aspect of a decision. For an example of the “mixed-scanning” approach applied to judicial decision-making, see N. Snortland and J. Stanga, ‘Neutral Principles and Decision-

mainstream theories relevant to this Working Paper and to consider them in the context of the limited nature of decisions involved in the patent examination process. The purpose is not to assert which of the models is most appropriate with respect to patent procedure but to explore the decision-making literature in order to add greater context to understandings of the work of patent examiners.⁴⁹

Prior to the discussion, there needs to be a brief description of what is meant by the word “decision”. It is arguable that the actions of examiners during the patent examination process involves the exercise of discretion, rather than the making of a decision. To some extent, the words are synonymous. Both reflect the capacity (or ability) of an individual to choose between particular avenues of action.⁵⁰ For the purposes, therefore, of this Paper, and the subsequent empirical research that is to ensue, the conduct of examiners, with respect to limited aspects of the process (those aspects which are not inflexible practices), will be seen as decisions. It is acknowledged, however, that the decisions have little effect beyond its role in the overall examination process, and therefore, may be seen as “small-scale”.⁵¹

making Theory: An Alternative to Incrementalism’ (1973) 41 *George Washington Law Review* 1006. A significant early model is the behavioural decision theory of Ward Edwards, ‘The Theory of Decision Making’ (1954) 51 *Psychological Bulletin* 380. Under this model, decision-makers consider their subjective expected utility from the decision and reach the optimal solution for them. As these models do not appear to be readily applicable to patent examination, the approaches are not examined here.

⁴⁹ It is also to be emphasised that the discussion of these theories is in the abstract. It is not intended that the work here is a critique of the practices of IP Australia. The detail of Australian practice was given above in order to provide a practical guide to a typical patent examination process – the theories to be described here are likely to be equally applicable to the USPTO or the European Patent Office. An example of the abstract nature of the discussion is the consideration of patent examiners as individuals. IP Australia uses three person search strategy teams (Australian Patent Office *Manual of Practice and Procedure*, Volume 2, 2003, Para 12.9.8). The consideration of multiple examiners is beyond the scope of this exploratory Working Paper and is best incorporated in materials produced for the empirical research.

⁵⁰ The *Australian Oxford Paperback Dictionary* (1989) defines “decision” as, *inter alia*, ‘the ability to form clear opinions and act on them’; and “discretion” as ‘freedom or authority to act according to one’s judgement’. The congruence of the two terms is emphasised by the same dictionary’s definition of “at a person’s discretion” as ‘in accordance with his or her decision’.

⁵¹ It is also recognised that the description of the examination process is, to an extent, idealised. The use of search strategy decisions as an example of the decision-making processes is arguably incomplete because there is no discussion of the global context of applications (that is, patent applicants often file for patents in a number of jurisdictions at the about the same time) and there is no specific engagement with the nature of decisions around applications that have already been examined and found lacking in a material way. The purpose of this Working Paper is to highlight the potential role of decision-making theory in the assessment of patent quality – the level of detail provided here is sufficient for this stage of the process. Any empirical research that follows on will be on the basis of a more complete picture of the examination process.

(a) Bounded Rationality

Herbert Simon developed the “bounded rationality” approach to understanding the decision-making process as, to a large extent, a reaction to the problems associated with the earlier rational choice model.⁵² In one of his first explorations of the ideas, Simon argued for an ‘approximate rationality’ exercised by a ‘choosing organism of limited knowledge and ability’.⁵³ This approach is also known as either “procedural” or “adaptive” rationality⁵⁴). For Simon, ‘human behaviour is intendedly rational, but only limitedly so’.⁵⁵

Bounded rationality recognises that decisions ‘cannot wait until everything is known. The [decision-maker] makes a decision which he or she hopes will be satisfactory and will suffice to meet the organisation’s needs at the moment’.⁵⁶ This desire to do ‘good enough’ in the making of a decision is referred to as ‘satisficing’ behaviour.⁵⁷ As with ‘comprehensive rationality’, ‘bounded rationality assumes that actors are goal-oriented ... [and] that behaviour is determined by the mix of incentives facing the decision-maker’.⁵⁸

The limitations of decision-makers are recognised in the understanding that their ‘bounded cognitive ability’ means that there is a reduced ‘ability to plan long behaviour sequences’ and the ‘bottleneck of short term memory produces a ‘tendency

⁵² The “rational choice” model of decision-making has been described in terms of “an actor becomes aware of a problem, posits a goal, carefully weighs alternative means and chooses among them according to his estimates of their respective merit, with reference to the state of affairs he prefers’. Etzioni, above n 48, 385. That is, the “rational choice” understanding of decision-making is based on a number of assumptions. These assumptions relate to the knowledge that a decision-maker *has* to be aware of before making a decision. This knowledge includes: the ‘set of alternatives open to choice’; the ‘relationships that determine the pay-offs (“satisfactions”, “goal attainment”) as a function of the alternative that is chosen’; and the ‘preference-orderings among pay-offs’: H. Simon, *Models of Man: Social and Rational*, John Wiley & Sons, New York, 1957, 242.

⁵³ H. Simon, ‘A Behavioural Model of Rational Choice’ (1955) 69 *Quarterly Journal of Economics* 99, 114. For Etzioni, ‘decision-makers have neither the assets nor the time to collect the information required for rational choice’: above n 48, 386. More recent understandings of rational choice theory do incorporate some of the criticisms with respect to the assumption of the completeness of knowledge. See, for example, R. Congleton, ‘In Defence of Ignorance: On the Significance of a Neglected Form of Incomplete Information’ (2001) 27 *Eastern Economic Journal* 391.

⁵⁴ V. Vanberg, ‘Rational Choice, Rule-Following and Institutions: An Evolutionary Perspective’ in U. Mäki, B. Gustafsson and C. Knudsen (eds), *Rationality, Institutions and Economic Methodology*, Routledge, London, 1993, 179.

⁵⁵ Quoted in D. Dequech, ‘Bounded Rationality, Institutions and Uncertainty’ (2001) 35 *Journal of Economic Issues* 911, 913.

⁵⁶ D. Corbett, *Australian Public Sector Management*, 2nd ed, Allen and Unwin, Sydney, 1996, 62.

⁵⁷ B. Jones, *Politics and the Architecture of Choice: Bounded Rationality and Governance*, University of Chicago Press, Chicago, 2001, 61.

⁵⁸ B. Jones, ‘Bounded Rationality’ (1999) 2 *Annual Review of Political Science* 297, 299.

to operate on goals sequentially'.⁵⁹ These limitations produce a decision-making process that can be seen as 'attention-driven choice'⁶⁰ – what maintains the focus of the decision-maker disproportionately affects the resulting decision.⁶¹

Bounded rationality has been incorporated into the mainstream of the economics profession,⁶² though it has not been received unquestioningly. One concern that has been voiced relates to the relevance of the theory in 'situations of fundamental uncertainty' as a result of its 'neglect of novelty and surprise'.⁶³ This view suggests that 'if novelty, creativity and the like are important', where rule following is not the norm, 'rationality is not just bounded',⁶⁴ and the theory is less applicable.

The application of the bounded rationality ideas to the patent examination process produces a reasonable "fit". The focus, for example, of the examiners is limited, with respect to the searches for the prior art at least, to the goal of what would be considered a good search strategy in the circumstances.⁶⁵ It is possible, also, that the strategy selected is strongly influenced by the strategies provided in the patent application. Further, given the role of patent examination in the patent system, the decision-making process does not have to take account of fundamental uncertainties and does not need to reflect opportunities for novelty and surprise. That is, as there is a large degree of rule following in the creation of search strategies, the theory may be of greater relevance. The "fit" is not complete, however. The next decision-making

⁵⁹ Ibid, 301.

⁶⁰ B. Jones and F. Baumgartner, 'A Model of Choice for Public Policy' (2005) 15 *Journal of Public Administration Research and Theory* 325, 334.

⁶¹ The attention-driven nature of the decision means that 'some aspects of the world are unmonitored, unattended to; other aspects are incorporated into the decision process beyond their intrinsic merit':
ibid.

⁶² Dequech, above n 55, 911.

⁶³ Ibid, 922.

⁶⁴ Ibid.

⁶⁵ The search strategy adopted by patent examiners is used as an example throughout this Working Paper. This is not to imply that the decisions involved in searches are indicative of all decisions made by examiners. For the purposes of this Paper, it is not important whether these decisions are typical or not – the theories highlighted here are applicable to all decisions and – and search strategy decisions provide an easily understood example for those who do not have hands-on experience of the examination process. Further, it is arguable that search decisions are among the more important as later decisions with respect to novelty and inventive step are based on the outcome of the prior art searches. If there are concerns over search strategies adopted then there may be a direct impact on the quality of the granted patent. The importance of search strategies to the quality of patents is such that it is a topic in science publications. See, for example, J. Barton, 'Reforming the Patent System' (2000) 287 *Science* 1933 and P. Marks, 'It's Groundhog Day for Inventions' *New Scientist* 2 April 2005, 26.

theory to be examined, incrementalism, builds on the ideas behind “bounded rationality”.⁶⁶

(b) Incrementalism

The incrementalist approach may be seen as ‘an application’ of the bounded rationality ‘paradigm’.⁶⁷ “Incremental” approaches to decision-making involve a number of different strategies. These include analysis:

- ‘limited to consideration of alternative policies all of which are only incrementally different from the status quo’;
- ‘limitation of analysis to a few somewhat familiar policy alternatives’;
- that is a ‘sequence of trials, errors and revised trials’;
- ‘that explores only some, not all, of the important possible consequences of a considered alternative; and
- ‘limited to any calculated or thoughtfully chosen set of stratagems to simplify complex policy problems’.⁶⁸

Each of these strategies are focused on the consideration and application of a limited number of options. That is, decision-makers, in the ‘real world, make their decisions incrementally, by a succession of limited comparisons of alternatives with which they are already familiar through past experience’.⁶⁹ This approach is seen as pragmatic because ‘limiting the focus to small variations from current situations makes good use of available knowledge’.⁷⁰ Further, the theory acknowledges that there is ‘no one decision or “right” solution but a “never-ending series of attacks” on the issues at hand through serial analyses and evaluation’; as a result, ‘incremental decision-

⁶⁶ A further model that has built on this work is the “fast and frugal” decision-making model (G. Gigerenzer and D. Goldstein, ‘Reasoning the Fast and Frugal Way: Models of Bounded Rationality’ (1996) 103 *Psychological Review* 650). This model has been used in an experiment on decisions that form part of academic literature searches, but the conclusion of the study was ‘there is some way to go before a useful applied system can be developed’: M. Lee, N. Loughlin and I. Lundberg, ‘Applying One Reason Decision-Making: The Prioritisation of Literature Searches’ (2002) 54 *Australian Journal of Psychology* 137, 142. I thank Melissa Wood for highlighting the relevance of this research.

⁶⁷ J. Padgett, ‘Bounded Rationality in Budgetary Research’ (1980) 74 *American Political Science Review* 354, 354.

⁶⁸ C. Lindblom, ‘Still Muddling, Not Yet Through’, (1979) 39 *Public Administration Review* 517, 517-8.

⁶⁹ D. Corbett, *Australian Public Sector Management*, 2nd ed, Allen and Unwin, Sydney, 1996, 63.

⁷⁰ W. Hoy and C. Tarter, *Administrators Solving the Problems of Practice: Decision-Making Concepts, Cases and Consequences*, Allyn and Bacon, Boston, 1995, 41.

making is described as remedial, geared more to the alleviation of present, concrete [concerns] than to the promotion of future social goals'.⁷¹

Concerns have been raised over the incrementalist understanding. Dror has argued that the theory is lacking because it relies on three unacknowledged conditions:

- the 'results of present policies must be in the main satisfactory ... so that marginal changes are sufficient for achieving an acceptable rate of improvements';
- 'there must be a high degree of continuity in the nature of the problems'; and
- 'there must be a high degree of continuity in the available means for dealing with problems'.⁷²

Etzioni expressed his concerns with the approach differently. On the macro level, he argued that incrementally-made decisions 'would, of necessity, reflect the interests of the most powerful'⁷³ as the powerful have already established the present policies and any small deviation would not be sufficient to challenge these interests. Second, Etzioni argued that 'incrementalism would tend to neglect basic societal innovations, as it focuses on the short run and seeks no more than limited variations from past policies'.⁷⁴

A third criticism was posited. Incrementalist understandings do not adequately theorise the relationship between the smaller decisions and what Etzioni characterises as 'fundamental' decisions – the example he gives is of declaring war. More specifically, he argued that 'most incremental decisions specify or anticipate fundamental decisions, and the cumulative value of the incremental decisions is greatly affected by the related fundamental decisions'.⁷⁵ Because there was no clarity about the impact the smaller scale decisions have on the bigger picture, or vice versa, the incremental model was seen, by Etzioni, as being incomplete.

When the incrementalist understanding is applied to the patent process, the concerns of other theorists are not as important. There is little scope for fundamental decisions

⁷¹ Etzioni, above n 48, 386-7.

⁷² Y. Dror, 'Muddling Through: "Science" or Inertia?' (1964) 24 *Public Administration Review* 153, 154. Dror's criticisms were based on an earlier exposition of Lindblom's theory, however, the concerns may still be seen to exist.

⁷³ Above n 48, 387.

⁷⁴ Ibid.

⁷⁵ Ibid, 388.

in assessing search strategies and the discretion of examiners is not broad enough to provoke substantial change or to challenge the hegemony of the patent system.⁷⁶ On its face, the incremental model appears to reflect the techniques and practices associated with the work of examiners during the application process. That is, the search strategies decided upon by examiners are likely to be only incrementally different from ones carried out by examiners in the past, with the fundamental approach and purpose remaining constant.

(c) Naturalistic Decision-Making

The naturalistic decision-making theory is a recent addition to the stable of work in this area. This approach, part of the discipline of experimental psychology, has been defined as an examination of

how experienced people, working ... in dynamic, uncertain and often fast-paced environments, identify and assess their situation, make decisions and take actions whose consequences are meaningful to them and to the larger organisation in which they operate.⁷⁷

It has further summarised as an analysis of ‘how people use experience to make decisions in naturalistic environments (eg. under time pressure, shifting conditions, unclear goals, degraded information and within team interactions).⁷⁸ A common theme ... is the role of expertise in decision making’.⁷⁹ These studies have often focussed on high pressure decision-making,⁸⁰ however, the emphasis on expertise makes the research useful for the purpose of assessing the patent examination process.⁸¹

⁷⁶ There may be other decisions related to the granting of patents that may be seen as fundamental, for example the extension of patent protection to business methods. These are, however, though internal to the patent office, most likely outside the power of individual examiners.

⁷⁷ C. Zsombok, ‘Naturalistic decision-making: where are we now?’ in C. Zsombok and G. Klein (eds), *Naturalistic Decision Making*, Lawrence Erlbaum, Mahwah NJ, 1997, 5.

⁷⁸ ‘Natural decision making’ has been described as a ‘label for a loose grouping of non-standard models of individual decision making’: T. Connolly and K. Koput, ‘Naturalistic Decision Making and the New Organisational Context’ in Z. Shapira (ed), *Organisational Decision Making*, Cambridge University Press, Cambridge, 1997, 285. Sub-groups include ‘Image Theory’, ‘Decision Cycles’, ‘Explanation-based Decision Making’, ‘Situation Assessment and Recognition’, ‘Cognitive Continuum Theory’ and ‘Dominance Search Model’: *ibid*, 286-9.

⁷⁹ T. Elliott, *Expert Decision-Making in Naturalistic Environments: A Summary of Research*, Defence Science and Technology Organisation, Edinburgh SA, 2005, 8.

⁸⁰ It has been applied, for example, in military contexts, see G. Kaempf, G. Klein, M. Thorsden and S. Wolf, ‘Decision Making in Complex Naval Command and Control Environments’ (1996) 38 *Human Factors* 220.

⁸¹ There is debate in the literature as to what constitutes expertise (either ‘professional or social credentials’ or ‘exceptional skill’: J. Phillips, G. Klein and W. Sieck, ‘Expertise in Judgment and Decision Making: A Case for Training Intuitive Decision Skills’ in D. Koehler and N. Harvey,

Much of the work is based on the recognition-primed decision model,⁸² which ‘describes how decision makers can rely on their experience to recognise situations and identify viable courses of action without comparing the relative benefits or liabilities of multiple courses of action’.⁸³ That is, unlike earlier models of decision-making, there is an acknowledgement that in many situations, decisions are very quick, without the need for detailed thought. It is also recognised, however, that an ‘important attribute of expert decision makers is that they seek a course of action that is workable, but not necessarily the best or optimal decision’;⁸⁴ an assessment that follows on from the “bounded rationality” theory expounded by Simon.

In an approach that may be linked to incrementalist understandings of decisions, one study has shown that decision-makers try to match “features” of the situation before them with past experience, in order to produce a course of action.⁸⁵ That is, decision makers build on their past experiences and follow a course of action in keeping with previous successes. In the patent examination context, this suggests that examiners will match features of applications in front of them with past applications, and then establish a search strategy in keeping with their past experience.

One variation of the model includes the situation where the ‘decision maker must actively work at generating an accurate assessment of the situation’.⁸⁶ This version recognises the need for a decision maker to interact with the situation. This may include, in the patent examination context, requiring a patent applicant to provide more information, or asking a more experienced examiner for advice on a search strategy.

Naturalistic decision-making understandings may be seen to provide a useful background for assessing the conduct of examiners. One drawback to this approach, and the previous models highlighted, is that there is not a detailed understanding of potential relationships between examiners and applicants, or patent attorneys. That is,

Blackwell Handbook of Judgment and Decision Making, Blackwell, Malden MA, 2004, 299). For the purposes of this Working Paper, it is sufficient to acknowledge that patent examiners have a level of expertise that is fundamental to the decisions they make during the patent examination process.

⁸² This is the ‘model most closely associated with the NDM perspective’: R. Pliske and G. Klein, ‘The Naturalistic Decision-Making Perspective’ in S. Schneider and J. Shanteau, *Emerging Perspectives on Judgment and Decision Research*, Cambridge University Press, Cambridge, 2003, 563.

⁸³ Kaempf, et al, above n 80, 220.

⁸⁴ Phillips, Klein and Sieck, above n 81, 305.

⁸⁵ Kaempf, et al, above n 80, 227.

⁸⁶ Phillips, Klein and Sieck, above n 81, 305.

these approaches view the decisions of examiners in isolation. The next model, game theory, allows for such interactions.

(d) Game Theory

Game theory may appear out of place in this discussion of other models of decision-making. This is, in part, because it arose first in the field of mathematics (whereas the others are from the social sciences) and also because game theory focuses on interactions between people, rather than the decision-making processes of an individual. The detail of the theory, and in particular, the mathematics that informs it, will not be entered into here. There will, however, be a brief description to demonstrate the relevance of game theory to decisions made by patent examiners.⁸⁷

The basic idea behind game theory is, naturally a ‘game’, featuring a ‘group of players, each maximising his pay-off ... [in which] each player has to consider the possible reactions of other players to his moves in deciding his optimal move’. Further, ‘he does not know the moves of his opponent with certainty. But he has to take a decision about his move with some sort of rational justification’.⁸⁸ That is, a player is aware that any action she or he carries out will be responded to by the opponent, and therefore, potential responses have to be considered prior to any decision being made.

The value of game theory to this Working Paper is that it provides a theoretical context for examining the decision-making of the patent examiner in the context of a “game” (or relationship) with the patent attorney making the application. That is, an examiner, although dealing with an extant application, knows that a patent attorney will respond to any objection the examiner raises (this is, in part, a result of the fact that there is a limited number of patent attorneys and that attorneys are “repeat players” in the process of applying for patents). Whilst the imperative of the examiner is to ensure that patent applications comply with the law, it is recognised that examiners are not Weberian ideal type bureaucrats,⁸⁹ and therefore may act in the context of a human relationship, rather than as a entirely rational automaton.⁹⁰

⁸⁷ I am indebted to Paul Jensen for highlighting the value of game theory to the understanding of decision-making and the patent examination process.

⁸⁸ T. Biswas, *Decision-Making Under Uncertainty*, Macmillan, Basingstoke, 1997, 119.

⁸⁹ For Weber, the ‘ideal type of bureaucracy is, in terms of formal rationality, the most rational type of organisation possible’; where ‘formal rationality of action refers to the degree to which conduct is organised according to rationally calculable principles’: A. Giddens, *Capitalism and Modern Social*

There are variations on the “games” theorised in the discipline. These include “zero-sum games” and “non-strictly competitive games”. The different variations suggest different successful strategies. For example, a difference between the two mentioned variations is that in the ‘zero-sum case, it is never advantageous to disclose one’s strategy’.⁹¹ In non-strictly competitive games, communication between the parties may be mutually beneficial. This conception of games may be more closely linked to the patent examination process because some of the goals of the examiners and attorney are aligned – both groups want a functioning patent system and both groups want to maximise the efficiency of the transaction.

In short, ‘game theory is the science of strategic decision-making. It is a powerful tool in understanding the relationships that are made and broken in the course of competition and co-operation’.⁹² It is relevant to the understanding of the decisions made by patent examiners because it provides a theoretical context for the relationship between examiner and attorney (whether competitive or co-operative). It is noted, however, that most understandings of game theory characterise both players as having a direct interest in the outcome of the game. It is not clear that examiners have such a direct interest in the decisions they make.⁹³ As with the previous theories discussed, game theory is useful, though only in part, for the assessment of quality of the patent process.

(e) Decision-Making Theory Summary

None of the four models described above provide a comprehensive match for the decision-making processes undertaken by patent examiners. There are two reasons for this. One, as they are models, they are intended to apply to a variety of circumstances without necessarily being ideally suited to any. Perhaps more importantly though, the

Theory: An Analysis of the Writings of Marx, Durkheim and Max Weber, Cambridge University Press, Cambridge, 1971, 183.

⁹⁰ The sociologist Tönnies conceived of actual human relationships being situated on a continuum between purely the impersonal (*gesellschaft*) and the purely personal (*gemeinschaft*) – what may loosely be seen as commercial opposed to familial. Tönnies recognised, however, that few relationships were placed at either extreme. See F. Tönnies, *Community and Society*, Transaction Publishers, New Brunswick, 1988.

⁹¹ R. Luce and H. Raiffa, *Games and Decisions: Introduction and Critical Survey*, John Wiley and Sons, New York, 1957, 111.

⁹² A. Kelly, *Decision-Making Using Game Theory*, Cambridge University Press, Cambridge, 2003, ix.

⁹³ The literature does, however, suggest that examiners, at least in the US, have an interest in processing as many applications as possible: Jaffe and Lerner, above n 21, 136.

limited nature of examiner decisions make them difficult to theorise. The particular features of the process are that the examiners:

- are subject to time constraints;
- have restricted options available to them;
- have significant experience in making similar decisions;
- do not have a direct interest in the outcome of the decision;⁹⁴ and
- make the decision in the context of a “relationship” with the attorney who made the application.

As a result, each of the above models have some application to the process. For example, time constraints are a feature of the bounded rationality and naturalistic models and the limited options may be seen in the incrementalist theory – each search strategy decision, for example, is likely to be only incrementally different from previous searches carried out by the examiner.

Three key factors of the decision-making process may be highlighted now, in order to consider the possibility of research into the quality of the examination process. These are:

- the “habitual” nature of the decisions made;
- the importance of expertise; and
- the relationship with attorneys.

Each of these will be discussed with respect to the above decision-making theories.

One aspect of three of the theories of decision-making (bounded rationality, in particular, though there are strong links with incremental and naturalistic ideas) is the relevance of the recognition that many aspects of thinking and decision-making become ‘automatised’.⁹⁵ Simon talks of this aspect in terms of ‘habitual rationality’.

⁹⁴ It is acknowledged patent examiners have a small degree of self-interest in the outcome of the decision-making process (that is, if they make too many bad decisions, they may be out of a job). This self-interest, however, only relates to the decision being “right” or “wrong”, it does not relate to bias toward one particular outcome, for example, with respect to the search strategy. This low level of self-interest is why discussions of risk, for example, are not directly relevant to this paper. For a specific decision-making theory that engages with the risk in the decision-making process, see D. Kahneman and A. Tversky, ‘Prospect Theory: An Analysis of Decision under Risk’ (1979) 47 *Econometrica* 263.

⁹⁵ R. Selten, ‘What is Bounded Rationality?’ (1999) Sonderforschungsbereich Discussion Paper, B-454, 4.

For him, there is value in this, as habits ‘may not only serve their purposes effectively, but also conserve scarce and costly decision-making time and attention’.⁹⁶ Vanberg expresses it more fully:

Simon suggests a theory of human decision-making which views an actor’s choice-behaviour as based on a repertoire of behavioural patterns, routines or programmes. The repertoire reflects, at any point in time, the actor’s past experience, and it is, through trial and error, continuously adjusted as new experiences are undergone. Routines that are found to work well tend to be retained, while experiences of failure encourage search for better programmes.⁹⁷

This understanding of ‘adaptive behaviour’⁹⁸ introduces aspects of learning theory. Ideas such as “reinforcement learning” and “learning direction theory” have been discussed, in the context of bounded rationality, by Selten.⁹⁹ This level of detail is not, however, needed for this Working Paper.

There are links between this habitual aspect of decisions and the role of expertise discussed in the naturalistic theories. People making decisions based on their experience in the area decide in a manner in keeping with both what they have done before and their expertise. To a large extent, expertise and habitual actions are inter-linked. For example, an examiner would be aware of leading court decisions in the area of patent law. After the decision had been learnt, its application would become a matter of habit and an aspect of her or his expertise. An important difference, however, is that some forms of expertise would be recognised by third parties and possibly the result of institutionalised education, whereas habit may be the result of personal behaviours only.

One aspect of the personal nature of the examination process that impacts, at least in terms of the theories advanced here, on the decisions is the relationship with patent attorneys. Game theory suggests that the use of strategies by the players may impact on the decisions made. The strategies, in turn, are likely to be affected by the expertise of the examiners (and the attorneys). To ignore the impact of strategies and “games” may provide an incomplete understanding of the decision-making process of examiners. The detailing of all the theories, however, allows for a broader

⁹⁶ H. Simon, *Administrative Behaviour: A Study of Decision-Making Processes in Administrative Organisations*, 4th ed, The Free Press, New York, 1997, 89.

⁹⁷ Vanberg, above n 54, 180.

⁹⁸ Simon, *Models of Man*, above n 52, 261.

⁹⁹ Above n 95, 15-6.

understanding of different ways of conceiving the issue under consideration that, in turn, will add to depth of any proposed techniques for testing patent quality.

4 – Assessing the Quality of Decision-Making in Patent Examination Process

The final part of this Paper draws together the practices detailed in the second part and the theoretical alternatives considered in the third part in order to provide a basis for future research that will produce a broader understanding of quality of decisions made in the patent examination process. The purpose of this part is to put forward possible methods for assessing the quality of decisions made by examiners when considering patent applications. These methods, in turn, will assist in the provision of new ways of improving the quality of the patent system overall.

(a) Proposed methods for assessing decisions in patent examination

Some commentators have already proposed ways of assessing the quality of the processes involved in patent examinations that do not focus on the court-assessed validity of the end-product. Merrill, for example, suggested the ‘peer review [of] the patent examination process with a representative sample of cases from different time periods’.¹⁰⁰ The focus of this appears to be whether the process overall was “successful”, rather than whether the decision-making processes specifically were well-directed. That is, there is little scope for analysis of the manner in which the decisions were made.

One publication does raise research options that allow for this level of detail. The Staff Union of the European Patent Office (SUEPO) released a Working Paper, *A Quality Strategy for the EPO*, in 2002.¹⁰¹ The publication was aimed at the

¹⁰⁰ Merrill, above n 23, 113. The Manual of Patent Examining Procedure, 8th edition, of the USPTO details the Office’s Quality Review Program. This program provides for the monitoring of patent application examinations ‘to improve quality and increase the likelihood of patents being found valid’: § 1308.03. Only applications that have given rise to granted patents are reviewed. Those that are to be reviewed are randomly selected and assessed by quality assurance specialists. Following complaints about the quality of business-method patents, the USPTO introduced a second level of examination for granted business method patents. Analysis of this reform suggests that it is a qualified success: J. Allison and S. Hunter, ‘On the Feasibility of Improving Patent Quality One Technology at a Time: The Case of Business Methods’ (2005) MIT Sloan Research Paper No. 4564-05. The *Guidelines for Examination at the European Patent Office* also do not include a section on quality standards. There is, however, provision for ‘regular quality checks’. Accessed from http://www.european-patent-office.org/dg1/brochures/index_search_doc.htm 6 July 2005. IP Australia also conducts a sampling of patent examinations. The results of these reviews are not, however, made public.

¹⁰¹ This publication recognises that there are both substantive and procedural elements to a “quality” patent. The substantive elements include ‘state of the art search’, ‘novelty and the level of inventive step’ (non obviousness); the procedural requirements include ‘procedural fairness’, ‘timeliness’ and

improvement of the quality of patents granted by the European Patent Office. The Union considered that ‘just spotting the problems in our “end product” is not enough for achieving quality’. Further, the ‘quality of the end product depends on that of the remaining components of the workflow, like the extent of accessible prior art, the quality of classification, the formalities work, etc’.¹⁰² The focus of the quality assessment may, therefore, usefully be on the patent examination process.

SUEPO proposed that quality in patent examinations may be assessed through the use of surveys.¹⁰³ The survey techniques considered were questionnaires and in-depth interviews. Three specific target groups are suggested: users (including applicants, patent attorneys and members of the public), experts (economists and academic lawyers) and examiners.¹⁰⁴ This approach should be useful in accessing whether the decisions made by examiners were effective.

The idea behind the method, the engagement with players in the examination process, reflects the ideas in this Working Paper. In order to assess the decision-making processes of the examiners it is important to know what they do and how they do it. To reinforce the usefulness of this approach, studies in the field of naturalistic decision-making have included interviews with decision-makers.¹⁰⁵ Further, the approach of bounded rationality theorists is also particularly valuable to this Paper; as an important implication of the theory, is that to understand the decision-making process, the ‘behaviour of decision-makers must be examined’.¹⁰⁶

(b) Proposed research into patent examination decision-making

As stated above, this Paper is to inform the second stage of this research into patent quality. The discussion of the decision-making theories will inform empirical research

‘affordability’: .Staff Union of the European Patent Office, *A Quality Strategy for the EPO*, Working Paper, 2002, 5.

¹⁰² Ibid, 16.

¹⁰³ The Union proposed two others. The first examines searches for prior art. “Pilot” searches could be conducted by examiners, ‘with the goal of finding the influence of certain parameters, like search time, search strategy, and classification or indexing structure, on the quality of the search result’. The second proposal is to explore the extent to which case law is used by examiners and how it impacts on the examination process: *ibid*, 15. These two methods would directly contribute to a naturalistic analysis of examiner decision-making as they both go to the expertise and knowledge of the examiners.

¹⁰⁴ With respect to the patent applicants, it is usefully proposed that, given the diversity of purposes to which patents are sought, ‘they could be surveyed about the quality of patents granted to others and about the level of inventive step and the scope of protection which they consider appropriate’: *ibid*.

¹⁰⁵ For example, Kaempf, et al, above n 80 (interviewed naval officers) and C. Dominguez, et al, ‘The Conversion Decision in Laproscopic Surgery: Knowing Your Limits and Limiting Your Risks’, cited in Pliske and Klein, above n 82 (interviewed surgeons).

¹⁰⁶ Jones, ‘Bounded Rationality’, above n 58, 299.

into the conduct of the patent examination process. Given the reliance in the process on decisions by the examiners, it is important to understand current theories of how decisions are made. Such an understanding will provide the information necessary to be able to assess the quality of the detail of the examination procedure. A thorough perspective of a quality procedure will, in turn, enable a deeper understanding of the quality of patents.

If it is accepted that an understanding of the procedure will allow for a more complete understanding of patent quality then it empirical research into the work of patent examiners may be seen as necessary. From this perspective it becomes important to survey patent examiners and patent attorneys in order to gain insights into the practicalities of the patent examination process. The inclusion of the patent attorneys would provide for a critique of the examiners' behaviour by those who know the system well. Further, the inclusion of both groups would allow for analysis of strategies that would arise from game theory. Again, once the daily practicalities of the examination process – the decisions – are understood, then it may be possible to gain a more nuanced assessment of the quality of both the procedure and of the granted patents.

There are advantages to using both questionnaires and interviews as research tools. The quantitative focus of the former provides a different perspective than the more qualitatively focused interview process.¹⁰⁷ That is, it is practical to give a large number of examiners and attorneys a questionnaire to complete, whereas, it would be much more time consuming to interview the same number. The use of questionnaires may also broaden the scope of the research. It may be possible to include questions on the wider topics of how patents and the quality of patents are perceived by examiners.

In-depth interviews offer the opportunity for very detailed understandings of the way that examiners work and the decisions that are part of the examination process are

¹⁰⁷ Surveys are central to the assessments used in competency-based perspectives of firms. Such perspectives are resource, rather than output, focussed forms of analysis (See, for example, B. Wernerfelt, 'A Resource-Based View of the Firm' (1984) 5 *Strategic Management Journal* 171 and M. Peteraf, 'The Cornerstones of Competitive Advantage: A Resource-Based View' (1993) 14 *Strategic Management Journal* 179). A significant resource of firms, including government agencies, is the competencies of the organisation as a whole and of individual members of the organisations. The assessment of these competencies has been conducted in the form of self-administered questionnaires. See, for example, C. Snow and L. Hrebiniak, 'Strategy, Distinctive Competence and Organisational Performance' (1980) 25 *Administrative Science Quarterly* 317 and A. Escrig-Tena and J. Bou-Llusar, 'A Model for Evaluating Organisational Competencies: An Application in the Context of a Quality Management Initiative' (2005) 36 *Decision Sciences* 221, 231.

made. The models detailed above, however, suggest that the decisions would be “habitualised” and a matter of expertise, therefore, there may be only a small amount of divergence between the decision-making processes of different examiners. It is also possible, however, that the processes may be the result of institutional culture – if a comparative study is undertaken (surveying examiners in different patent offices), then any cultural bias may be assessable.

It is acknowledged that there is little detail in these proposals for future research. As emphasised above, this Working Paper is only the first stage of a project examining the quality of the patent examination process. At this point, there is an insufficient understanding of the nature of the decisions made by patent examiners. Further, there is minimal work in the psychology of judgment and decision-making that is directly comparable to the research needed for an understanding of the patent examination process. This Paper represents an initial drawing together the results of disparate disciplines in order to provide a background to a new approach to the study of the quality of the patent system. Specific research programmes in this area may only be developed after additional research and analysis has been carried out.

5 - Conclusion

These proposed research methods are designed to further the understanding of decision-making in the patent examination process. Patents are granted as a matter of course in patent offices around the world on a daily basis. The routine nature of the work does not detract from the complexity of the process, the skills of the examiners or the importance of the many varied decisions that, in sum, form an integral part of the examination of patents.

A great deal of exemplary work has been done in the area of assessment of the quality of patents themselves. This Working Paper is based on the belief that it is equally important to examine the quality of the procedures that produce the patents. Without a deeper knowledge of the process, further proposed definitions of quality patents would only be based on assumptions and therefore would not be an effective tool for improvement of the patent examination and grant systems. Research into the decision-making process relating to patents will provide a different perspective on the examination process and will inform future research into methods of assessment of

the quality of the process and, ultimately, the quality of the patents granted by patents offices in Australia and overseas.

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