EQUITABLE INTELLECTUAL PROPERTY PROTECTION OF COMPUTER PROGRAMS IN SOUTH AFRICA: SOME PROPOSALS FOR REFORM

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1   Introduction

This paper provides a brief overview of the copyright, patent and trade secret protection of computer programs in South Africa and then sets out suggestions for how this protection could be altered or better implemented to create a more equitable balance between creators' and users' rights.[1] The overview of intellectual property ("IP") protection of computer programs is brief as there is already a substantive body of South African specific literature that discusses it extensively.[2] This paper's main focus is the evaluation of the equity of the protection and making reform proposals.

A computer program is a series of instructions which enable a computer to perform a task or achieve a result.[3] Computer programs are created in human-readable source code which is then compiled or translated into machine-readable object code.[4] In copyright parlance, object code is "merely an adaptation of source code".[5] A computer program is inherently functional

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[1]   G Dutfield & U Suthersanen *Global Intellectual Property Law* (2008) 51 identify the three main stakeholders in IP as "the author-inventor, the producer-investor and the consumer" In this article the author-inventor is referred to as the creator and the consumer as the user The interests of producers and creators are closely aligned and therefore this article subsumes the interests of producers into those of creators

[2]   For example L-A Tong "Copyright Protection for Computer Programs in South Africa: Aspects of Generis Categorisation" (2009) *JWIP* 266; D van der Merwe "Patent Law" in D van der Merwe, A Roos, T Pistorius & S Eiselen *Information and Communications Technology Law* (2008) 35; C de Villers & T Tshaya "Software and Business Methods Patents" (2008) 2 *JILT* 1 <http://www2 warwick ac uk/fac/soc/law/elj/jilt/2008_2/devilliersandtshaya/> (accessed 09-03-2011); R de Villiers "Computer Programs and Copyright: The South African Perspective" (2006) 123 *SALJ* 315; W Rahamim "Internet and E-commerce Patents" in R Buys (ed) *Cyberlaw@SAII: The Law of the Internet in South Africa* 2 ed (2004) 61

[3]   S 1 of the Copyright Act 98 of 1978; De Villiers (2006) *SALJ* 316; D Bender "Software Protection: The 1985 Perspective" (1985) 7 *Western New Law Review* 405 407; *Haupt t/a Softcopy v Brewers Marketing Intelligence (Pty) Ltd* 2006 4 SA 458 (SCA) paras 23 and 28

[4]   De Villiers (2006) *SALJ* 317; L Diver "Would the Current Ambiguities within the Legal Protection of Software be Solved by the Creation of a Sui Generis Property Right for Computer Programs?" (2008) 3 *JIPLP* 125; D Lipton "IP's Problem Child: Shifting the Paradigms for Software Protection" (2006) 58 *Hastings LJ* 205 219-222

[5]   De Villiers (2006) *SALJ* 317; s (1)(1)(d)(i) of the Copyright Act 98 of 1978

because its execution causes a computer to behave or act in a particular way.[6]

Computer programs may be simultaneously protected by copyright, patents and trade secrets if the eligibility requirements for such protection are met. Copyright protection may extend to the expression of object and source code, while patents may extend to the functionality of the computer program and its source code may be maintained as a trade secret. Each of these types of protection is discussed in turn below in part 2. Thereafter an evaluation of the equity of this protection follows in part 3.

2 Current IP protection

2 1 Copyright

Copyright is regulated exclusively by the Copyright Act 98 of 1978.[7] Copyright automatically subsists in original[8] eligible work that is created by a qualified person[9] or is first published in South Africa or another country to which protection is extended.[10] In addition, section 2(2) of the Copyright Act provides that:

> "[A] work, except a broadcast or programme-carrying signal, shall not be eligible for copyright unless the work has been written down, recorded, represented in digital data or signals or otherwise reduced to a material form."

This requirement has been viewed as flowing from the idea-expression dichotomy[11] which seeks to limit copyright protection to the expression (and not the idea or functionality) of works.[12] This position is legislated in the United States[13] and codified in the European Directive on the legal protection of computer programs ("Software Directive"),[14] the Agreement on Trade Related Aspects of Intellectual Property Rights ("TRIPS")[15] and the World Intellectual Property Organisation ("WIPO") Copyright Treaty ("WCT").[16] However, the idea-expression dichotomy has been criticised as

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[6] Diver (2008) *JIPLP* 126; P Samuelson, R Davis, MD Kappor & JH Reichmann "A Manifesto Concerning the Legal Protection of Computer Programs" (1994) 94 *Colum L Rev* 2308 2316-2317

[7] *King v SA Weather Service* 2009 2 All SA 31 (SCA) para 6

[8] S 2(1) of the Copyright Act

[9] Ss 3(1) and 37 of the Copyright Act; Copyright Regulations GN R 136/89 in *GG* 11718 of 03-03-1989, as amended A qualified person is a person who is a South African citizen or resident or of another country to which protection is extended such as a fellow Berne Convention for the Protection of Literary and Artistic Works 1886, as amended, 1161 UNTS 3 ("Berne Convention") member state

[10] Ss 4(1) and 1(5) of the Copyright Act extend copyright extension to works first published in a Berne Convention member state

[11] T Pistorius "Copyright Law" in H Klopper, T Pistorius, B Rutherford, L-A Tong, A van der Merwe & P van der Spuy *Law of Intellectual Property in South Africa* (2010) 143 149 para 21 2 2

[12] Tong (2009) *JWIP* 285; De Villiers (2006) *SALJ* 331; RH Stern "Scope of Protection Problems with Patents and Copyrights on Methods of Doing Business" (1999) 10 *Fordham Intell Prop Media & Ent LJ* 108

[13] § 102(b) of the US Copyright Act 1976 17 USC

[14] Art 1(2) of the European Parliament and Council *Directive 2009/24/EC of the European Parliament and of the Council of 23 April 2009 on the Legal Protection of Computer Programs* OJ L 111, 5 5 2009 16

[15] Art 9(2) of the TRIPS Annex 1C, (1994) 1869 UNTS 299, 33 ILM 1125, 1197

[16] Art 2 of the WCT (1996), WIPO Doc CRNR/DC/94, 36 ILM 65

being a "simplistic … [and] …inadequate"[17] approach because it is not always possible to separate idea from expression, particularly in relation to computer programs.[18] Indeed, it has been noted by South African courts that copyright may well extend to "a detailed collection of ideas".[19] The Copyright Act does not provide for the idea-expression dichotomy, hence enabling courts to hold that copyright protection may well extend to ideas in certain circumstances. However, it is important to note that in some cases, courts have acknowledged the idea-expression dichotomy. For example in *Sure Travel Ltd v Excel Travel (Pty) Ltd* the court said "it is the mode of expression that is protected in a literary work, not any functional features".[20]

Copyright in computer programs subsists for the longer of 50 years from the end of the year in which the work is made available to the public with the consent of the owner of the copyright or is first published, or failing this within 50 years of the making of the work.[21]

2 1 1   *Sui generis categorisation of computer programs*

The Copyright Act did not originally expressly provide for the protection of computer programs but they were protected as literary works,[22] as were preparatory works such as flowcharts and other design specification documentation.[23] In addition, certain preparatory works were protected as artistic works.[24] The amendment of the Copyright Act in 1992 made computer programs a separate category of eligible works.[25] Preparatory materials continue to be protected as literary or artistic works. This distinction between the treatment of computer programs and their preparatory works has been critiqued for creating disjointed or non-aligned copyright protection.[26]

Only a few other jurisdictions use the same approach of treating computer programs as *sui generis* category of copyright eligible works.[27] Many jurisdictions, including the United States and United Kingdom, subsume computer programs into the literary works category.[28] The Berne Convention

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[17] DP van der Merwe "Copyright and Computers, with Special Reference to the Internet –From Penmanship to Peepshow" (1998) 115 *SALJ* 180 184-186

[18] RA Beutel "Software Engineering Practice and the Idea/Expression Dichotomy: Can Structured Design Methodologies Define the Scope of Software Copyright?" (1991) 32 *Jurimetrics J* 1 2; M Flinders "Protecting Computer Software – Analysis and Proposed Alternative" (2007) 7 *J High Tech L* 71 77

[19] De Villiers (2006) *SALJ* 331-332 quoting from *Galago Publishers (Pty) Ltd v Erasmus* 1989 1 SA 276 (A) 283-284

[20] *Sure Travel Ltd v Excel Travel (Pty) Ltd* 2004 BIP 275 (W) para 46

[21] S 3(2)(b) of the Copyright Act

[22] Tong (2009) *JWIP* 266; *Northern Office Micro Computers (Pty) Ltd v Rosenstein* 1981 4 SA 123 (C); *Econostat (Pty) Ltd v Lambrecht* 89 JOC (W); *Apple Computer v Rosy t/a SA Commodity Brokers (Pty) Ltd* 134 JOC (D); *Pastel Software (Pty) Ltd v Pink Software (Pty) Ltd* 399 JOC (T)

[23] Tong (2009) *JWIP* 272; De Villiers (2006) *SALJ* 319

[24] Pistorius "Copyright Law" in *Law of Intellectual Property in South Africa* 158 para 20 10; Tong (2009) *JWIP* 272; De Villiers (2006) *SALJ* 319; T Pistorius & C Visser "The Copyright Amendment Act 125 of 1992 and Computer Programs: A Preliminary Overview" (1992) 4 *SAMLJ* 349

[25] S 2(1)(i) of the Copyright Act

[26] Pistorius "Copyright Law" in *Law of Intellectual Property in South Africa* 158 para 20 10; Tong (2009) *JWIP* 272; Pistorius & Visser (1992) *SAMLJ* 349

[27] Pistorius & Visser (1992) *SAMLJ* 348

[28] § 102(a)(1) of the US Copyright Act; s 3(1) of the UK Copyright, Designs and Patents Act of 1988 ("CDPA")

does not specifically provide for the protection of computer programs as literary works but it is argued that computer programs do in fact find protection as such under Berne.[29] While this is debatable, the matter has been settled as both TRIPS[30] and the WCT[31] classify computer programs as literary works. The categorisation of computer programs as a separate category of eligible works raises some concerns about the Copyright Act's compliance with TRIPS.[32] An exploration of this issue and whether classifying computer programs as literary works is an appropriate approach is beyond the scope of this paper and readers are referred to discussions of this issue by other scholars.[33]

2 1 2 *Infringement*

2 1 2 1 Literal copying

Under the Copyright Act infringement occurs where there has been reproduction of a substantial portion of copyright protected work.[34] The courts have held that in order to prove reproduction one must establish:

> "(i) [T]hat there is sufficient objective similarity between the alleged infringing work and the original work, or a substantial part thereof, for the former to be properly described, not necessarily as identical with, but as a reproduction or copy of the latter; and (ii) that the original work was the source from which the alleged infringing work was derived, ie that there is a causal connection between the original work and the alleged infringing work, the question to be asked being: has the defendant copied the plaintiff's work, or is it an independent work of his own?"[35]

The Supreme Court of Appeal in *Haupt t/a Softcopy v Brewers Marketing Intelligence* held that whether or not a substantial portion of a computer program has been copied is decided with reference to the quality or value, and not the quantity of, the copied portion.[36] Applying this test, the court found that the copying of "26% of the graphic component and 83% of the search component comprising 63 lines of several thousands of source code"[37] amounted to a substantial portion due to its value and therefore held that the copying constituted infringement. The court did not elucidate further on

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[29] T Dreier "Berne Convention" in T Dreier & B Hugenholtz (eds) *Concise European Copyright Law* (2006) 712

[30] Art 10(1) of the TRIPS provides:
"Computer programs, whether in source or object code, shall be protected as literary works under the Berne Convention (1971) "

[31] Art 4 of the WCT provides:
"Computer programs are protected as literary works within the meaning of Article 2 of the Berne Convention Such protection applies to computer programs, whatever may be the mode or form of their expression "

[32] Tong (2009) *JWIP* 266, 270-271

[33] Tong (2009) JWIP 268; DI Bainbridge *Intellectual Property* 249-250; C Visser "A Comparative Survey of Aspects of Subsistence of Copyright in Computer Software" (1984) 17 *CILSA* 32 36-37

[34] Ss 1(2A) and 23 of the Copyright Act; *Galago Publishers (Pty) Ltd v Erasmus* 1989 1 SA 276 (A) 432 and *Haupt t/a Softcopy v Brewers Marketing Intelligence* 2006 4 SA 458 (SCA) para 44

[35] *Galago Publishers (Pty) Ltd v Erasmus* 1989 1 SA 276 (A) 432 For discussion see Pistorius "Copyright Law" in *Law of Intellectual Property in South Africa* 200 para 27 2 1; Tong (2009) *JWIP* 284-285; De Villiers (2006) *SALJ* 328-330

[36] *Haupt t/a Softcopy v Brewers Marketing Intelligence* 2006 4 SA 458 (SCA) para 4; *Biotech Laboratories (Pty) Ltd v Beecham Group PLC* 2002 4 SA 249 (SCA) para 9; *Jacana Education (Pty) Ltd v Frandsen Publishers (Pty) Ltd* 1998 2 SA 965 (SCA) 972G-J

[37] *Haupt t/a Softcopy v Brewers Marketing Intelligence* 2006 4 SA 458 (SCA) para 45

how to determine substantiality in relation to computer programs and some scholars have lamented the court's "perfunctory"[38] approach. There are no other reported cases that have provided further guidance on this point.

2 1 2 2   Non-literal copying

Non-literal copying of computer programs involves emulating non-literal aspects of computer programs namely "structure, sequence of operations, functions, interfaces and methodologies".[39] It is more problematic than literal copying[40] and differing jurisdictional approaches have emerged. *Pastel Software (Pty) Ltd v Pink Software (Pty) Ltd*[41] briefly considered non-literal copying but this consideration is inadequate because it did not distinguish between literal and non-literal copying.[42] Case law from other jurisdictions is therefore instructive. English case law is particularly persuasive due to the historical development of copyright law in South Africa.[43] However, South Africa's *sui generis* categorisation of computer programs may limit the relevance of case law from jurisdictions that classify computer programs as literary works. This creates uncertainties about South Africa's approach to non-literal copying.[44] In addition, unlike the United Kingdom and the United States copyright legislation, the Copyright Act does not contain any provisions that permit the use of reverse engineering[45] during non-literal copying.

(i)   US Approach

Generally, in the United States copyright protection does not readily extend to non-literal aspects of computer programs.[46] The abstraction-filtration-comparison test is used to separate expression from idea.[47] This test was first enunciated in *Computer Associates International v Altai Inc*[48] and entails the following three stages:

1) Abstraction: identifying the constituent parts of the program, for example its purpose, structure, modules, source and object code.[49]
2) Filtration: a determination of whether the identified constituents are expressions or ideas.[50] The expression is then protected by copyright.[51]

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[38] De Villiers (2006) *SALJ* 336

[39] Bainbridge *Intellectual Property* 254

[40] Diver (2008) *JIPLP* 128

[41] 399 JOC (T)

[42] Tong (2009) *JWIP* 285-286

[43] Pistorius "Copyright Law" in *Law of Intellectual Property in South Africa* 149 para 19 4 2

[44] Tong (2009) *JWIP* 286; De Villiers (2006) *SALJ* 336

[45] Defined as "a variety of practices undertaken to understand how a software program is built and how it achieves its functionality" by RH Lande & SM Sobin "Reverse Engineering of Computer Software and US Antitrust Law" (1996) 9 *Harv J L & Tech* 238 240

[46] R Ballardini "Scope of IP Protection for the Functional Elements of Software" in N Bruun (ed) *In Search of New IP Regimes* (2010) 39 and 50; T Pistorius "Copyright Law and IT" in D van der Merwe, A Roos, T Pistorius & S Eiselen *Information and Communications Technology Law* (2008) 239 248

[47] De Villiers (2006) *SALJ* 334-335; Lipton (2006) *Hastings LJ* 207

[48] 982 F2d 693 (2d Cir 1992)

[49] De Villiers (2006) *SALJ* 334; Flinders (2007) *J High Tech L* 89

[50] De Villiers (2006) *SALJ* 334; Flinders (2007) *J High Tech L* 89

[51] *Computer Associates International v Altai Inc* 982 F2d 693 (2d Cir 1992) 710

The merger and *scenes a fair* doctrines are applied in order to separate ideas from expression. The merger doctrine applies where the idea and expression have merged because "the underlying idea (or system, process, or method of operation) can effectively be expressed only in one way".[52] Such merged expression is not afforded copyright protection because to do so would be to also protect the idea, system or method.[53] Under the *scenes a fair* doctrine copyright protection is not extended to expressions that are "so rudimentary, commonplace, standard or unavoidable that they do not serve to distinguish one work within a class of works from another".[54] Policy levers such as fair use and inter-operability exceptions and limitations are also used to exclude or limit the protection of ideas.

3) Comparison: The constituent elements that have been characterised as protectable expression are then compared with the alleged infringing work so as to determine whether or not infringement has in fact occurred.[55]

In some instances such an approach successfully excludes ideas from protection,[56] although there are some doubts about the efficacy of this approach.[57] It has been criticised for being "grossly inefficient"[58] when applied to complex computer programs and United States' courts "remain fundamentally uncertain of how broadly to demarcate"[59] copyright protection for computer programs. Some clarification is provided by statutory provisions which permit the reverse engineering in certain circumstances to enable the approximation of equivalent functionality.[60]

(ii)   UK Approach

The Copyright, Designs and Patents Act of 1988 also permits reverse engineering in certain circumstances.[61] Initially the United Kingdom adopted a version of the abstraction-filtration-comparison test[62] but this has been replaced by a test that evaluates the skill, labour and judgment expended in creating the work.[63] This test has been enunciated as follows:[64]

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[52] Lipton (2006) *Hastings LJ* 213 quoting Marshall Leaffer *Understanding Copyright Law* 4 ed (2005) § 2 I4[B][4] Also see Bainbridge *Intellectual Property* 49 and 260-261; P Samuelson "Why Copyright Law Excludes Systems and Processes from the Scope of its Protection" (2007) 85 *Tex L Rev* 1921 1943

[53] DL Burk "Method and Madness in Copyright" (2007) 3 *Utah L Rev* 588 589; MJ Faust "What Do we Do with a Doctrine like Merger? A Look at the Imminent Collision of the DMCA and Idea/Expression Dichotomy" (2008) 12 *Marq Intell Prop L Rev* 132 142; De Villiers (2006) *SALJ* 334

[54] Faust (2008) *Marq Intell Prop L Rev* 143 Also see Lipton (2006) *Hastings LJ* 214 and De Villiers (2006) 123 *SALJ* 334

[55] De Villiers (2006) *SALJ* 334; Flinders (2007) *J High Tech L* 89

[56] De Villiers (2006) *SALJ* 335 n 140

[57] Lipton (2006) *Hastings LJ* 209; Diver (2008) *JIPLP* 128

[58] Diver (2008) *JIPLP* 128

[59] Ballardini "Scope of IP Protection for the Functional Elements of Software" in *In Search of New IP Regimes* 43

[60] De Villiers (2006) *SALJ* 327 citing s 107 of the US Copyright Act

[61] De Villiers (2006) *SALJ* 327 citing ss 50A, 50B, 50BA and 50C read with s 296A of the UK CDPA

[62] *John Richardson Computers Ltd v Flanders* [1993] FSR 497; Ballardini "Scope of IP Protection for the Functional Elements of Software" in *In Search of New IP Regimes* 45

[63] De Villiers (2006) *SALJ* 335; *IBCOS Computers Ltd v Barclays Mercantile Highland Finance Ltd* [1994] FSR 275 (ChD) 290, 302; *Cantor Fitzgerald International v Tradition (UK) Ltd* [2000] RPC 95 (ChD) 132, 136

[64] *IBCOS Computers Ltd v Barclays Mercantile Highland Finance Ltd* [1994] FSR 275 (ChD) 289.

"(1) What are the work or works in which the plaintiff claims copyright?
(2) Is each such work 'original'?
(3) Was there copying from that work?
(4) If there was copying, has a substantial part of that work been reproduced?"

Under this approach, functional or non-literal elements of computer programs are protected as "detailed concepts incorporated in the expression"[65] of the computer program. These aspects will be protected where it is proven that substantial skill and labour relating to expression was expended in their development. If the labour and skill relate to ideas, they are treated as irrelevant.[66] Making a case for non-literal copying is almost impossible where the alleged infringer did not have sight of the original source code.[67] It has been argued that this approach may result in some functional elements being protected.[68] However, the Court of Justice of the European Union (ECJ)'s decision in *SAS Institute Inc v World Programming Ltd*[69] has made it clear that copyright protection of computer programs does not extend to functionalities.

2 2 Patents

This section is brief because the patent protection of computer programs is an oft-debated matter and there is already substantial literature on the topic.[70]

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[65] De Villiers (2006) *SALJ* 335-336 Also see S Stokes *Digital Copyright: Law and Practice* 3 ed (2009) 106

[66] *Navitaire Inc v easyJet Airline CO, Bulletproof Technologies Inc* [2005] ECDR 17 paras 74 and 130; *SAS Institute v World Programming Ltd* [2010] EWHC 1829 (Ch) para 244

[67] S Stokes "The Development of UK Software Copyright Law: From John Richardson Computers to Navitaire" (2005) 11 *CTLR* 129 133; A Clay "Nova Productions Ltd v Mazooma Games Ltd – Game over for Nova" (2007) 18 *Ent LR* 187; *Navitaire Inc v easyJet Airline CO, Bulletproof Technologies Inc* [2005] ECDR 17 para 113; *Nova Productions v Mazooma Games* [2007] EWCA Civ 219 (Court of Appeal) paras 31-45 and *SAS Institute v World Programming Ltd* [2010] EWHC 1829 (Ch) para 236 *SAS Institute v World Programming Ltd* [2010] EWHC 1829 (Ch) referred five questions to the ECJ pertaining to the interpretation of certain sections of the Software Directive and Directive 2001/29/EC of the European Parliament and of the Council of 22 May 2001 on the harmonisation of certain aspects of copyright and related rights in the information society OJ 2001 L 167, 10 ("Copyright Directive") See A Hobson & M Starmer "Case Report: Copying Software – Key Questions Referred to the ECJ" (2011) 17 *CTLR* 13

[68] De Villiers (2006) *SALJ* 336; Ballardini "Scope of IP Protection for the Functional Elements of Software" in *In Search of New IP Regimes* 51

[69] ECJ 02-05-2012 case no C-406/10 For commentary see P Samuelson "The Past, Present and Future of Software Copyright: Interoperability Rules in the European Union and United States" (2012) 34 *EIPR* 229

[70] For example see D Sheppard "Patenting Computer Software and Business Methods" (2001) April *De Rebus* 28, O Mooki "What's Lacking in Copyright Law?" (2001) June *De Rebus* 3; D Sheppard "Patent Protection – Sheppard Responds" (2001) July *De Rebus* 3; C de Villiers "Patentability – Look to British and European Law" (2001) August *De Rebus* 3; S Ryan "To Patent or not to Patent" (2001) *De Rebus* 24; E Teljeur "Intellectual Property Rights in South Africa: A Review" (2002) *TIPS* <http://www tips org za/ node/276> (accessed 18-10-2012); Rahamim "Internet and E-commerce Patents" in *Cyberlaw@SAII* 61; L Abramson "Patenting Business Methods" (2006) *Without Prejudice* 25; APS van der Merwe "Business Methods, Technology and Patentability" (2006) 69 *THRHR* 122; R Jambo *Intellectual Property Rights in South Africa: An Analysis of IP Protection for Business Methods in the Financial Services Industry* MBA research report, Graduate School of Business, University of Cape Town (2006); De Villers & Tshaya (2008) *JILT* 1 and Van der Merwe "Patent Law" in *Information and Communications Technology Law* 35-59

Patents are regulated exclusively by the Patents Act 57 of 1978.[71] They protect the functionality of computer programs, preclude reverse engineering and bar the patent protection of the same functionality by others even in cases of independent development.[72] Patents subsist for twenty years, subject to prescribed renewal fees.[73] They are acquired by application to the Patent Office which registers patents without substantive examination.[74] However, there are certain formalities such as the advertisement of complete patent applications in the Patent Journal.[75] The date of publication in the Patent Journal is deemed to be date of grant of the patent.[76] Patents can thereafter be revoked, upon application, on various grounds, including failure to meet patentability criteria.[77]

Patent protection is extended to inventions that are new, include an inventive step and have industrial application.[78] Further, the patent application must adequately disclose the invention.[79] An invention will have novelty if "it does not form part of the state of the art"[80] which is all publicly available information worldwide by written or oral description or by demonstration[81] and in patent applications with earlier priority dates.[82] To have inventive step an invention must not be obvious to someone with skill in that field.[83] The courts have crafted a four stage test for inventive step which may be summarised as follows:[84]

i)   An evaluation of the prior art,
ii)   The identification of the problem solved by the invention,
iii) The identification of the notional "person skilled in the art" to which that invention relates, and
iv)   An evaluation of whether faced with a similar problem a person with ordinary skill in the art would have created the same solution/invention.

If a person with ordinary skill in the art would have created the same invention as that for which a patent is being sought, then the invention is unpatentable. An invention that can be produced or used in industry, trade or agriculture has industrial applicability.[85]

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[71] *King v SA Weather Service* 2009 2 All SA 31 (SCA) para 6
[72] S 45 of the Patents Act; W Cornish, D Llewelyn & T Aplin *Intellectual Property: Patents, Copyright, Trademarks and Allied Rights* 7 ed (2010) 8 para 1-05
[73] S 46 of the Patents Act
[74] Ss 34-35
[75] S 14
[76] Ss 44(1)-(3)
[77] S 61
[78] S 25(1) For discussion see Van der Merwe "The Law of Patents" in *Law of Intellectual Property in South Africa* 265 277-291
[79] S 32 of the Patents Act
[80] S 25(5)
[81] S 25(6)
[82] S 25(7)
[83] S 25(10)
[84] The leading case is *Ensign-Bickford (SA) (Pty) Ltd v AECI Explosives and Chemicals Ltd* 1999 1 SA 70 (SCA) 80
[85] S 25(1) of the Patents Act

2 2 1   Qualified computer program exclusion

The Patents Act also contains subject matter exclusions which are directly relevant to computer programs. Section 25(2)(f) provides that computer programs are not inventions for purposes of the Act. However, this is qualified by section 25(3) which provides that only computer programs "as such" are not patentable. The meaning of this qualified subject matter exclusion is not clear due to a lack of case law on the point. Numerous patents have been issued for computer programs in South Africa[86] but only one matter has been litigated.[87] Unfortunately, the judgement does not address the "as such" limitation at all.

Article 52(2)-(3) of the Convention on the Grant of European Patents[88] ("European Patent Convention" or "EPC") and section 1(2)(c) of the UK Patent Act of 1977 also provide for the same qualified computer program exclusion. Therefore case law from the UK courts and the European Patent Office ("EPO")'s boards is instructive.[89] The EPO and its Boards of Appeal apply the any hardware approach while the technical effects approach applies in the United Kingdom.[90] Under the any hardware approach test if a computer program has "a claim to something 'concrete' e.g. an apparatus"[91] it is not a computer program as such and is patentable. This approach has been in use since 2000 although the Boards have nuanced it over the years.[92] The United Kingdom's technical effects approach is more rigorous.[93] Under this approach only computer programs that make a technical contribution are patented.[94] The following test for determining whether an invention makes a technical contribution was developed by the Court of Appeal in 2006 in *Aerotel/Macrossan*:[95]

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[86] See Companies and Intellectual Property Commission ("CIPC") searchable database at <http://patentsearch cipro gov za> (accessed 18-10-2012)

[87] *3M Future Africa (Pty) Ltd v Standard Bank, MTN Group Ltd and MTN Mobile Money SA (Pty) Ltd Commissioner of Patents* 14-09-2012 case no 2002/2337; see the complainant's website for an overview 3M Future "Standard Bank" (31-08-2012) *3M Future* <http://www 3mfuture com/standard_bank_ infringement htm> (accessed 18-10-2012)

[88] Convention on the Grant of European Patents (1973) as amended 2000, 1065 UNTS 199

[89] Van der Merwe "The Law of Patents" in *Law of Intellectual Property in South Africa* 265, 275

[90] J Boon "UK Software Patents – Get with the Program" (2009) 25 *Computer Law & Security* 367 368; D Bainbridge "Court of Appeal Parts Company with the EPO on Software Patents" (2007) 23 *Computer Law & Security Report* 199 200; W Cook & G Lees "Test Clarified for UK Software and Business Methods Patents: But what about the EPO?" (2007) 29 *EIPR* 115

[91] *Aerotel Ltd v Telco Holdings Ltd, Macrossan's Patent Application* [2006] EWCA Civ 1371 (CA (Civ Div)) ("*Aerotel/Macrossan*") para 26

[92] *Controlling Pension Benefits System/PBS Partnership* OJ EPO 2001, 441 (first variant); *Auction Method/ Hitachi* OJ EPO 2004, 575 (second variant); *Microsoft/Data Transfer with Expanded Clipboard Formats* 23-02-2006 case no T 0424/03 (third and current variant); *Duns Licensing Associates LP* OJ EPO 2008, 46; *File Search Method/Fujistu* 18-04-2007 case no T 1351/04; *Gameaccount* 29-06-2007 case no T1543/06 and *Graphical User Interface/Sharp* 05-03-2008 case no T1188/04 For a discussion of the various iterations of this test see CB Ncube "Software Patents" in S Papadous & S Snail (eds) *Cyberlaw III @ SA: The Law of the Internet in South Africa* 3 ed (2012) 123

[93] *CFPH LLC v Comptroller General of Patents* [2005] EWHC 1589 (Pat) paras 43-46

[94] *Merryl Lynch's Application* [1989] RPC 56; *Gales Application* [1991] RPC 305; *Aerotel Ltd v Telco Holdings Ltd, Macrossan's Patent Application* [2006] EWCA Civ 1371 (CA (Civ Div)) para 26

[95] *Aerotel Ltd v Telco Holdings Ltd, Macrossan's Patent Application* [2006] EWCA Civ 1371 (CA (Civ Div)) para 40

"(1) [P]roperly construe the claim
(2) identify the actual contribution;
(3) ask whether it falls solely within the excluded subject matter;
(4) check whether the actual or alleged contribution is actually technical in nature."

This approach has consistently been applied since its enunciation.[96] It has been amplified by the High Court which has said it will examine the following in determining whether inventions had technical effect:[97]

"i)   [W]hether the claimed technical effect has a technical effect on a process which is carried on outside the computer;
ii)   whether the claimed technical effect operates at the level of architecture of the computer; that is to say whether the effect is produced irrespective of the data being processed or the applications being run;
iii) whether the claimed technical effect results in the computer being made to operate in a new way;
iv)   whether there is an increase in the speed or reliability of the computer;
v)   whether the perceived problem is overcome by the claimed invention as opposed to merely being circumvented."

2 2 2   US Approach

In contrast, the US Patent Act 35 USC §§ 101-376 (2000) does not have a computer program statutory exclusion. Patents are granted for computer programs if they meet the patentability standards required for all other inventions. Two tests have been developed to determine whether or not the computer program in issue meets the subject matter eligibility requirements of the US Patents Act. In 1972 in *Gottschalk v Benson*[98] the Supreme Court formulated the machine or transformation test for processes as follows:

"Transformation and reduction of an article 'to a different state or thing' is the clue to the patentability of a process claim that does not include particular machines."[99]

In 1978 the Supreme Court applied this test in *Parker v Flook*[100] and held that the computer program in issue was not patentable because it was abstract mathematics. In 1981 in *Diamond v Diehr*[101] it held that the test was whether the process resulted in a concrete, tangible and useful result. It then found that the computer program in issue transformed an article, was not abstract and

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[96] *Astron Clinica's Application* [2008] EWHC 85 (Pat), *Symbian Ltd's Application* [2008] EWCA Civ 1066; *AT&T Knowledge Ventures LP v Comptroller General of Patents; CVON Innovations Limited v Comptroller General of Patents* [2009] EWHC 343 (Pat); UK Intellectual Property Office (UKIPO) "Practice Note: Patents Act 1977: Patentable subject matter" (02-11-2006) *UKIPO* <http://www ipo gov uk/pro-types/pro-patent/p-law/p-pn/p-pn-subjectmatter htm> (accessed 18-10-2012); UKIPO "Practice Note: Patents Act 1977: Patentable subject matter" (08-02-2008) *UKIPO* <http://www ipo gov uk/pro-types/pro-patent/p-law/p-pn/p-pn-subjectmatter-20080207 htm> (accessed 18-10-2012);, UKIPO "Practice Note: Patents Act 1977: Patentability of computer programs" (08-12- 2008) *UKIPO* <http://www ipo gov uk/pro-types/pro-patent/p-law/p-pn/p-pn-computer htm> (accessed 18-10-2012)

[97] *AT&T Knowledge Ventures LP v Comptroller General of Patents; CVON Innovations Limited v Comptroller General of Patents* [2009] EWHC 343 (Pat) para 40

[98] 409 US 63 (1972)

[99] 70 para 5

[100] 437 US 584 (1978)

[101] 450 US 175 (1981) This test was applied by the Federal Circuit Court in cases such as *Arrhythmia Research Technology Inc v Corazonix Corp* 958 F2d 1053 (1992); *In re Alappat* 33 F3d 1526 (1994); *State Street Bank & Trust Co v Signal Financial Group, Inc* 149 F3d 1368 (Fed Cir 1998) cert denied 119 S Ct 851 and *AT&T v Excel Communications Inc* 172 F3d 1352 (1999).

therefore patentable. These two tests were then used as deemed appropriate by the courts. However, in 2008 the Federal Circuit Court held that the concrete, tangible and useful result test was inadequate and that only the machine or transformation test was to be used to test process claims.[102] In 2010, the Supreme Court in *Bilksi v Kappos*[103] rejected this view and held that the machine or transformation test was not the only test and new technologies would require new tests. However, the Supreme Court did not suggest any such new tests. This decision has resulted in uncertainty[104] and seems to indicate a return to a restrictive approach as it left matters where they were in1972 in *Gottschalk v Benson*.[105] Pursuant to this decision the US Patents and Trademarks Office ("USPTO") issued new guidelines that reflect this approach[106] which has been applied by its Board of Patent Appeal and Interferences.[107]

2 3   Trade secrets

A trade secret is "trade, business or industrial information belonging to a person (usually an entrepreneur) which has a particular economic value and which is not generally available to and therefore known by others".[108] Article 39(2) of the TRIPS requires the extension of trade secret protection to confidential information. South Africa complies with this obligation by affording common-law protection to trade secrets, including computer programs.[109]

Trade secrets are not registered. Their cost and establishment are totally within the control of the owner. Trade secret protection may be maintained indefinitely as long as the information is kept in confidence.

Globally, the source code of proprietary computer programs is generally protected as a trade secret. The object code is distributed to licensees and purchasers of computer programs but this disclosure does not vitiate the secrecy of the source code because object code is incomprehensible to humans.[110] Like patents, trade secrets protect the functionality of computer programs.

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[102] In re *Bilski* 545 F3d 943 (2008) 959; TJ Scott Jr & ST Schreiner "Planning for the Brave New World: Are Business Method Patents going to be Second Class Citizens?" (2007) 19 *Intellectual Property & Technology Law Journal* 6 10

[103] 130 S Ct 3218

[104] SP Meyer "Business Methods Dodge a Bullet – Method Patents Survive for Now" (2010) 15 *Cyberspace Lawyer* 1; MA Lemley, M Risch, TM Sichelman & RP Wagner "Life after Bilski" (2011) 63 *Stan L Rev* 1315

[105] RC Dreyfuss & JP Evans "From Bilski back to Benson: Preemption, Inventing Around, and the Case of Genetic Diagnostics" (2011) 63 *Stan L Rev* 1349; KN van Voorhis "The Business Method Patent 360: Have they Come Full Circle (or Did They Never Change)?" (2008) 923 *PLI/Pat* 367

[106] USPTO *Interim Guidance for Determining Subject Matter Eligibility for Process Claims in View of Bilski v Kappos* Federal Register Vol 75 No 143 (27-08-2010) Notices 43922 43925-43926

[107] *Ex parte Proudler* No 2009-006599

[108] HJO van Heerden & J Neethling *Unlawful Competition* (1995) 223-224

[109] For example *Northern Office Microcomputer (Pty) Ltd v Rosenstein* 1981 4 SA 123 (C)

[110] *Silvaco Data Systems v Intel Corp* 184 Cal App 4th 210 (2010) 215

However, they do not hinder others from legitimately reverse engineering or independently creating the same or similar computer programs.[111]

3 Evaluation of equity

"The protection and enforcement of intellectual property rights should contribute to the promotion of technological innovation and to the transfer and dissemination of technology, to the *mutual advantage of producers and users of technological knowledge and in a manner conducive to social and economic welfare, and to a balance of rights and obligations*."[112]

Generally, in order to equitably balance the contesting rights of the creators and users, IP rights should be formulated and enforced so as to meet societal goals[113] or the public interest, be responsive to the economic environment and take cognisance of the position of both creators and users.

An equitable regulatory scheme will meet users' and creators' needs. Users of IP's main needs are for "access to and affordability of scientific … technology".[114] Consequently, they seek to avoid undue restrictions on their usage of the IP concerned and require a clear IP regulatory regime within which they are certain of their legal rights. Creators of IP can generally be said to desire full control of their IP. They seek comprehensive and enforceable IP protection that grants them "recognition, respect and remuneration"[115] for their work. Where the IP is commercialised, creators also seek competitive markets that will enable them to recoup their investment.[116] Creators also require IP protection that is compatible with the nature of the good or service being protected (in this case, computer programs)[117] and the manner in which the creative process unfolds (in this case, standard programming practices). The ease and affordability of acquisition together with the cost of enforcement of IP protection are also important to creators. Finally, creators benefit from a vibrant commons from which to draw the building blocks for their creations.

To evaluate whether current patent, copyright and trade secret protection of computer programs is equitable, the following questions will be asked of this protection:

i) Is there clarity and certainty with regard to the nature and scope of protection provided?

ii) Is this form of protection compatible with creators' needs and practices?

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[111] D Bender "The More Things Change, the More They Stay the Same: An Unhurried Reflection on Software Protection Over the Years" (1990) 16 *Rutgers Computer & Tech LJ* 309; JA Szepesi "Maximizing Protection for Computer Software" (1996) 12 *Santa Clara Computer & High Tech LJ* 173 190; M Lemley, PS Menell, RP Merges & P Samuelson *Software & Internet Law* 3 ed (2006) 40; I Daizadeh, D Miller, A Glowalla, M Leamer, R Nandi & CI Numark "A General Approach for Determining When to Patent, Publish, or Protect Information as a Trade Secret" (2002) 20 *Nature Biotechnology* 1053 1053

[112] Art 7 of the TRIPS (emphasis added)

[113] W Fisher "Theories of IP" in S Munzer (ed) *New Essays in the Legal and Political Theory of Property* (2001) 168 172

[114] 172

[115] Dutfield & Suthersanen *Global Intellectual Property Law* 52

[116] 52

[117] The classification of software as either a good or service is moot For example, see *London Borough of Southwark v IBM UK Ltd* [2011] EWHC 549 (TCC); K Moon "The Nature of Computer Programs: Tangible? Goods? Personal Property? Intellectual Property?" (2009) 31 *EIPR* 396

(a)   Does it contribute to, or detract from, the commons from which ideas and functionalities are drawn?
(b)   Is it an appropriate reward or incentive?
(c)   Is it compatible with the nature of computer programs?
(d)   Is it compatible with the standard programming process?
(e)   Is it easy and affordable to acquire?
iii)   Does it benefit the user by encouraging innovation and competition thus making computer programs both affordable and accessible?

Each of these questions is canvassed in turn below.

3 1   Legal certainty

As shown above there are divergent approaches to the patent and copyright protection of computer programs. In respect of copyright, some uncertainty persists with regard to non-literal copying. The United States and the United Kingdom use differing approaches and the issue is yet to be the subject of judicial scrutiny in South Africa. It is not possible to predict the likely outcome of such judicial consideration as South Africa does not protect computer programs as literary works but protects them as a *separate* category of copyright eligible works. Therefore South African courts may shun United States and United Kingdom precedents on the copyright protection of computer programs due to the difference in categorisation approaches. With regard to patents, it is not clear whether South African courts will adopt the any hardware or technical effects approach to the interpretation of the qualified statutory computer program exception. There are no legal uncertainties with regard to trade secret protection of computer programs and a similar approach is applied in the United States, England and South Africa.

3 2   Compatibility with creators' needs and the creative process

From a creator's perspective, the key concerns are whether IP protection enables creators to contribute to or maintain a vibrant idea/functionality commons, serves as a meaningful reward or incentive for innovation, is compatible with the creative process, and the ease and affordability with which such protection can be acquired.

3 2 1   Impact on the idea/functionality commons

The copyright protection of computer programs often precludes disclosure of both functionality and expression as it is standard software industry practice to withhold the source code. The object code is made available but it is not readily decipherable to humans. Disassembly or decompilation may reveal the source code but this has attendant delays and costs. Further, it involves copying parts of or the entire program which may found an infringement claim.[118]

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[118] Lande & Sobin (1996) *Harv J L & Tech* 241

The disclosure provided by patents is of limited value because the abstract nature of computer programs leads to very broadly and vaguely drafted patent specifications which secure very wide protection to the first creator to the detriment of future creators.[119] Further, this disclosure omits the potentially most useful aspect, the source code of the computer program in issue.[120] Trade secrets make no contribution at all to the idea/functionalities commons because both functionality and expression are kept confidential. The net effect of all of this is the shrinking of the commons from which innovation sprouts, to the detriment of creators, users and society generally.

3 2 2   Is it an appropriate reward and incentive?

From a utilitarian and public interest perspective, there are three main benefits that society should gain from patents. These are increased innovation and economic growth (as spurred by an efficient patent system that is seen to grant deserved and appropriate patent rights), a useful tool to use and information (through disclosure in the patent specification). However, patents for computer programs do not bestow any of these benefits.

The exclusivity patents afford to the first creator of computer programs is detrimental to future creators in that it removes certain functionalities from the commons without offering commensurate benefits through meaningful disclosure or being an important incentive for future inventors. Widespread computer program patents create patent thickets[121] that prevent other creators from efficiently creating alternate computer programs. Other creators who wish to develop their own programs may find that they are unable to do so due to patent thickets that have sprouted around the programs and related technology.[122] Where such a situation prevails the relevant patents are failing to meet their primary public policy purpose of encouraging innovation.[123]

While copyright and trade secrets are widely used forms of protection for computer programs, this preference seems anomalous considering that they

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[119] A Devlin *"The Misunderstood Function of Disclosure in Patent Law"* (2010) 23 *Harv J L & Tech* 401 403*:*

> *"*[T]he extent to which patent documents successfully teach the inner workings of cutting-edge technologies is quite limited The information conveyed by many specifications is inadequate and, in practice, fails to reflect the legislative requirements of § 112 Indeed, a majority of patents do not convey meaningful information of any kind Patents in the information technology ('IT') industry are perhaps the worst offenders, being notorious for their vague language *"*

Also see RJ Tomkowicz "Uneasy Fit: Software Patents and the Duty of Disclosure in Patent Law" (2010) 25 *Canadian Intellectual Property Review* 221 223; B Jolliffe "The Word-processing Patent – A Sceptical View from a Person having Ordinary Skill in the Art" (2005) 35 *SACJ* 2 and J Bessen & MJ Meurer *Patent Failure: How Judges, Bureaucrats and Lawyers put Innovators at Risk* (2008) 200

[120] Tomkowicz (2010) *Canadian Intellectual Property Review* 229; S Boettiger & DL Burk "Open Source Patenting" (2004) 1 *Journal of International Biotechnology Law* 221 224

[121] R Stim *Patent, Copyright & Trademark: An Intellectual Property Desk Reference* (2007) 104:

> "A patent thicket is a collection of patents – often owned by different companies – that must be licensed in order to commercialise a new technology… A patent thicket has the effect of limiting the players in an industry and because of that it raises antitrust concerns "

Also see JE Bessen *Patent Thickets: Strategic Patenting of Complex Technologies* Working Paper (2003) <http://www researchoninnovation org/thicket pdf> (accessed 18-03-2011)

[122] See E Maskin "Public Goods and Public Science" in E Maskus & JH Reichman (eds) *International Public Goods and Transfer of Technology under a Globalized Intellectual Property Regime* (2005) 139

[123] Devlin (2010) *Harv J L & Tech* 401, 404

may compromise programming efficiency and program inter-operability. Further, from a creator's perspective, trade secret protection is "fragile" because once lost it cannot be recaptured.[124] In addition, the monopoly it affords creators is of limited value because it does not preclude reverse engineering and independent creation. However, from a user and competing creator's perspective this limitation of trade secret protection is advantageous because it allows the production of competing products, albeit inefficiently.

3 2 3   Compatibility with the nature of computer programs

Copyright protection of computer programs is primarily problematic because of the difficulties in separating function from expression, which together with the protection of non-literal aspects may result in the protection of functional aspects of computer programs. This violates the integrity of IP protection because it raises boundary problems between patent and copyright law as copyright encroaches into patent scope.[125]

The abstract nature of computer programs makes patent protection inappropriate because it makes striking an appropriate balance between rewarding creativity and enabling free competition very elusive.[126] Further, computer program patent claims tend to be vague and abstract[127] rendering them incomprehensible, even to experts in the field.[128] This makes interpreting patent claims more difficult for courts and is likely to lead to the validation of sub-patentable computer programs. The software industry is fast-paced and computer programs have a short shelf life accompanied by frequent updates.[129] They also have low development costs.[130] Accordingly, short to medium term protection is appropriate.[131] A related point of criticism is the potential reach of patents beyond the initial protected computer program to generations of follow on programs. This occurs where broad patent claims prevent later incremental inventions by others because of fear of an infringement claim by the holder of the earlier broad patent.[132] This is inappropriate because it awards first creators an unduly long term of exclusivity in return for (usually) insufficient disclosure and hampers the creative efforts of future creators for an inordinately lengthy period of time.

3 2 4   Compatibility with programming practices

Patents, copyright and trade secrets are incompatible with creators' practices and needs because they create thickets which hinder favoured programming

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[124] Szepesi (1996) *Santa Clara Computer & High Tech LJ* 193
[125] Ballardini "Scope of IP Protection for the Functional Elements of Software" in *In Search of New IP Regimes* 30
[126] M Likhovski, M Spence & M Molineaux *First Mover Monopoly: A Study on Patenting Business Europe* Oxford Intellectual Property Research Centre Working Paper 05/00 (2000) 30-32; Bessen & Meurer *Patent Failure* 22, 187, 200-203
[127] Bessen & Meurer *Patent Failure* 195 and 200
[128] Jolliffe (2005) *SACJ* 2, Bessen & Meurer *Patent Failure* 198
[129] Lemley et al *Software & Internet Law* 30
[130] MA Lemley & DL Burk "Policy Levers in Patent Law" (2003) 89 *Va L Rev* 1575 1622
[131] Lemley et al *Software & Internet Law* 30
[132] Lemley & Burk (2003) *Va L Rev* 1623

practices such as the re-use of code and modularisation. Units or modules of code are written so that it is possible to use them in many different contexts with little or no modifications to ensure efficiency and inter-operability. Copyright protection of source code makes programming new programs inefficient. This is compounded by the possibility of infringement claims that could arise where programmers reverse engineer computer programs. Therefore programmers often have to independently create or re-write substantial amounts of source code or pay licence fees to access and use existing code. Where new code has to be written this is inefficient, may hinder inter-operability and ease of use to the detriment of users. Hence, some developers choose not to enforce their copyright and instead use appropriate licenses to enable others to use their code (free and open source software is discussed below in part 4.3).

3 2 5   *Acquisition and enforcement*

The delays and costs inherent in acquiring and enforcing patents make them ill-suited to the rapidly evolving software industry.[133] It is argued that trade secret and copyright protection is suitable for the fast-paced software industry because it has no attendant registration costs or delays. Further, it is argued that if the anticipated revenue generation from the computer program is modest, trade secret protection is an appropriate form of protection because its costs may be kept low.[134] While this is true, it does not outweigh the negative effects of copyright and trade secrets outlined above. IP infringement litigation is generally very costly and often protracted. The development of new programs may be stifled as creators decide to opt out of an industry that seems burdened by legal uncertainty and its associated financial costs.

3 3   Enabling user access to affordable computer programs

The negative impact of IP protection on creators translates into the denial of users' needs for affordable and accessible computer programs. This is because programming inefficiencies, shrinking commons and IP thickets work together to lead to fewer, possibly incompatible and more expensive programs being available. Any such increases in the cost of obtaining access to methods is inappropriate, especially in a developing country such as South Africa where small users have great economic potential but often have limited resources.

Small and medium sized enterprises ("SME"s) have been found to be significant drivers of economic growth in South Africa through contributions

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[133] PS Menell "Tailoring Legal Protection for Computer Software" (1987) 39 *Stan L Rev* 1329 1350
[134] Szepesi (1996) *Santa Clara Computer & High Tech LJ* 198-199

to GDP, the alleviation of poverty and the provision of employment.[135] Therefore, the government has committed itself to promoting local SMEs,[136] in part through the creation of an enabling legal environment. Therefore the IP protection of computer programs ought to promote, and not hinder, entrepreneurial growth of SMEs, in compliance with stated national goals. Further, the lack of compatibility or inter-operability between available programs means that they are more difficult to use.

4   Recommendations for achieving equity

In view of the above shortcomings of patent, copyright and trade secret protection for computer programs it is imperative to consider how a more equitable approach may be achieved.

4 1   Legislative changes

It is worth considering whether a change of law is both feasible and likely. Several possibilities arise here, namely:

i)   introducing a *sui generis* scheme of IP protection for computer programs to either replace, or co-exist with, the current IP protection scheme;

ii)   strengthening the existing patent scheme to reduce the incidence of weak patents; and

iv)   providing for reverse engineering to ameliorate the anti-competitive effects of copyright and patents.

Each of these options is canvassed below.

4 1 1   Sui generis protection

There have been regular calls over the years for the creation of a *sui generis* IP protection system for computer programs.[137] Most notably, in 1979, WIPO unsuccessfully tried to initiate discussions on a treaty for the protection of

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[135] Small Enterprise Development Agency ("SEDA") *Review of Trends on Entrepreneurship and the Contribution of Small Enterprises to the Economy of South Africa 2000-2006* (2007) 20-21; C Stork & S Esselaar (eds) *Towards an African e-index of SME e-Access and Usage Across 14 African Countries* (2006) 51; Task Group of the Policy Board for Financial Services and Regulation *SMES' Access to Finance in South Africa – A Supply-side Regulatory Review* (2001) 43-44 <http://www treasury gov za/publications/other/default aspx> (accessed 10-03-2011); A Kesper *Failing or Not Aiming to Grow? SMMEs and their Contribution to Employment Growth in South Africa* TIPS Working Paper 15 (2000) 4; A Berry M von Blottnitz, R Cassim, A Kesper, B Rajaratnam and DE van Seventer *The Economics of SMMEs in South Africa* (2002) 4 <http://www edgegrowth com/Portals/0/Documents/Seminal%20Docs/ THE%20ECONOMICS%20OF%20SMMES%20IN%20SOUTH%20AFRICA pdf> (accessed 10-03-2011); A Beyene "Enhancing Competitiveness and Productivity of Small and Medium Scale Enterprises (SMEs) in Africa: An Analysis of Differential Roles of National Governments through Improved Support Services" (2002) 27 *Africa Development* 130 131

[136] DTI *Integrated Strategy on the Promotion of Entrepreneurship and Small Enterprises: Unlocking the Potential of South African Entrepreneurs* (2005) 3; DTI *White Paper on Small Business: National Strategy for the Development and Promotion of Small Business in South Africa* (1995)

[137] See, for example, Samuelson et al (1994) *Colum L Rev* 2308; Lemley et al *Software & Internet Law* 45; Diver (2008) *JIPLP* 125; VM Janich "Sui Generis Rights for Business Methods" (2004) 35 *IIC* 376; JF Agnelli III "Computer Programs under the United States Intellectual Property System: *Sui Generis* Legislation is Needed" (2008) 3 *S New Eng Roundtable Symp LJ* 109; JC Phillips "*Sui Generis* Intellectual Property Protection for Computer Software" (1992) 60 *Geo Wash L Rev* 997

computer software, which would have followed the *sui generis* approach proposed in its 1978 Model Provisions.[138] The sole legacy of this attempt is that current definitions of computer programs have their root in the definition proffered by the Model Provisions.[139]

Such a *sui generis* system would be tailored to meet the unique needs of creators and take the abstract and functional nature of computer programs into account thereby eliminating many, if not all, of the weaknesses in the current system. For example it may require fuller disclosure,[140] permit independent creation,[141] enable reverse engineering[142] and provide a shorter term of protection.[143] In many respects it would be similar to existing *sui generis* protection systems for the protection of semiconductor chips or the European database right.[144]

There has been significant opposition to calls for the establishment of a *sui generis* IP scheme from both academics[145] and states.[146] One reason for this opposition is the complexity that would arise in the creation of industry specific laws, particularly with regard to drawing boundaries between industries where work falls into multiple fields or industries. Further, it is feared that such an approach would open the floodgates with other industrial sectors also calling for their own *sui generis* laws.[147]

Another reason is the difficulty attendant on establishing an appropriate relationship between *sui generis* and existing IP protection. Some scholars have argued for the complete abolition of existing forms of protection[148]

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[138] WIPO International Bureau Report for Expert Group on the Legal Protection of Computer Software *Measures to Enhance International Cooperation in the Field of Legal Protection of Computer Software* (1979) LPCS/1/2; WIPO *Model Provisions on the Protection of Computer Software* (1978)

[139] S 1(i) of the WIPO *Model Provisions on the Protection of Computer Software*; CB Ncube "Copyright Protection of Computer Programs, Computer-generated Works and Databases in Zimbabwe" (2002) *JILT* 1 <http://www2 warwick ac uk/fac/soc/law/elj/jilt/2002_2/ncube> (accessed 15-04-2011)

[140] Paras 16-18 of the WIPO International Bureau Report for Expert Group on the Legal Protection of Computer Software *Measures to Enhance International Cooperation in the Field of Legal Protection of Computer Software* mooted the possibility of an international system of deposit of computer programs

[141] Para 14(l) of the WIPO International Bureau Report for Expert Group on the Legal Protection of Computer Software *Measures to Enhance International Cooperation in the Field of Legal Protection of Computer Software*

[142] Menell (1987) *Stan L Rev* 1371

[143] Para 14(m) of the WIPO International Bureau Report for Expert Group on the Legal Protection of Computer Software *Measures to Enhance International Cooperation in the Field of Legal Protection of Computer Software* suggested protection of between fifteen to 25 years

[144] Ballardini "Scope of IP Protection for the Functional Elements of Software" in *In Search of New IP Regimes* 55 See the US Semiconductor Chip Protection Act 17 USC §§ 901-914 (1984) and European Parliament and Council *Directive 96/9/EC of the European Parliament and of the Council of 1996 on the Legal Protection of Databases* OJ L 77/20, 27 3 1996

[145] See, for example, JC Ginsburg "Four Reasons and a Paradox: The Manifest Superiority of Copyright over Sui Generis Protection of Computer Software" (1994) 94 *Colum L Rev* 2559

[146] DS Karjala "Protecting Innovation in Computer Software, Biotechnology, and Nanotechnology" (2011) 16 *Virginia Journal of Law & Technology* 42 47 n 25 where reference is made to a failed Japanese proposal for *sui generis* protection of software

[147] Ballardini "Scope of IP protection for the Functional Elements of Software" in *In Search of New IP Regimes* 55

[148] Samuelson (1994) *Colum L Rev* 2308; Lemley et al *Software & Internet Law* 45, Diver (2008) *JIPLP* 125; Janich (2004) *IIC* 376; Agnelli III (2008) *S New Eng Roundtable Symp LJ* 109; Phillips (1992) *Geo Wash L Rev* 997

while others have pointed out that *sui generis* protection ought to coexist with existing forms of protection.[149]

There are no indications that a change of law as drastic as abolishing current forms of IP protection of computer programs and replacing them with *sui generis* protection is likely to happen in the foreseeable future on the international plane. This is because TRIPS makes the provision of copyright,[150] patent[151] and trade secret[152] protection for eligible computer programs mandatory. Having mobilised immense resources to achieve the establishment of these forms of protection, it is unlikely that states would have the desire or stamina to begin creating a new international protection scheme.[153] More so, when attempts at negotiating another IP treaty, the Substantive Patent Law Treaty ("SPLT") have been going on for the last fifteen years, with multiple starts and stops.[154]

The same reasons rule out the alternative of creating an international *sui generis* IP system that coexists with existing IP protection. Moreover, if existing IP protection is retained there will be little motivation for creators to opt for *sui generis* protection. Finally, coexistence raises questions about the scope of protection of each type of protection and fears that this would simply be creating an extra layer of complexity to an already contested area.

South Africa's adoption of a national *sui generis* IP scheme is improbable as this would fly in the face of established international practice and the country's obligations under TRIPS. In addition, South Africa participated actively in the negotiation of, and is a signatory to, the WCT,[155] which expressly provides in article 4 that computer programs are to be protected as literary works. However, South Africa has not yet ratified the WCT, perhaps due to the statutory amendments which would be required to comply with article 4. As noted above, there are already concerns about South Africa's treatment of computer programs as a *sui generis* category of copyright eligible works, in contrast to their treatment as literary works by other TRIPS and WCT member states. It is therefore unlikely that the country will seek to divert further from the majority approach by establishing a *sui generis* IP protection scheme for computer programs.

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[149] Ballardini "Scope of IP Protection for the Functional Elements of Software" in *In Search of New IP Regimes* 53-54
[150] TRIPS Art 10(1)
[151] Art 27(1)
[152] Art 39(2)
[153] PS Menell "The Challenges of Reforming Intellectual Property Protection for Computer Software" (1994) 94 *Colum L Rev* 2644 2653
[154] For commentary on these negotiations see JH Reichman *Patent Law Harmonisation and the Draft SPLT* paper presented to WIPO's Open Forum on the Draft SPLT, Geneva, 2006 <http://www.wipo int/export/ sites/www/meetings/en/2006/scp_of_ge_06/presentations/scp_of_ge_06_reichman pdf> (accessed 12-06-12); G Dutfield "Is the World Ready for Substantive Patent Law Harmonisation? A Lesson from History" in P Drahos (ed) *Death of Patents* (2005) 249
[155] For an overview of South Africa's participation in WCT negotiations see T Pistorius "Developing Countries and Copyright in the Information Age" (2006) 2 *PER* 1 and V van Coppenhagen "Copyright and the WIPO Copyright Treaty, with Specific Reference to the Rights Applicable in a Digital Environment and the Protection of Technological Measures" (2002) 119 *SALJ* 429

4 1 2   Improving the current patent application process

Amending the Patents Act to provide for opposition before patent grant may be beneficial.[156] This is a better alternative to simply introducing substantive examination which would raise capacity problems resulting in ineffective or inefficient prior art searches. However, an opposition is likely to yield better results because opposition proceedings could be mounted by public interest groups and industry rivals who would be knowledgeable about prior art. Indeed, they would only oppose a patent on the basis of hard evidence of prior art. For example, in 2005 public interest groups led by Freedom to Innovate South Africa announced their intention to apply for the invalidation of Microsoft's XML patent[157] which was patented in South Africa in 2004.[158] However, an application was not subsequently filed probably because of prohibitive court costs.[159] Further, the XML patent was refused in the US and had been amended voluntarily by Microsoft in New Zealand in the face of opposition from the Open Source Software movement.[160] Another benefit of pre-grant opposition would be that it would be less complex than post grant invalidation litigation because opposition would be an administrative procedure under the auspices of the patent office rather than High Court litigation. However, opposition proceedings may turn out to be costly due to evidentiary procedures, the cost of legal representation and subsequent appeals.

4 1 3   Reverse engineering of copyright protected and patented programs

Legislative provision could be made to enable reverse engineering and secure protection from copyright and patent infringement suits for independent creators of computer programs.[161] Reverse engineering has gained legitimacy as an accepted means of securing inter-operability[162] and therefore ought to be permitted.[163] Another reason in support of such legislative intervention is the limited value of disclosure by computer program patents.[164] As noted above, statutory provisions that permit reverse engineering in specified circumstances exist in the United Kingdom and the United States.

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[156] A Layne-Farrar & DS Evans "Software Patents and Open Source: The Battle Over Intellectual Property Rights" (2004) 9 *Virginia Journal of Law & Technology* 1 30

[157] A Otter "Local Organisations Challenge Microsoft XML Patent" (29-06-2005) *Tectonic* <http://tectonic co za/?p=497> (accessed 18-10-2012), Tectonic "XML Opposition Headed to Court?" (30-09-2005) *Tectonic* <http://www tectonic co za/?p=632> (accessed 19-03-2011)

[158] Patent No ZA200303346.

[159] A Otter "SA Patent Opposition Could be Costly" (29-08-2009) *Tectonic* <http://www tectonic co za/?p=1135> (accessed 16-03-2011)

[160] A Otter "OSS Group Claims Microsoft Patent Victory" (28-08-2006) *Tectonic* <http://www tectonic co za/?p=1133> (accessed 16-03-2011)

[161] Lemley & Burk (2003) *Va L Rev* 1584 and 1621; MA Lemley & JE Cohen "Patent Scope and Innovation in the Software Industry" (2001) 89 *Cal L Rev* 1 6, 17-25

[162] Lemley & Burk (2003) *Va L Rev* 1575, 1621 n149

[163] PS Menell "An Epitaph for Traditional Copyright Protection of Network Features of Computer Software" (1998) 43 *Antitrust Bulletin* 651 679

[164] Lemley & Burk (2003) *Va L Rev* 1691

4 2   Judicious application of existing patent protection

Even if statutory provision is not made for reverse engineering, courts[165] may use their discretion to accept a reverse engineering defence in appropriate infringement cases.[166] For example, such a defence could be accepted where the purpose of the reverse engineering was to create inter-operability and enhance ease of use. Inter-operability is also a key competition or anti-trust concern as evidenced by the Microsoft anti-trust cases[167] which ultimately resulted in the adoption of an inter-operability program by Microsoft.[168]

Equity may also be achieved by the courts' adoption of the restrictive United Kingdom approach which would ensure that only deserving or patentable programs are protected, leading to fewer patents and a reduction of patent thickets. Consequently, creators will find it easier to create new computer programs resulting in the availability of a wider variety of computer programs to the benefit of users.

There is state or government preference for a restrictive approach as evidenced by the government's adoption of a Free and Open Source Software ("FOSS") Policy in 2007[169] and ministerial pronouncements against computer program patents at the time of its adoption.[170] The adoption of this policy has been criticised on a number of points, including its possible negative impact on the local software industry. Further, there are various barriers to the adoption of FOSS in South Africa and the rest of sub-Saharan Africa.[171] Full engagement with the merits of the adoption of this policy is beyond the scope of this paper. Suffice to say, its effects may not be as detrimental as initially feared because, for various reasons, this policy has not been fully implemented in South Africa. The following section canvasses the potential value of voluntary use of open licenses by creators of computer programs. It does not consider government or public sector use of FOSS but focuses on the position of private and commercial users such as individuals or SMEs.

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[165] The patent office is excluded from this discussion because it does not substantively examine patent applications

[166] Lemley & Burk (2003) *Va L Rev* 1689 and 1691

[167] For example, *Microsoft Corp v European Commission* (T-201/04) [2007] ECR II-3601; [2007] 5 CMLR 11 (GC September 17, 2007) For commentary on these cases see L Rubini (ed) *Microsoft on Trial: Legal and Economic Analysis of a Transatlantic Antitrust Case* (2010)

[168] Global Competition Litigation Review "Arbitration: Microsoft Adopts Interoperability Commitment in the Form of a Public Undertaking Enforceable through Arbitration in Response to Pending Commission Investigations under Regulation 1/2003" (2010) 3 *Global Competition Litigation Review* R53-54

[169] Department of Public Service and Administration *Policy on Free and Open Source Software Use for South African Government* (2006) The full text of the Policy is available at <www info gov za/view/ DownloadFileAction?id=94490> (accessed 04-03-2011) For an overview of the development, adoption and implementation of this policy see L Weilbach & E Byrne "A Human Environmentalist Approach to Diffusion in ICT Policies: A Case Study of the FOSS Policy of the South African Government" (2010) 8 *Journal of Information, Communication and Ethics in Society* 108 and L Weilbach & E Byrne "Implementing Open Source Software to Conform to National Policy" (2011) 13 *Journal of Systems and Information Technology* 286

[170] Tectonic "SA Minister Slams Software Patents" (18-03-2008) *Tectonic* <http://www tectonic co za/?p=2304> (accessed 04-03-2011)

[171] For example, see SK Sowe *Using Multiple Case Studies to Analyse Open Source Software Business Sustainability and Innovation in Sub-Saharan Africa* Development Informatics Working Paper Series, Institute for Development Policy and Management, Manchester University (2011) <http://webserv ias unu edu/fel/sites/default/files/FOSS%20SusInno-Case%20Studies pdf> (accessed 16-03-2012)

4 3   Free and open source software

Creators could also contribute to the creation of a more equitable environment by opting out of the patent, copyright and trade secret system. However, simply opting out of traditional IP protection leaves creators without the conventional means for extracting reward and remuneration for their computer programs and leaves these programs open to misappropriation. It also leaves the creator vulnerable to infringement claims from others who have IP protection over identical or similar computer programs.

Free software ("FS") or open source software ("OSS") (together FOSS) equitably balances creators' and users' rights. FOSS is copyright protected but its source code is published and licensed under certain conditions.[172] Examples of the most frequently used licenses include the Open Software License 3.0[173] and the GNU General Public License 3.0.[174] There are several business models that enable creators to generate significant revenue from FOSS. FOSS may be sold. However, the more popular business model is to provide the computer programs at no cost and to thereafter charge market-related fees for related hardware, training, technical support, customisation or maintenance.[175] This business model allows creators to compensate for the lack of sale income through revenue generated from the sale of associated goods and services. Therefore, it still provides a financial incentive for creativity and some businesses have successfully used this business model.[176] It is also important to note that not all software development is motivated by financial rewards and that some programmers would still create new programs in an environment with little or no financial rewards.[177] For such developers, this business model allows them a measure of sustainability as the funds generated from associated goods and services enables them to fund their activities.

In addition, creators benefit from a more vibrant ideas/functionalities commons and resulting programming efficiencies.[178] In particular, creators benefit from the communal development that characterises FOSS[179] and

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[172] J Speres "The Enforceability of Open Source Software Licences: Can Copyright Licences be Granted Non-contractually?" (2009) 21 *SA Merc LJ* 174 175

[173] <http://www opensource org/licenses/osl-3 0> (accessed 18-03-2011)

[174] <http://www gnu org/licenses/gpl html> (accessed 18-03-2011)

[175] S Krishnamurthy "An Analysis of Open Source Business Models" in J Feller, B Fitzgerald, S Hissam & K Lakham (eds) *Making Sense of the Bazaar: Perspectives on Open Source and Free Software* (2003) 279 280; HW Chesbrough & MM Appleyard "Open Innovation and Strategy" (2007) 50 *California Management Review* 57 65-66

[176] For example, C Visser "Free/libre and Open Source Software" (2004) 12 *JBL* 205 208

[177] H Benbya "Understanding Developers' Motives in Open Source Projects: A Multi-Theoretical Framework" (2010) 27 *Communications of the Association for Information Systems* 589; S Chakravarty, E Haruvy & F Wu "The Link Between Incentives and Product Performance in Open Source Development: An Empirical Investigation" (2007) 9 *Global Business and Economics Review* 151 and E Haruvy, A Prasad & SP Sethi "Harvesting Altruism in Open-Source Software Development" (2003) 118 *Journal of Optimization Theory and Applications* 381

[178] D Riehle "The Economic Motivation of Open Source Software: Stakeholder Perspectives" (2007) 40 *Computing Practices* 25 31; J Wesselius "The Bazaar Inside the Cathedral: Business Models for Internal Markets" (2008) 25 *IEEE Software* 60 62-63

[179] For an example of such collaboration see the account in ES Raymond *The Cathedral and the Bazaar: Musings on Linux and Open Source by an Accidental Revolutionary* (1999).

which, in many instances, results in FOSS of superior quality than proprietary computer programs.[180]

For individual users, the adoption of FOSS would eliminate any cost, delays and complexities attendant on licensing negotiations for commissioned computer programs and the need to purchase off-the-shelf packages. Further, as the source code is available it is possible for users to customise the computer programs to meet their peculiar needs and preferences. Institutional users of FOSS may find that their position is more complex due to their unique organisational or business needs and this may obviate the benefits of FOSS.

The development and deployment of similar open licenses for patents[181] and trade secrets[182] is still in its nascent stages and therefore will not be discussed in this paper.

5   Conclusion

Current patent, copyright and trade secret protection of computer programs is inequitable from both a creator's and user's perspective. This is largely due to the negative impact this protection has on innovation and competition due to:

i)   its shrinking effect on the idea/functionality commons;
ii)   its incompatibility with programming practices which favour modularisation and re-use; and
iii)   its incompatibility with the functional and abstract nature of computer programs.

In such an inequitable environment, creators are unable to thrive or compete efficiently and users are deprived of affordable access to computer programs.

In view of this inequity, several alternatives to patent, copyright and trade secret protection were probed above. These alternatives are:

i)   legislative provision for *sui generis* IP protection to replace, or co-exist with, existing IP protection;
ii)   legislative provision for pre-patent grant opposition proceedings and statutory provisions which permit reverse engineering in the Copyright and Patents Acts;
iii)   the courts' adoption of a restrictive approach to the patenting of computer programs, modelled on the United Kingdom approach, accompanied by a judicially created reverse engineering defence; and
iv)   the use of balancing tools such as FOSS by creators.

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[180] J Bessen "Open Source Software: Free Provision of Complex Public Goods" in J Bitzer & PJH Schröder (eds) *The Economics of Open Source Software Development* (2006) 57 57-58; Chesbrough & Appleyard (2007) *California Management Review* 57 64

[181] Boettiger & Burk (2004) *Journal of International Biotechnology Law* 221

[182] MJ Madison "Open Secrets" in R Dreyfuss & K Strandberg (eds) *The Law and Theory of Trade Secrecy: A Handbook of Contemporary Research* (2011) 222; G van Overwalle "Uncorking Trade Secrets: Sparking the Interaction Between Trade Secrecy and Open Biotechnology" in R Dreyfuss & K Strandberg (eds) *The Law and Theory of Trade Secrecy: A Handbook of Contemporary Research* (2011) 246

The first option is both unfeasible and unlikely primarily due to existing international obligations and practices entrenching existing IP protection. The remaining options are more viable as they are premised on leveraging existing protection to the benefit of both users and creators. Precedents already exist from other jurisdictions, such as the United Kingdom, for a restrictive approach to patenting. Similarly, models of good pre-patent grant opposition and peer review mechanisms exist, for example in the United States. Finally, a small but significant segment of the software industry has embraced FOSS as has the South African government.

SUMMARY

This paper examines the intellectual property ("IP") protection of computer programs. It considers how South Africa can achieve an equitable balance between creators' interests in securing remuneration and attribution for, and users' interests in securing affordable access to, these programs.

The criterion used for determining equity is whether legal certainty has been achieved with regard to the nature and scope of protection; whether the protection is compatible with the nature of computer programs, programmers' needs and practices, and whether, ultimately, the protection enables user access to affordable computer programs. The paper finds that existing IP protection is inequitable due to its anti-competitive, and innovation-chilling effects, which hinder creative efforts and, consequently, thwart access to affordable computer programs. These negative effects are primarily due to legal uncertainties, incompatibilities with the functional and abstract nature of computer programs and programming practices that favour re-use and modularisation of source code.

It then argues that certain changes in law that permit reverse engineering and partially codify the approach to non-literal copyright infringement; the judicious interpretation and application of existing protection and the introduction of measures such as pre-patent grant opposition would more fairly balance creators' and users' rights. Ultimately, it concludes that the most equitable route is for creators to eschew the current forms of IP protection in favour of free and open source software and open business models, which permit innovation sharing, enable viable revenue generation and attribution for creators and enable user access.

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