

**THE END OF POST-SALE CONFUSION:
HOW CONSUMER 3D PRINTING WILL DIMINISH THE
FUNCTION OF TRADEMARKS**

*James Grace**

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I. INTRODUCTION

In January of 2013, the Finnish telecom giant Nokia publicly released design files enabling the production of cases for its newly launched smartphones, Lumia 820 and Lumia 520, on consumer-grade three-dimensional (“3D”) printers.¹ Nokia made its computer-

* Harvard Law School LL.M. 2014; University of Ottawa, J.D. 2012; Queen’s University, B.Sc. 2009. Thank you to Professor Benjamin Roin for supervising the paper that served as the inspiration for this Note. Thank you also to Dianne Hajdasz, Dr. Teresa Scassa, and Matthew Grace for their insightful comments. Finally, the author would like to express deep

aided design (“CAD”) files available to the public, subject to a Creative Commons license,² allowing people to print cases directly using their own consumer 3D printer or upload the CAD files to a 3D printing service to print cases for a fee.³ The 3D printing community heralded Nokia as an innovator for becoming the first global manufacturer to make CAD files for their products publicly available.⁴ Yet, what seemed nothing more than a novel promotional campaign actually marked a paradigm shift in the functioning of trademarks.

Nokia’s decision to make CAD files for some of its products publicly available was a radical departure from the traditional philosophy of technology companies. For instance, Nokia’s chief competitor, Apple, only makes its trademarks available to third-party accessory manufacturers subject to stringent license requirements.⁵ These manufacturers are expressly forbidden from printing or engraving any of Apple’s trademarks directly on their products.⁶ Apple also asserts its trademark rights against counterfeiters in court, seeking injunctive and monetary relief against those who would manufacture or sell knockoff versions of its products.⁷

By contrast, Nokia has provided CAD files to the public in order to enable the fabrication of products featuring Nokia’s logo.⁸ The terms and conditions of Nokia’s user agreement provide that the CAD files are offered through a Creative Commons license whereby downloaders agree to only use the CAD files for *private* purposes, ac-

gratitude to the editors of the Harvard Journal of Law & Technology, especially Article Editor Samuel Wagreich, for their hard work in bringing this Note to print.

1. *3D Print a Shell for Your Nokia Phone*, NOKIA DEVELOPER WIKI (Jan. 18, 2013), http://developer.nokia.com/community/wiki/3D_print_a_shell_for_your_Nokia_Phone; Mike Senese, *Nokia Releases Files of 3-D Printing Your Own Phone Case*, WIRED (Jan. 18, 2013, 5:14 PM), <http://www.wired.com/design/2013/01/nokia-3d-print-case/>.

2. See *Attribution-NonCommercial-ShareAlike 3.0 Unported*, CREATIVE COMMONS, <http://creativecommons.org/licenses/by-nc-sa/3.0/> (last visited Dec. 18, 2014).

3. *3D Print a Shell for Your Nokia Phone*, *supra* note 1; see, e.g., Bart Veldhuizen, *Our New Prices — How Do They Work?*, SHAPEWAYS BLOG (June 2, 2008), <http://www.shapeways.com/blog/archives/23-our-new-prices-how-do-they-work.html> (Shapeways’ prices range from \$2.50 to \$3.30/cm³ based on the material and whether the purchaser lives in the EU).

4. See Duann Scott, *Nokia Becomes the First Major Manufacturer To Release 3D Printable Files for Their Product*, SHAPEWAYS BLOG (Jan. 18, 2013), <http://www.shapeways.com/blog/archives/1886-Nokia-Becomes-the-First-Major-Manufacturer-to-Release-3D-Printable-Files-for-Their-Product.html>.

5. Third-party manufacturers of accessories for Apple’s iPhone and iPod products are permitted to license the use of Apple’s trademarks for the limited purpose of indicating product compatibility. *iPod, iPhone, and iPad Icons: Guidelines*, APPLE INC. (Mar. 2013), <https://developer.apple.com/softwarelicensing/agreements/files/iPod-iPhone-iPad-Icons-Guidelines.pdf>.

6. *Id.*

7. See, e.g., Complaint, Apple Inc. v. Apple Story Inc., No. 1:11-CV-03550 (E.D.N.Y. filed July 25, 2011).

8. See, e.g., *Nokia Lumia 820 MakerBot Shell*, THINGIVERSE (Jan. 18, 2013), <http://www.thingiverse.com/thing:43163>.

knowledging that they are not licensed to use Nokia's intellectual property — including the Nokia trademark — for *commercial* purposes.⁹ As such, the Nokia example signals the beginning of trademarked products that are produced neither directly by a trademark owner nor by a licensed manufacturer entering the public marketplace.

Historically, trademarks were relied upon to indicate the source of origin of a product.¹⁰ In the early twentieth century, the emergence of trademark licensing attenuated the relationship between the manufacturer and the trademark owner.¹¹ 3D printing will further diminish this connection between the trademark owner and its ultimate manufacturer by enabling consumers to make their own trademark-bearing products without any oversight by or contractual relationship with the trademark owner.¹² This new understanding of a product's origin will impact how consumers perceive trademarks in a post-sale environment where labeling and packaging attesting to authenticity is absent. It may soon become unreasonable for consumers to expect brands to exert any control over the quality and quantity of products that display their trademarks.¹³

This Note discusses how the emergence of consumer 3D printing will impact the role of trademarks in society by undermining the rationale of the post-sale confusion doctrine. Part II provides background on consumer 3D printing technology and the status of the industry. Part III explains the function of trademark law generally and the doctrine of post-sale confusion. Part IV examines how 3D printing will alter consumer expectations of trademarks and weaken the rationale for post-sale confusion. Part V anticipates a judicial response to limit the application of post-sale confusion and proposes amending the Lanham Act to strictly prohibit commercial counterfeiting. Part VI concludes.

9. See *Attribution-NonCommercial-Share Alike 3.0 Unported*, *supra* note 2; *3D Printing Terms and Conditions*, NOKIA DEVELOPER, <http://developer.nokia.com/terms-and-conditions/3d-printing> (last visited Dec. 18, 2014).

10. See, e.g., Mark P. McKenna, *Trademark Use and the Problem of Source*, 2009 U. ILL. L. REV. 773, 786 (2009).

11. *Id.* at 790.

12. While CAD files may be downloaded with the authorization of the trademark owner — such as with the case of Nokia — files may be produced using a 3D scanner or accessed from a file-sharing website such as Shapeways or Thingiverse without the authorization of the trademark owner.

13. See *infra* Part IV.B.

II. CONSUMER 3D PRINTING: THE TECHNOLOGY AND THE INDUSTRY

A. *The Capabilities of Consumer 3D Printing*

3D printing, also known as additive manufacturing, has existed for over thirty years.¹⁴ Beginning with a CAD file of a 3D object, a 3D printer slices the file image into two-dimensional cross-sections and deposits or “prints” the cross-sections layer-by-layer.¹⁵ As each layer is printed, the platform is lowered, allowing the next layer to be deposited on top, and, over a period of hours or days, a 3D object takes shape.¹⁶ Instead of using conventional inkjet cartridges, 3D printers utilize various materials, including plastic, steel, and ceramics.¹⁷

The emergence of commercial-grade 3D printers was touted by *The Economist* as signaling a “third industrial revolution.”¹⁸ 3D printers allow for tremendous efficiency gains in the areas of rapid prototyping and supply chain management.¹⁹ In his 2013 State of the Union Address, President Barack Obama proclaimed that 3D printing “has the potential to revolutionize the way we make almost everything.”²⁰ This revolution is well underway in the aerospace and medical device industries, where commercial-grade 3D printers have enabled the fabrication of lightweight jet engine components and custom-fitted prosthetics.²¹ Conversely, the consumer 3D printing industry is still in its

14. See U.S. Patent No. 4,575,330 (filed Aug. 8, 1984).

15. See Deven R. Desai & Gerard N. Magliocca, *Patents, Meet Napster: 3D Printing and the Digitization of Things*, 102 GEO. L.J. 1691, 1695–96 (2014); Davis Doherty, *Downloading Infringement: Patent Law as a Roadblock to the 3D Printing Revolution*, 26 HARV. J.L. & TECH. 353, 356–58 (2012).

16. Desai & Magliocca, *supra* note 15, at 1695–96.

17. See *3D Printing Materials Comparison Sheet*, SHAPEWAYS, <http://www.shapeways.com/materials/material-options> (last visited Dec. 18, 2014).

18. *A Third Industrial Revolution*, in SPECIAL REPORT: MANUFACTURING AND INNOVATION 4, ECONOMIST, Apr. 21, 2012, available at <http://www.economist.com/node/21552901>.

19. See, e.g., Tim Catts, *GE Turns to 3D Printers for Plane Parts*, BLOOMBERG BUSINESSWEEK (Nov. 27, 2013), <http://www.businessweek.com/articles/2013-11-27/general-electric-turns-to-3d-printers-for-plane-parts> (General Electric employs 3D printing technology to produce 85,000 fuel nozzles for jet engines that would normally be comprised of twenty separate components).

20. President Barack Obama, Address Before a Joint Session of Congress on the State of the Union (Feb. 12, 2013) (transcript available at <http://www.presidency.ucsb.edu/ws/?pid=102826>).

21. Samuel Wagreich, *3D Printing: Everything You Need To Know*, INC., <http://www.inc.com/samuel-wagreich/3d-printing-revolution-fact-or-fiction.html> (last updated Feb. 14, 2013); *3D Printing Scales Up*, ECONOMIST, Sept. 7, 2013, at 11, 12–13, available at <http://www.economist.com/news/technology-quarterly/21584447-digital-manufacturing-there-lot-hype-around-3d-printing-it-fast>.

infancy, and there is great speculation about whether the public's initial curiosity will evolve into adoption of the technology.²²

B. The Market for Consumer 3D Printers and Services

Consumers seeking to 3D print Nokia's case have several options. They can choose to use their own 3D printer, visit a 3D printing retail location, or use a web-based 3D printing service. Currently, there are dozens of models of consumer 3D printers on the market.²³ The most well-known manufacturer of consumer 3D printers is MakerBot, which offers a line of six models ranging in price from \$1375 to \$6499.²⁴ Smaller start-up companies offer 3D printers priced under \$400 through crowdfunding websites such as Kickstarter.²⁵

Individuals seeking to create their own designs have access to a growing variety of consumer-friendly 3D modeling software.²⁶ Those in search of CAD files to replicate existing products have three main options. First, they may access CAD files that have been made publicly available by companies, such as in the case of Nokia. Second, they may generate their own CAD files of the products they wish to replicate using a 3D scanner.²⁷ Third, they may use online services, such as Shapeways²⁸ and Thingiverse,²⁹ which contain searchable catalogues of hundreds of thousands of CAD files that have been uploaded by independent designers.³⁰

22. See, e.g., Wagreich, *supra* note 21.

23. See Brian Heater, *The Shape of Things To Come: A Consumer's Guide to 3D Printers*, ENGADGET (Jan. 29, 2013, 2:00 PM), <http://www.engadget.com/2013/01/29/3d-printer-guide/>; see also David Lumb, *The Top Nine Consumer 3-D Printers for Every Budget*, FAST COMPANY (Aug. 28, 2013), <http://www.fastcolabs.com/3016490/9-consumer-3-d-printers-for-every-budget>.

24. *MakerBot Replicator 3D Printers: Compare*, MAKERBOT, <http://store.makerbot.com/compare> (last visited Dec. 18, 2014).

25. See, e.g., *The Buccaneer — The 3D Printer that Everyone Can Use!*, KICKSTARTER, <https://www.kickstarter.com/projects/pirate3d/the-buccaneer-the-3d-printer-that-everyone-can-use> (last visited Dec. 18, 2014) (Pirate3D Inc. raised over \$1.4 million to fund the manufacturing of its \$347 consumer 3D printer called The Buccaneer).

26. See John Herrman, *How To Get Started: 3D Modeling and Printing*, POPULAR MECHANICS (Mar. 15, 2012, 6:30 AM), <http://www.popularmechanics.com/technology/how-to/tips/how-to-get-started-3d-modeling-and-printing>.

27. See, e.g., *MakerBot Digitizer*, MAKERBOT, <http://store.makerbot.com/digitizer> (last visited Dec. 18, 2014).

28. *About Us*, SHAPEWAYS, <http://www.shapeways.com/about> (last visited Dec. 18, 2014).

29. *Digital Designs for Physical Objects*, THINGIVERSE, <http://www.thingiverse.com/about> (last visited Dec. 18, 2014).

30. See, e.g., *The 100,000th Thing on Thingiverse!*, MAKERBOT BLOG (June 8, 2013), <http://www.makerbot.com/blog/2013/06/08/100000th-thing-on-thingiverse/>; Savannah Peterson, *Shapeways Supports the First Ever White House Maker Faire and National Day of Making*, SHAPEWAYS BLOG (June 18, 2014), <http://www.shapeways.com/blog/archives/2590-Shapeways-Supports-the-First-Ever-White-House-Maker-Faire-and-National-Day-of-Making.html>.

Shapeways and Thingiverse operate using different business models that emulate models used in ecommerce and peer-to-peer file sharing. Thingiverse uses an open source platform where designers upload and consumers download CAD files free of charge for at-home 3D printing.³¹ On the other hand, Shapeways hosts independently run shops, which upload product designs for customers to browse.³² Shapeways prints design files with its 3D printers and ships 3D products directly to customers.³³ Customers pay Shapeways for the printing service, and designers are able to determine their own markup fee.³⁴ The uploaded files on both websites may contain original designs, or, despite the websites' stated policies on intellectual property protection,³⁵ they may be copies of existing designs that are subject to copyright, patent, and trademark protection.³⁶

III. TRADEMARK LAW AND THE DOCTRINE OF POST-SALE CONFUSION

A. Trademark Law Generally

3D printing will potentially impact three categories of trademarks: word marks, design marks (logos), and trade dress (specifically, product configuration).³⁷ In the United States, the Lanham Act defines a trademark as "any word, name, symbol, or device, or any combination thereof" used by a manufacturer or merchant to identify his or her products and distinguish them from those manufactured or sold by others.³⁸ A cornerstone of a trademark in the common law is distinctiveness; in order to qualify as a trademark, a word or symbol must be distinctive such that it is capable of identifying the source of the product bearing the mark.³⁹ Trademark law is intended to protect

31. Andy Greenberg, *Inside Thingiverse, The Radically Open Website Powering the 3D Printing Movement*, FORBES (Nov. 21, 2012, 6:00 AM), <http://www.forbes.com/sites/andygreenberg/2012/11/21/inside-thingiverse-the-radically-open-website-powering-the-3d-printing-movement/>.

32. See *About Us*, *supra* note 28.

33. See *FAQs Shops*, SHAPEWAYS, http://www.shapeways.com/betashops/faq_s_shops (last visited Dec. 18, 2014).

34. *Id.*

35. See *Intellectual Property Policy*, THINGIVERSE, <http://www.thingiverse.com/legal/ip-policy> (last visited Dec. 18, 2014); *Shapeways Content Policy and Notice Takedown Procedure*, SHAPEWAYS, http://www.shapeways.com/legal/content_policy (last visited Dec. 18, 2014).

36. See, e.g., Clive Thompson, *Clive Thompson on 3-D Printing's Legal Morass*, WIRED (May 30, 2012, 1:43 PM), <http://www.wired.com/2012/05/3-d-printing-patent-law/>.

37. 3D printing will likely not impact product packaging, which is another category of trade dress.

38. Lanham Act, 15 U.S.C. § 1127 (2006).

39. J. THOMAS MCCARTHY, MCCARTHY ON TRADEMARKS AND UNFAIR COMPETITION (4th ed.), Sept. 2014, § 11:2 ("If a designation is not 'distinctive,' it is not a 'mark.'").

the interests of both consumers and trademark owners.⁴⁰ From an economic perspective, trademarks facilitate the development of the efficient marketplace by both lowering consumer search costs and incentivizing trademark owners to invest in maintaining the quality of their products.⁴¹ Trademarks have functioned as indicators of product quality by protecting consumer expectations that all products bearing the mark will be of consistent quality, whether manufactured directly by the trademark owner or by an authorized licensee.⁴²

In the United States, the principal remedy of a trademark owner is to bring an action against a defendant for trademark infringement.⁴³ In order to succeed in a trademark infringement action, a trademark owner must establish that the defendant has used a mark in commerce in a way that is likely to cause confusion among consumers concerning the product's source of origin or sponsorship.⁴⁴

The likelihood of confusion is the central issue in a trademark infringement action.⁴⁵ The standard for confusion is fundamentally the same whether an action is brought with regards to a registered or an unregistered trademark.⁴⁶ In determining the likelihood of consumer confusion, courts have generally looked at factors similar to the following eight factors articulated by the Second Circuit in *Polaroid Corp. v. Polarad Electronics Corp.*: (1) the strength of the plaintiff's mark; (2) the similarity of the marks; (3) the proximity of the products; (4) the likelihood that the plaintiff will "bridge the gap" and offer the same types of products as the defendant; (5) actual confusion; (6) the defendant's good faith; (7) the quality of defendant's product; and (8) the sophistication of the buyers.⁴⁷

40. See *Park 'N Fly, Inc. v. Dollar Park & Fly, Inc.*, 469 U.S. 189, 190 (1985) (finding that the Lanham Act's goals are to provide "national protection of trademarks in order to secure to the mark's owner the goodwill of his business and to protect the ability of consumers to distinguish among competing producers").

41. William M. Landes & Richard A. Posner, *Trademark Law: An Economic Perspective*, 30 J.L. & ECON. 265, 269–70 (1987).

42. See MCCARTHY, *supra* note 39, § 18:55.

43. Owners of famous trademarks can also bring an action for trademark dilution under the Federal Trademark Dilution Act of 1995. Pub. L. No. 104-98, 109 Stat. 985 (1996) (codified at 15 U.S.C. §§ 1125(c), 1127), available at <http://www.gpo.gov/fdsys/pkg/PLAW-104publ98/pdf/PLAW-104publ98.pdf>.

44. Lanham Act, 15 U.S.C. §§ 1114, 1125 (2006); see *A.J. Canfield Co. v. Vess Beverages, Inc.*, 796 F.2d 903, 906 (7th Cir. 1986) (stating that, to prevail against an alleged infringer, the plaintiff "must show a valid trademark and a likelihood of confusion on the part of the public").

45. See MCCARTHY, *supra* note 39, § 23:1. In an infringement action involving trade dress, the plaintiff has the added burden of establishing that its trademark is non-functional and is either inherently distinctive or has acquired secondary meaning. See, e.g., *Munsingwear, Inc. v. Jockey Int'l, Inc.*, 31 U.S.P.Q.2d 1146, 1148–49 (D. Minn. 1994).

46. See Anne M. McCarthy, *The Post-Sale Confusion Doctrine: Why the General Public Should Be Included in the Likelihood of Confusion Inquiry*, 67 *FORDHAM L. REV.* 3337, 3343–44 (1999).

47. *Polaroid Corp. v. Polarad Elecs. Corp.*, 287 F.2d 492, 495 (2d Cir. 1961). Each circuit articulates a similar version of this multifactor test. For example, the Ninth Circuit applies

B. The Doctrine of Post-Sale Confusion

Prior to assessing the likelihood of confusion using the *Polaroid* factors, courts are required to assess “the type of confusion actionable, the relevant population of confused persons, and the relevant time of confusion.”⁴⁸ The post-sale confusion doctrine was originally developed in 1955 by the Second Circuit in *Mastercrafters Clock & Radio Co. v. Vacheron & Constantin-Le Coultre Watches, Inc.*⁴⁹ in order to provide a basis for finding that the sale of counterfeit luxury clocks constituted trademark infringement.⁵⁰ Post-sale confusion is premised on the idea that, even though the actual consumer might not be deceived about a product’s origin at the time of purchase, other members of the public might be misled when they subsequently encounter the consumer in possession of the product.⁵¹ Counterfeit Rolex watches are a prototypical example of a product that generates post-sale confusion. While someone may purchase a counterfeit Rolex watch for \$20, knowing it is not genuine, the general public who subsequently observes the watch on the wrist of the purchaser may perceive the watch to be an authentic Rolex.⁵²

Judicial support for this doctrine was bolstered after Congress amended the Lanham Act in 1962.⁵³ The amendment eliminated the requirement that infringing conduct cause a likelihood of confusion among “purchasers.”⁵⁴ One explanation for the removal of the term “purchasers” is that it was simply intended to achieve consistency throughout the Lanham Act.⁵⁵ However, a more plausible explanation is that Congress intended to eliminate a restriction on the scope of the relevant population and timing for applying the confusion analysis.⁵⁶

the *Sleekcraft* test. See *AMF Inc. v. Sleekcraft Boats*, 599 F.2d 341, 348–49 (9th Cir. 1979). See generally Barton Beebe, *An Empirical Study of the Multifactor Tests for Trademark Infringement*, 94 CAL. L. REV. 1581 (2006) (a study on different circuits’ multifactor tests).

48. McCarthy, *supra* note 46, at 3346 (citations omitted).

49. *Mastercrafters Clock & Radio Co. v. Vacheron & Constantin-Le Coultre Watches, Inc.*, 221 F.2d 464, 466 (2d Cir. 1955).

50. See Connie Davis Powell, *We All Know It’s a Knock-Off! Re-evaluating the Need for the Post-Sale Confusion Doctrine in Trademark Law*, 14 N.C. J.L. & TECH. 1, 18 (2012).

51. *Id.* at 17.

52. See Alex Kozinski, *Trademarks Unplugged*, 68 N.Y.U. L. REV. 960, 963–64 (1993); *Rolex Watch U.S.A., Inc. v. Canner*, 645 F. Supp. 484, 492 (S.D. Fla. 1986).

53. See Act of Oct. 9, 1962, Pub. L. No. 87-772, 76 Stat. 769 (codified as amended at 15 U.S.C. § 1051 et seq.).

54. *Id.* at 773 (the 1962 amendment also deleted the “source of origin” requirement for finding trademark infringement, effectively permitting infringement actions where the defendant’s conduct caused a likelihood of confusion with respect to association or sponsorship).

55. See McCarthy, *supra* note 46, at 3350.

56. See *id.*; see also H.R. Rep. No. 87-1108, at 4 (1961) (“The purpose of the proposed change is . . . to omit the word ‘purchasers,’ since the provision actually relates to potential purchasers as well as to actual purchasers.”).

The case law on post-sale confusion continued to evolve through the 1980s.⁵⁷ In *Lois Sportswear, U.S.A. Inc. v. Levi Strauss & Co.*, the Second Circuit considered a claim of trademark infringement brought by Levi Strauss against rival jeans designer Lois Sportswear.⁵⁸ Levi Strauss possessed a registered trademark in its jeans' distinctive pocket stitch design and alleged that Lois Sportswear's virtually identical pocket stitching was confusingly similar.⁵⁹ The court found that Lois Sportswear's labeling was sufficiently distinguishing to enable consumers to discern between the two brands of jeans at the point of sale.⁶⁰ Nevertheless, applying the *Polaroid* factors, the court held that Lois Sportswear had infringed Levi Strauss's trademark because there existed a likelihood of confusion among the public in the post-sale environment where such distinguishing labels had been discarded.⁶¹ The court found that it was clear that the 1962 amendment made post-sale confusion actionable under the Lanham Act.⁶²

Through the application of post-sale confusion, Levi Strauss prevailed in protecting a significant aspect of its jeans' design in the absence of copyright or design patent protection.⁶³ *Lois Sportswear* is now regarded as the leading case supporting the post-sale confusion doctrine.⁶⁴ Its decision is viewed as part of a broader trend in trademark law toward providing more expansive trademark rights.⁶⁵ These expansive rights allow trademark holders to bring claims against both legitimate competitors using similar trademarks and counterfeiters selling knockoff products.⁶⁶

C. *The Rationale for the Doctrine of Post-Sale Confusion*

In traditional cases of trademark infringement based on confusion at the point of sale, the injury to the plaintiff stems from the diversion

57. See Powell, *supra* note 50, at 17–24; David M. Tichane, *The Maturing Trademark Doctrine of Post-Sales Confusion*, 85 TRADEMARK REP. 399, 399–400 (1995) (suggesting that initial judicial reluctance to adopt the doctrine of post-sale confusion during the 1970s may have been the result of fear of encroaching on the domains of copyright and patent law).

58. *Lois Sportswear, U.S.A. Inc. v. Levi Strauss & Co.*, 799 F.2d 867 (2d Cir. 1986).

59. *Id.* at 869 (Levi's trademark consisted of "two intersecting arcs which roughly bisect both pockets" on the back of its jeans).

60. *Id.* at 871.

61. *Id.* at 873–76.

62. *Id.* at 872.

63. Tichane, *supra* note 57, at 407 (writing that "[C]lothing is not protectable" under copyright law and "designers never file patent applications").

64. Powell, *supra* note 50, at 20.

65. See Tichane, *supra* note 57, at 399 ("The growth of the doctrine coincided with the judicial expansion of both the population to be protected from confusion and the types of product traits which are entitled to trademark protection.")

66. See Beebe, *supra* note 47, at 1649–50 (reviewing 1252 trademark infringement decisions, including instances of counterfeiting).

of the plaintiff's customers.⁶⁷ The defendant adopts a trademark that is identical or confusingly similar to the plaintiff's trademark and consumers purchase the defendant's product under the mistaken impression that it originated from the plaintiff.⁶⁸ The consumers are deceived into purchasing the defendant's product and the plaintiff loses sales. In contrast, the injury suffered in infringement actions grounded upon post-sale confusion is less obvious.

Courts have been inconsistent in defining the precise injury caused by post-sale confusion.⁶⁹ Sheff reviewed the case law applying post-sale confusion and distilled two theories of injury invoked by courts: "bystander confusion" and "status confusion."⁷⁰ Bystander confusion arises when a potential purchaser of the plaintiff's product observes the defendant's product outside the retail context and mistakenly believes that the defendant's product originates from the plaintiff.⁷¹ The potential purchaser makes a negative assessment of the quality of the product and refrains from purchasing the plaintiff's product in the future.⁷² For example, a potential consumer in the market for a smartphone may observe a colleague's smartphone case featuring the Nokia trademark. If the case appears to be of inferior quality because it is cracked or discolored, then the consumer may make a negative association with the quality of Nokia's products generally and decide to purchase a competitor's product instead. This theory of injury is consistent with traditional rationales for trademark protection,⁷³ including the fact that trademarks have historically been relied upon by the public as indicators of quality.⁷⁴

On the other hand, status confusion arises when consumers are not purchasing a product for its high quality but instead for its social status.⁷⁵ At the turn of the twentieth century, the economist and sociologist Thorstein Veblen recognized the importance that some individuals place on being seen to possess significant wealth.⁷⁶

67. See Mark P. McKenna, *The Normative Foundations of Trademark Law*, 82 NOTRE DAME L. REV. 1839, 1843 (2007).

68. See *id.* at 1853.

69. Jeremy N. Sheff, *Veblen Brands*, 96 MINN. L. REV. 769, 773 (2012).

70. *Id.* at 778–94. Sheff also discusses a third theory of injury, "downstream confusion," which is not directly implicated by 3D printing. Downstream confusion is at issue in situations where an unconfused initial purchaser might resell or gift products bearing the defendant's trademark to third parties who mistakenly believe that the product originates with the plaintiff. The concern here is that a consumer will knowingly purchase a counterfeit smartphone case and sell it or gift it another who believes it to be authentic.

71. *Id.* at 778–85.

72. *Id.*

73. *Id.* at 779.

74. FRANK I. SCHECHTER, *THE HISTORICAL FOUNDATIONS OF THE LAW RELATING TO TRADE-MARKS* 166 (Columbia University Press 1925).

75. Sheff, *supra* note 69, at 790–94.

76. THORSTEIN VEBLÉN, *THE THEORY OF THE LEISURE CLASS* 36–37 (Macmillan Co.) (1899).

Trademarks that are readily associated with expensive products serve to signal to the public the social status of those that own said expensive products.⁷⁷ These so-called “Veblen brands” derive their social status from their high prices.⁷⁸ These products command a high price in part due to their scarcity.⁷⁹ For example, the price of a Hermès handbag or a Ferrari is in part derived from the fact that these products are produced in limited quantities.⁸⁰

Status confusion results in injury to the trademark owner, the existing purchasers of the authentic products, and the public at large.⁸¹ As to the first, potential customers may perceive that a product is not scarce and may refrain from making a purchase, resulting in lost sales for the trademark owner.⁸² Second, existing purchasers of the authentic Veblen goods are harmed because the loss of perceived scarcity diminishes the value of the products they own. Lastly, the public at large is harmed because people are deceived into falsely attributing social status to those in possession of counterfeit goods.⁸³

Some products derive their value both from high quality and scarcity. The trademark owners associated with these products seek to prevent injury caused by both bystander confusion and status confusion. In *Rolex Watch U.S.A., Inc. v. Canner*, the court recognized that observing counterfeit Rolex watches in public left potential consumers “unimpressed with the quality of the item” and “discouraged from acquiring a genuine because these items ha[d] become too common place.”⁸⁴

Brands that were once regarded as Veblen brands have lost their ability to signal social status due to market oversaturation.⁸⁵ Famously, Italian fashion brand Pierre Cardin diluted its image for *haute couture* by over licensing its trademark for use on thousands of products unrelated to its core fashion business, ranging from strollers to toilets.⁸⁶ While Nokia may not be considered to be a Veblen brand,⁸⁷

77. Sheff, *supra* note 69, at 796–98.

78. *Id.* at 796–97.

79. *Id.*

80. *See, e.g.,* Hermès Int’l v. Lederer de Paris Fifth Ave., Inc., 219 F.3d 104, 108 (2d Cir. 2000); Ferrari S.P.A. Esercizio v. Roberts, 944 F.2d 1235, 1237–38 (6th Cir. 1991).

81. Sheff, *supra* note 69, at 792 (discussing two forms of potential injury associated with status confusion: injury to the existing purchaser and to the public generally).

82. *See, e.g.,* Rolex Watch U.S.A., Inc. v. Canner, 645 F. Supp. 484, 495 (S.D. Fla. 1986).

83. Sheff, *supra* note 69, at 792.

84. *Rolex Watch*, 645 F. Supp. at 495.

85. *See, e.g.,* MARK TUNGATE, FASHION BRANDS: BRANDING STYLE FROM ARMANI TO ZARA 12–13 (Kogan Page 3d ed. 2012) (arguing that expansive licensing of the Pierre Cardin trademark “undermined the sense of exclusivity that is the core value of any luxury brand”); Christina Passariello, *Pierre Cardin Ready To Sell His Overstretched Label*, WALL ST. J., <http://online.wsj.com/news/articles/SB10001424052748704547604576263541408680576> (last updated May 2, 2011, 12:01 AM ET).

86. *See* Passariello, *supra* note 85.

Apple arguably does maintain its price premium due in part to scarcity.⁸⁸ Unauthorized 3D-printed replicas of Apple trademarked products could undermine the public perception of the brand's product quality and scarcity.

D. The Existing Criticism of Post-Sale Confusion

Proponents of post-sale confusion, such as McCarthy, argue that the doctrine is necessary to protect the significant investment required to develop a successful product.⁸⁹ Yet, while McCarthy argues that the doctrine protects the interests of both the trademark owner and the public,⁹⁰ opponents of post-sale confusion believe that it is an otiose doctrine that fails to advance the dual goals of trademark law in light of other available remedies.⁹¹ For instance, Powell argues that the doctrine is concerned with protecting the goodwill of manufacturers but is not aligned with trademark's consumer protection rationale.⁹² Powell contends that the doctrine is superfluous in light of the availability of recently enacted statutes, such as the Trademark Dilution Revision Act of 2006,⁹³ which prohibits the dilution of famous trademarks.⁹⁴

Sheff argues that the protection of so-called Veblen brands raises First Amendment concerns by unduly restricting social expression.⁹⁵ Jeffrey Harrison contends that post-sale confusion merely serves to protect the vanity of a few at the expense of the majority of the public.⁹⁶ Lemley and McKenna argue that the doctrine has been applied too broadly, including situations where a potential consumer's purchasing decisions are not impacted.⁹⁷ The conflicting views presented

87. *Best Global Brands 2013*, INTERBRAND, <http://interbrand.com/assets/uploads/Interbrand-Best-Global-Brands-2013.pdf> (last visited Dec. 18, 2014).

88. See Tim Worstall, *If Apple Is a Veblen Brand Then Raise the Price of the Next iPhone by \$100*, FORBES (Apr. 15, 2014, 8:41 AM), <http://www.forbes.com/sites/timworstall/2014/04/15/if-apple-is-a-veblen-brand-then-raise-the-price-of-the-next-iphone-by-100/> (writing that whether Apple is a Veblen brand is controversial).

89. See McCarthy, *supra* note 46, at 3368; Tichane, *supra* note 57, at 422.

90. McCarthy, *supra* note 46, at 3338.

91. See, e.g., Powell, *supra* note 50, at 34–35.

92. *Id.* at 10–13; see also Michael A. Johnson, *The Waning Consumer Protection Rationale of Trademark Law: Overprotective Courts and the Path To Stifling Post-Sale Consumer Use*, 101 TRADEMARK REP. 1320, 1321–22 (2011).

93. Trademark Dilution Revision Act of 2006, Pub. L. No. 109-312, 120 Stat. 1730 (2006) (codified as amended in scattered sections of 15 U.S.C.).

94. Powell, *supra* note 50, at 34 (arguing that post-sale confusion is unnecessary due to the availability of remedies under the Trademark Counterfeiting Act of 1984, the Anti-Counterfeiting Consumer Protection Act of 1996, and the Trademark Dilution Revision Act of 2006).

95. Sheff, *supra* note 69, at 815–18.

96. See Jeffrey L. Harrison, *Trademark Law and Status Signaling: Tattoos for the Privileged*, 59 FLA. L. REV. 195, 227 (2007).

97. Mark A. Lemley & Mark McKenna, *Irrelevant Confusion*, 62 STAN. L. REV. 413, 456 (2010).

above demonstrate that post-sale confusion has been the subject of significant scholarly criticism.

Recently, some courts have demonstrated restraint in applying the controversial doctrine.⁹⁸ Yet even though some courts continue to accept that the “injury” traditionally caused by post-sale confusion is worthy of protection under trademark law, this form of injury may cease to exist due to changing consumer expectations in light of consumer 3D printing. Consumer 3D printing will enable the replication of trademark-bearing products that have until now been protected through post-sale confusion. However, 3D printing culture might also influence how a consumer perceives the role of a trademark in post-sale environments and whether they can be relied upon as indicators of source.

IV. THE EFFECT OF 3D PRINTING ON POST-SALE CONFUSION

A. 3D Printable Products Are Within the Domain of Post-Sale Confusion

While the doctrine of post-sale confusion was originally developed to address counterfeiting of luxury products like Rolex watches and designer jeans, the doctrine has also been applied to various simple consumer products that can now be easily reproduced through consumer 3D printing. Prime examples include smartphone cases, office supplies, such as pen holders,⁹⁹ and automobile accessories, such as key chains.¹⁰⁰ A search through the catalogues of Thingiverse and Shapeways reveals CAD files for constructing a variety of automobile accessories including key chains, hood ornaments, and smartphone holders that prominently feature the trademarks of luxury car brands such as Audi.¹⁰¹

Outside the 3D printing context, courts have indicated that word marks, design marks, and trade dress in these types of simple consum-

98. *See, e.g.*, *Gibson Guitar Corp. v. Paul Reed Smith Guitars, LP*, 423 F.3d 539, 552 (6th Cir. 2005) (finding that “post-sale confusion cannot serve as a substitute for point-of-sale confusion in this case.”). The court did not address the significance of product scarcity before finding that post-sale confusion was inapplicable. Arguably, this is an example of a court imposing a high standard on the plaintiff to demonstrate that the defendant’s conduct jeopardized the public’s perception of quality and scarcity.

99. *Fibonacci Office Organizer*, SHAPEWAYS, <http://www.shapeways.com/model/1175229/fibonacci-office-organizer.html?materialId=27> (last visited Dec. 18, 2014).

100. *Audi Key Chain*, SHAPEWAYS, <http://www.shapeways.com/model/1708090/audi-key-chain.html?materialId=23> (last visited Dec. 18, 2014).

101. A database search of both Shapeways.com and Thingiverse.com using the search term “Audi” produced dozens of automobile accessories and replacement parts bearing the AUDI trademark and “ring” logo. *Audi Product Search*, SHAPEWAYS, <http://www.shapeways.com/search?q=audi&s=10#more-products> (last visited Dec. 18, 2014); *Audi Product Search*, THINGIVERSE, <http://www.thingiverse.com/search?q=audi&sa> (last visited Dec. 18, 2014).

er products can be protected through the doctrine of post-sale confusion. For example, *Au-Tomotive Gold Inc. v. Volkswagen of America Inc.* concerned a defendant who sold stainless steel “logo license plates” which incorporated Volkswagen’s “VW” design mark.¹⁰² Despite the fact that the defendant’s packaging disavowed any association with Volkswagen, the Ninth Circuit nonetheless found that the possibility of post-sale confusion was present.¹⁰³ In *Eldon Industries, Inc. v. Rubbermaid, Inc.*, while the court did not ultimately conclude whether there was actual infringement of trade dress rights embodied in various product lines of plastic stackable letter-size trays, it noted that, if there were infringement, it would most likely have occurred on the basis of post-sale confusion.¹⁰⁴ *Plasticolor Molded Products Inc. v. Ford Motor Company* also discussed possible post-sale confusion pertaining to defendant’s production of unauthorized plastic automobile floor mats marked with Ford’s PINTO word mark and MUSTANG design mark, but did not make a determination on the issue due to lack of supporting evidence.¹⁰⁵

The three preceding examples illustrate that the unauthorized production of simple, 3D-printable products made of plastic, rubber, and stainless steel may result in injury due to post-sale confusion. Similar results should follow if these products had actually been 3D-printed. The unauthorized production of products incorporating protected word marks, design marks, and trade dress via 3D printing presents the same concerns to trademark owners who fear the erosion of their traditional revenue streams as products created through traditional manufacturing methods. Companies that are unable to educate the public on the merits of buying genuine products, or are unable to monetize¹⁰⁶ and oversee the distribution and printing of their own CAD files, will inevitably need to police websites for files which enable 3D printing. Shapeways and Thingiverse have notice and takedown policies in place modeled after the Digital Millennium Copyright Act (“DMCA”),¹⁰⁷ and Shapeways has received requests to

102. *Au-Tomotive Gold Inc. v. Volkswagen of Am., Inc.*, 603 F.3d 1133, 1134 (9th Cir. 2010) (“The trademark at issue in this appeal is the familiar Volkswagen logo consisting of the letters ‘VW’ inside a circle.”).

103. *Id.* at 1136.

104. *Eldon Indus., Inc. v. Rubbermaid, Inc.*, 735 F.Supp. 786, 821 (N.D. Ill. 1990).

105. *Plasticolor Molded Products v. Ford Motor Co.*, 713 F.Supp. 1329, 1340 (C.D. Cal. 1989); *see also id.* at 1336 (“[A] mark that is likely to confuse prospective purchasers observing it after the point of sale constitutes no less an infringement.” (citing *Levi Strauss and Co. v. Blue Bell, Inc.*, 632 F.2d 817, 822 (9th Cir. 1980))).

106. Analogizing to the distribution of digital music over the Internet, iTunes was able to successfully monetize the distribution of digital music in a way that its predecessors, such as Napster, were not.

107. Compare 17 U.S.C. § 512(c)(3), with *Shapeways Content Policy and Notice Takedown Procedure*, *supra* note 35, and *Makerbot Terms of Use*, THINGIVERSE, <http://www.thingiverse.com/legal> (last updated Dec. 18, 2014).

remove CAD files that are allegedly infringing.¹⁰⁸ For these reasons, an adjustment to trademark jurisprudence such that it incorporates a remedy for post-sale confusion created by 3D-printed consumer products seems warranted.

B. 3D Printing Will Diminish Consumer Expectations of Trademarks

Historically, it was reasonable for the public to assume that trademark owners exercised control over the quality of their products because they manufactured their products directly and had incentive to maintain product quality in order to develop consumer goodwill.¹⁰⁹ Even if a trademark owner licensed its rights to a third-party manufacturer, the doctrine of naked licensing¹¹⁰ required the trademark owner to monitor the quality and quantity of products produced by the licensee.¹¹¹ However, this expectation may soon not be justifiable in post-sale settings.

In an age of ubiquitous 3D printing, consumer attitudes toward trademarks may change such that trademarks may no longer be viewed as indicators of quality and scarcity outside of the retail context. Consumers will inevitably become more sophisticated in their understanding of the capabilities and limits of 3D printing. When they observe other individuals with trademarked products of variable and sometimes inferior quality, they may attribute the inferior quality not to the brand itself but to the fact that the product may have been 3D-printed. Furthermore, 3D-printed products may be inferior to their respective authentic products if consumers fabricate them using different materials¹¹² or manufacturing methods.¹¹³

Consumers may also come to view the entire notion of scarcity as a mere illusion. Any product that is perceived as capable of being 3D-printed may lose its status as a Veblen good as scarcity requires there

108. Bryan Bishop, *Square Enix Stops Fan from Selling 3D-Printed 'Final Fantasy VII' Figures*, THE VERGE (Aug. 17, 2013, 4:04 AM), <http://www.theverge.com/2013/8/17/4629764/square-enix-stops-fan-from-selling-3d-printed-final-fantasy-vii-figures>.

109. See *Qualitex Co. v. Jacobson Prods. Co., Inc.*, 514 U.S. 159, 164 (1995).

110. Although beyond the scope of this Note, trademark owners who authorize private 3D printing of their products without implementing quality control measures risk abandoning their trademark due to the doctrine of naked licensing. See generally Rudolph J. Kuss, *The Naked Licensing Doctrine Exposed: How Courts Interpret the Lanham Act To Require Licensees To Police Their Licensees & Why This Requirement Conflicts with Modern Licensing Realities & the Goals of Trademark Law*, 9 MARQ. INTELL. PROP. L. REV. 361 (2005); Irene Calboli, *The Sunset of "Quality Control" in Modern Trademark Licensing*, 57 AM. U. L. REV. 341 (2007).

111. See Kuss, *supra* note 110, at 362–66.

112. See *3D Print a Shell for Your Nokia Phone*, *supra* note 1 (indicating that non-plastic materials may be used to print Nokia phone cases).

113. See Tom Warren, *3D Printing Your Own Nokia Lumia Case Isn't All It's Cracked Up To Be (Hands-On)*, THE VERGE (Jan. 24, 2013, 9:15 AM), <http://www.theverge.com/2013/1/24/3909426/nokia-3d-printing-lumia-820-hands-on> (discussing the poor quality of the 3D-printed Nokia smartphone cases).

to be a restricted supply. Although many downloading agreements attempt to limit an individual's right to use a CAD file to a single non-commercial use,¹¹⁴ there appears to be no viable mechanism by which copyright holders can enforce this provision. Eventually, 3D printers may be equipped with digital rights management ("DRM") technology to prohibit the printing of copyrighted, trademarked, or patented material.¹¹⁵

For example, Intellectual Ventures has patented a system for 3D printers that requires any uploaded CAD file to be scanned against an online database for an authorization to print.¹¹⁶ In any event, consumers may still use a personal 3D scanner to generate CAD files, move the file to a small USB drive, and use an offline 3D printer unequipped with such DRM. For this reason, it might become impossible for trademark owners to both prohibit unauthorized replication and assess the degree to which 3D-printed copies of their products exist in the market.

Consumers who have either used a 3D printer, or who are otherwise familiar with the technology, may thus no longer assume that the trademarks they encounter can be relied upon as indicators of origin. The role of trademarks in a post-sale setting may shift from being a signifier of the source of origin to merely the source of design or an expression of a consumer's affinity with a brand identity. The Apple logo embossed on the smartphone case of a passerby may be more reliable as an indicator that its owner identifies with Apple's tech savvy and edgy image and philosophy than as an indication that the product encountered is authentic. Therefore, the utility of trademarks may diminish from the consumer's perspective as trademarks cease to perform one of their traditional functions.

C. 3D Printing in Contrast to Traditional Counterfeiting

It is true that traditional counterfeiting also undermines consumer expectations regarding the quality and scarcity of trademarked products. When traditional counterfeiting of a particular product becomes widespread,¹¹⁷ consumers may begin to assume that the products they encounter in a post-sale context are, by default, counterfeit rather than

114. See, e.g., *3D Printing Terms and Conditions*, *supra* note 9 ("You may not use the Materials for commercial purposes.").

115. Paul Marks, *Patent Could Shackle 3D Printers with DRM*, NEW SCIENTIST (Oct. 16, 2012, 3:29 PM), <http://www.newscientist.com/blogs/onepercent/2012/10/patent-could-shackle-3d-printers-drm.html>.

116. Manufacturing Control System, U.S. Patent No. 8,286,236 (filed Jan. 31, 2008) (issued Oct. 9, 2012).

117. Thomas C. Frohlich et al., *9 Most Counterfeited Products in the USA*, USA TODAY (Mar. 29, 2014, 11:59 AM EDT), <http://www.usatoday.com/story/money/business/2014/03/29/24-7-wall-st-counterfeited-products/7023233/>.

authentic.¹¹⁸ However, personal counterfeiting through 3D printing further diminishes consumer expectations of trademarks in the post-sale context by both expanding the scope of products susceptible to counterfeiting and by eliminating any means of effective enforcement.

The existence of 3D printing means that more types of products are susceptible to counterfeiting. Traditional counterfeiting required mass production in order to achieve economies of scale.¹¹⁹ Counterfeiting was most common for popular luxury items that could be replicated at scale, such as Tiffany flatware.¹²⁰ Conversely, 3D printing enables one-off production of counterfeit goods. For example, consumer 3D printing may disturb the market for certain luxury, rare, or out-of-production automobile replacement parts. Indeed, both mechanics and end-consumers may decide to 3D print certain components rather than incur the time and expense of ordering them through traditional channels.¹²¹ Customized colors and sizes could be fabricated to suit the desires of individual consumers. Awareness of consumer 3D printing may give an already skeptical public further reason to doubt the authenticity of many more products they encounter in daily life.

Trademark law — in contrast to patent and copyright law — does not prohibit the unauthorized reproduction of a product for strictly private non-commercial use. The act of 3D printing a trademarked product for private non-commercial use likely does not constitute trademark infringement because the trademark has not been used *in commerce*.¹²² A sale is generally required to establish use in commerce.¹²³ A potential solution is for Congress, acting pursuant to its

118. *See, e.g.*, *Tiffany (NJ) Inc. v. eBay Inc.*, 600 F.3d 93, 97 (2d Cir. 2010). In 2004, petitioner, Tiffany & Co., initiated a program in which it purchased a large volume of Tiffany-labeled goods off of eBay. Tiffany & Co. alleged that the 73.1% of the products it purchased in 2004 and 75.5% of the products it purchased in 2005 were counterfeit. It subsequently posted on its website that “[m]ost of the purported TIFFANY & CO. silver jewelry and packaging available on eBay is counterfeit.” *Id.* at 100.

119. *See* Thomas A. Campbell & William J. Cass, *3-D Printing Will Be a Counterfeiter’s Best Friend*, SCI. AM. (Dec. 5, 2013), <http://www.scientificamerican.com/article/3-d-printing-will-be-a-counterfeiters-best-friend/> (“3-D printing saves would-be copycats the time and expense they once needed in order to obtain molds for parts and to set up complicated assembly lines. Even if a court ultimately rules against the imitators, their manufacturing expenses will have been minimal.”).

120. *Tiffany (NJ) Inc.*, 600 F.3d at 97.

121. P. Andrew Riley, *Catch Me If You Can: Auto Parts in the Era of 3D Printing*, LAW360 (May 16, 2014), <http://www.law360.com/articles/538090/catch-me-if-you-can-auto-parts-in-the-era-of-3d-printing>.

122. Desai & Magliocca, *supra* note 15, at 1712, 1717 n.132.

123. *See* Lanham Act, *supra* note 38, at § 1127 (“For purposes of this chapter, a mark shall be deemed to be in use in commerce [when] . . . the goods are sold or transported in commerce”; *see also* *Rescuecom Corp. v. Google Inc.*, 562 F.3d 123, 127–28 (2d Cir. 2009) (emphasizing that *sale* is a significant factor in determining what constitutes “use in commerce” under the Lanham)).

Commerce Clause power,¹²⁴ to amend the Lanham Act to prohibit unauthorized private non-commercial use of trademarks.¹²⁵ Nevertheless, the present wording of the Lanham Act leaves trademark owners with no basis to enforce their trademark rights to curtail acts of private counterfeiting.¹²⁶

Prior to the invention of 3D printing, there was no cost-effective means of replicating a single trademarked product.¹²⁷ Because it was not economically viable, private counterfeiting was not an issue in trademark law.¹²⁸ Consumers could reasonably expect that brand owners would protect their trademark rights from counterfeiting by pursuing both claims for trademark infringement and criminal enforcement. Conversely, the task of enforcing trademark claims against disparate home-based consumers that 3D printing products in small quantities would likely prove much more difficult and less cost effective.¹²⁹

Just as consumer expectations inform the development of trademark law, consumer understanding of trademark law will shape their expectations and reliance on trademarks.¹³⁰ This phenomenon has

124. David Klein, *The Ever Expanding Section 43(a): Will the Bubble Burst?*, 2 U. BALT. INTEL. PROP. L.J. 65, 65 n.2 (1993) (“Congressional power to regulate trademarks comes from the Commerce Clause, not the clause empowering the regulation of patents and copyrights.” (citations omitted)).

125. Pursuant to its Commerce Clause power, the federal government may regulate personal intrastate economic activity that in the aggregate has a substantial effect on intrastate commerce. See *Wickard v. Filburn*, 317 U.S. 111, 127–29 (1942) (holding that Congress was permitted to regulate the cultivation of wheat for personal intrastate use under its Commerce Clause power because the cumulative impact of the activity would have a substantial effect on interstate commerce). The cumulative impact of individually manufactured trademarked products for intrastate use would likely be considered to have a substantial impact on interstate commerce due to the disruption caused to the normal channels of trade. *But see Nat’l Fed. of Indep. Bus. v. Sebelius* 132 S. Ct. 2566, 2588 (2012) (suggesting that Congress’ power to regulate intrastate commerce under *Wickard*’s “aggregation” theory is not limitless) (Roberts, C.J., writing for the Court).

126. The definition of “use in commerce” in the Lanham Act could be amended to deem the act of manufacturing, whether for commercial or non-commercial purposes, to constitute a use in commerce.

127. See *A Third Industrial Revolution*, *supra* note 18, at 3 (“Ask a factory today to make you a single hammer. . . . The makers would have to produce a mould, cast the head, machine it to a suitable finish, turn a wooden handle and then assemble the parts. To do that for one hammer would be prohibitively expensive.”).

128. Scholarly debate concerning the “fair use” of trademarks centers around issues of free expression, such as parody and news reporting, as opposed to private counterfeiting. See generally William McGeeveran, *Rethinking Trademark Fair Use*, 94 IOWA L. REV. 49 (2008).

129. One way to alleviate the need to enforce such trademark claims would be to implement a DMCA-type regime, which could be used to incentivize for-profit distributors of CAD files to remove potentially infringing materials from their websites. Desai & Magliocca, *supra* note 15, at 1718–20.

130. *But see* David J. Franklyn & David A. Hyman, *Trademarks as Search Engine Keywords: Much Ado About Something?*, 26 HARV. J.L. & TECH. 481, 542 (2013) (“It remains to be seen whether trademark law should be harmonized with consumer expectations — or vice-versa.”).

been recognized in the context of product placement in movies and television.¹³¹ Courts expanded the doctrine of post-sale confusion in order to infer sponsorship in cases of trademarked products appearing on film because consumers already believed that the law mandated that such uses be licensed.¹³² Similarly, when consumers recognize that 3D printing for private non-commercial purposes does not constitute trademark infringement, and is therefore incapable of being curtailed through enforcement measures, they may reluctantly accept that 3D-printed products and authentic products must coexist.¹³³

Furthermore, 3D printing may blur the line between authentic and counterfeit products, calling the very notion of product authenticity into question. Authorized and unauthorized versions of trademarked products — each seemingly identical in appearance — could be produced using consumer 3D printers without any effective means of quality control by the trademark owner. In the eyes of some consumers, distinguishing between products on the basis of authenticity may be a distinction without a difference. As a result, consumers may cease to rely on trademarks as indicators of origin in the post-sale environment.

V. THE FUTURE OF POST-SALE CONFUSION

A. Growing Public Awareness of 3D Printing

The 3D printing industry is becoming mainstream. With worldwide printer sales growing roughly 49% in 2013¹³⁴ and one-third of U.S. consumers contemplating purchasing a 3D printer in the near future,¹³⁵ HP and Staples, major players in printer manufacturing and retailing respectively, have announced plans to offer their own lines of 3D printers and in-store printing services.¹³⁶ Both schools¹³⁷

131. See Johnson, *supra* note 92, at 1343–44.

132. *Id.*

133. Desai & Magliocca, *supra* note 15, at 1712 (“3D printing reverses the world where consumers are led to believe that all uses of a mark are licensed.”).

134. Gartner Says Worldwide Shipments of 3D Printers To Grow 49 Percent in 2013, GARTNER (Oct. 2, 2013), <http://www.gartner.com/newsroom/id/2600115>.

135. T.J. McCue, *3D Printing in the Home: 1 in 3 Americans Ready for 3D Printers*, FORBES (Mar. 19, 2014, 7:24 AM), <http://www.forbes.com/sites/tjmccue/2014/03/19/3d-printing-in-the-home-1-in-3-americans-ready-for-3d-printer/>.

136. Joshua Brustein, *Staples Wants To Bring 3D Printing to the Masses*, BLOOMBERG BUSINESSWEEK (Apr. 10, 2014), <http://www.businessweek.com/articles/2014-04-10/staples-wants-to-bring-3-d-printing-to-the-masses>; *Why Is HP Entering the 3D Printing Industry?*, FORBES (Mar. 28, 2014, 1:42 PM), <http://www.forbes.com/sites/greatspeculations/2014/03/28/why-is-hp-entering-the-3d-printing-industry/>.

137. Ben Millstein, *Announcement: MakerBot Academy and America’s Classrooms*, MAKERBOT (Nov. 12, 2013), <http://www.makerbot.com/blog/2013/11/12/announcement-makerbot-academy-and-americas-classrooms/>; Press Release, MakerBot Adds 3D Printable Curriculum Content to Thingiverse for Teachers, MARKET WATCH (Apr. 15, 2014), <http://www.marketwatch.com/story/makerbot-adds-3d-printable-curriculum-content-to->

and toy manufacturers¹³⁸ are partnering with consumer 3D printing companies to integrate the technology into how children learn and play. In the coming years, consumer awareness of the capabilities of 3D printing will increase and the practical applications of the technology will become better understood. These evolving consumer expectations will influence the timing and nature of any judicial or congressional response.

B. Judicial Response

3D printing does not eliminate the rationale for post-sale confusion in every context.¹³⁹ There are many examples of products that are currently not suitable for 3D printing, including products composed of multiple materials, and those with mechanical or electrical components.¹⁴⁰ Nevertheless, U.S. courts will likely be forced to address the question of whether the role of trademarks in the post-sale context has changed. No legislation is required to repeal the doctrine of post-sale confusion; it is a judicially-created doctrine.¹⁴¹ Furthermore, the Supreme Court has never validated or even discussed the doctrine,¹⁴² increasing the need for lower court interpretation.

The emergence of trademark licensing in the early 20th century forced courts to reconsider the meaning of trademark “source.” Historically, trademarks functioned as indicators of the actual source of a product since the trademark owner and the manufacturer was one and the same.¹⁴³ Trademark owners were prohibited from issuing licenses to other companies to manufacture their products.¹⁴⁴ However, as companies expanded in geographic scope and in the number of products they carried, it was no longer feasible to manufacture all of their products directly. By the 1930s, courts expanded the meaning of a trademark’s source to account for the emerging practice of outsour-

thingiverse-for-teachers-2014-04-15 (MakerBot has delivered 3D printers to nearly 1000 schools).

138. Press Release, 3D Systems and Hasbro Agree To Co-Venture and Mainstream 3D Printing Play Experiences for Children, HASBRO (Feb. 14, 2014), <http://investor.hasbro.com/social/releasedetail.cfm?ReleaseID=825857>.

139. For intricate multi-component products such as computers that are incapable of replication through 3D printing, public expectations of trademarks in the post-sale environment may be unchanged.

140. Riley, *supra* note 121.

141. Sheff, *supra* note 69, at 772–73.

142. *Id.*

143. Mark P. McKenna, *Trademark Use and the Problem of Source*, 2009 U. ILL. L. REV. 773, 789 (2009) (“[C]ourts in the traditional era understood ‘source’ to refer only to the actual producer of a product Courts developed the traditional framework at a time when producers sold relatively few types of products or services in limited geographic areas”).

144. Mark P. McKenna, *The Normative Foundations of Trademark Law*, 82 NOTRE DAME L. REV. 1839, 1893–95 (2007).

ing manufacturing.¹⁴⁵ For the first time, courts acknowledged that a trademark owner should still be recognized as the source of a trademark if it exercised sufficient quality control over its licensed manufacturer.¹⁴⁶ In 1946, this change in judicial reasoning was codified in the Lanham Act.¹⁴⁷ The amendment provided that use of a trademark by a “related company” would inure to the benefit of the trademark owner.¹⁴⁸ This enabled trademark owners to sue competitors for trademark infringement. Changing industry practices forced courts to reexamine long-held doctrine, which, decades later, crystallized into expanded statutory trademark rights.

More recently, the emergence of Internet search engines, such as Google and Yahoo, in the late 1990s further changed the role of trademarks. Consumers began using trademarks as keywords in search engines both to identify specific brands, and as proxies for categories of products.¹⁴⁹ In an effort to divert search engine users to their own websites, companies would purchase keywords of their competitors’ trademarks.¹⁵⁰ Aggrieved trademark owners sued competitors who adopted their trademark as keywords, alleging that the practice created initial interest confusion because web users would not readily distinguish between organic and sponsored links.¹⁵¹ In assessing the applicability of initial interest confusion to keyword advertising, courts have placed considerable significance on appreciating a customer’s understanding and expectations of search engines.¹⁵²

145. McKenna, *supra* note 143, at 790.

146. *See, e.g.*, *Keebler Weyl Baking Co. v. J.S. Ivins’ Son, Inc.*, 7 F.Supp. 211, 214 (E.D. Pa. 1934) (“An article need not be actually manufactured by the owner of the trade-mark if being enough that it is manufactured under his supervision and according to his directions thus securing both the right of the owner and the right of the public.” (citing *Coca-Cola Co. v. State*, 225 S.W. 791, 794 (Tex. Civ. App. 1920))).

147. *See generally* Leslie D. Taggart, *Trade-Marks and Related Companies: A New Concept in Statutory Trade-Mark Law*, 14 LAW & CONTEMP. PROBS. 234 (1949).

148. Lanham Act, *supra* note 38, at § 1055.

149. *See* Franklyn & Hyman, *supra* note 130, at 483–84 (“Consumer goals and expectations turn out to be quite heterogeneous: a majority of consumers use brand names to search primarily for the branded goods, but most consumers are open to purchasing competing products.”).

150. When a user of Google enters a purchased keyword into the search engine, a “sponsored link” from the purchasing advertiser appears above, or to the right hand side of, “organic” search results which are based on website relevance. *See generally id.* at 483. Thus, when a company purchases its competitor’s trademarks as keywords, each time that a user searches for the competitor’s trademark, the purchasing company’s sponsored link also appears.

151. The International Trademark Association describes initial interest confusion as “a doctrine which . . . allows for a finding of liability where a plaintiff can demonstrate that a consumer was confused by a defendant’s conduct at the time of interest in a product or service, even if that initial confusion is corrected by the time of purchase.” *Board Resolutions: Initial Interest Confusion*, INT’L TRADEMARK ASS’N (Sept. 18, 2006), <http://www.inta.org/Advocacy/Pages/InitialInterestConfusion.aspx>.

152. *See* Franklyn & Hyman, *supra* note 130, at 502–03, 513.

Increasing familiarity with new technology decreases the likelihood of confusion.¹⁵³ Post-sale confusion, much like initial interest confusion, is a trademark doctrine that was developed in the age of brick and mortar that must be reexamined in light of technological changes. Just as customers who are familiar with the operation of search engines are less likely to be confused when they use a trademarked term as a keyword,¹⁵⁴ customers who are aware of the capabilities of 3D printing are less likely to make assumptions about product authenticity in the post-sale environment.

Presently, U.S. courts are grappling with the intellectual property issues surrounding the technology of 3D printing itself, as opposed to the issues surrounding 3D-printed products.¹⁵⁵ It does not appear that a trademark infringement lawsuit concerning 3D-printed products has yet arisen before the U.S. courts.¹⁵⁶ It took five years after the launch of Netscape, the first commercial web browser,¹⁵⁷ for U.S. courts to reevaluate the role of initial interest confusion in the age of the Internet.¹⁵⁸ It may take even longer before courts are forced to weigh in on the role of post-sale confusion.¹⁵⁹

The issue of 3D printing's impact on post-sale confusion might first be raised in court as a defense to a trademark infringement claim. The case could involve consumer products or automotive accessories, since these categories of products may be the subject of significant private consumer 3D printing. As with early decisions concerning the use of trademarks on the Internet, judges will vary in their understanding of 3D printing.¹⁶⁰ Evidence of growing consumer sophistication

153. Jennifer E. Rothman, *Initial Interest Confusion: Standing at the Crossroads of Trademark Law*, 27 CARDOZO L. REV. 105, 181 (2005).

154. Franklyn & Hyman, *supra* note 130, at 503.

155. There have been over 6800 patent applications to the U.S. Patent and Trademark Office relating to 3D printing technology. Mark Schonfeld, *Legal Aspects of the 3D Printing Revolution*, CORPORATE LIVEWIRE (Jan. 6, 2014, 9:24 AM), <http://www.corporatelivewire.com/top-story.html?id=legal-aspects-of-the-3d-printing-revolution>. A leader in the 3D printing industry, Stratasys, has sued rival 3D printer manufacturer, Afinia, for patent infringement. Complaint and Demand for Jury Trial at 1, *Stratasys Inc. v. Microboards Tech., LLC d/b/a Afinia*, No. 0:13-CV-03228-DWF-JJG (D. Minn. Nov. 25, 2013).

156. Furthermore, there has not been any patent infringement actions concerning 3D-printed objects. *See* Schonfeld, *supra* note 155.

157. Paul Sawers, *20 Years Ago Today, the Commercial Web Browser Was Born with Netscape Navigator*, THE NEXT WEB (Oct. 13, 2014, 7:03 PM), <http://thenextweb.com/insider/2014/10/13/20-years-ago-today-modern-web-born-launch-netscape-navigator/>.

158. *Brookfield Commc'ns Inc. v. W. Coast Entm't Corp.*, 174 F.3d 1036, 1062–66 (9th Cir. 1999) (finding that video rental store chain's use of entertainment-industry information provider's MOVIEBUFF trademark in chain's website and website's metatags created initial interest confusion).

159. It is possible that consumer 3D printing will not be adopted as readily as the Internet was two decades ago. Therefore, it may take longer for intellectual property related issues to come before the courts.

160. *See* Rothman, *supra* note 153, at 169 (“The lack of familiarity with Internet technology and e-commerce has led to some absurd conclusions about the Internet in the context of trademark infringement actions . . .”).

with 3D printing and mounting criticism of the doctrine among legal scholars may persuade some courts to avoid the application of post-sale confusion. This may be accomplished narrowly by finding post-sale confusion inapplicable to specific categories of goods where consumer 3D printing is most prevalent. Alternatively, courts may act more broadly and find that post-sale confusion is no longer applicable due to a shift in the role of trademarks generally in the post-sale environment.

Completely abandoning the doctrine of post-sale confusion would be highly controversial. Such judicial action could be politically unpopular because it would effectively legitimize commercial counterfeiting.¹⁶¹ The grounds for finding confusion in a trademark infringement action parallel the grounds for finding confusion for the purpose of deterring criminal counterfeiting.¹⁶² In the absence of the doctrine of post-sale confusion, certain forms of commercial counterfeiting would escape both civil and criminal liability. This undesirable result may provoke a congressional response.

C. Congressional Response

In response to lobbying pressure from industry,¹⁶³ a circuit split, or possible rejection of post-sale confusion by the Supreme Court, Congress may decide to amend the Lanham Act to expressly include the doctrine as grounds for constituting trademark infringement. Alternatively, Congress could decide to pursue a different course by seeking to prohibit commercial counterfeiting without affirming the doctrine of post-sale confusion. To this end, Congress might benefit from looking toward the trademark regimes of other countries.

The trademark regime in Canada is very similar to that of the United States. Section 20 of Canada's Trade-marks Act creates a cause of action for trademark infringement based on a likelihood of confusion, analogous to sections 32 and 43(a) of the Lanham Act.¹⁶⁴ Section 19 of Canada's Trade-marks Act provides the owner of a registered trademark with the exclusive right to use the trademark in association with specific wares and services.¹⁶⁵ Effectively, section 19

161. Sheff, *supra* note 69, at 829.

162. Zachary J. King, *Knock-Off My Mark, Get Set, Go to Jail? The Improprieties of Criminalizing Post-Sale Confusion*, 88 N.Y.U. L. REV. 2235–37 (2013) (arguing that post-sale confusion should not be allowed as a basis for criminal liability).

163. See Rothman, *supra* note 153, at 190 (In respect to the need to reform the doctrine of initial interest confusion in trademark law, Rothman states that “[e]ven if courts do eliminate the errant initial interest confusion doctrine, it is likely that powerful trademark holders will try to codify the doctrine back into the law.”).

164. Trade-marks Act, R.S.C. 1985, c. T-13, § 20.

165. *Id.* at § 19 (“Subject to sections 21, 32 and 67, the registration of a trade-mark in respect of any wares or services, unless shown to be invalid, gives to the owner of the trade-

provides a separate cause of action¹⁶⁶ for asserting trademark infringement when coupled with section 53.2, which provides interested persons with the ability to seek relief from the court for violations of the Act.¹⁶⁷ Section 20 applies to cases concerning the use of confusingly similar trademarks by competitors, whereas section 19 is limited to cases of deliberate commercial counterfeiting.¹⁶⁸ The use of confusingly similar trademarks, or identical trademarks on a different type of product, would not constitute trademark infringement under section 19.¹⁶⁹ Accordingly, in most instances, the ambit of protection provided by section 20 would subsume actions under section 19.¹⁷⁰ However, section 19 provides trademark owners the ability to pursue infringement actions against commercial counterfeiters that adopt its exact trademark on identical products without the burden of proving a likelihood of confusion.¹⁷¹

Congress could choose to amend the Lanham Act and the Trademark Counterfeiting Act in order to provide a similar right to trademark owners in the United States. Section 19 of Canada's Trademarks Act cannot be readily transposed into the Lanham Act; the wording of section 19 is poorly drafted as it provides a declaratory right without a remedy¹⁷² when not read in conjunction with section 53.2. However, section 19 of Canada's Trade-mark Act illustrates that it is possible for the implementation of a separate statutory cause of action for trademark infringement of limited application,¹⁷³ which would apply to instances of counterfeiting and would not require

mark the exclusive right to the use throughout Canada of the trade-mark in respect of those wares or services").

166. There exists debate whether section 19 should be considered to be a cause of action separate from section 20. See Mirko Bibic & Vicky Eatrdes, *Would Victoria's Secret Be Protected North of the Border? A Revealing Look at Trade-Mark Infringement and Depreciation of Goodwill in Canada*, 93 TRADEMARK REP. 904, 909–11 (2003).

167. Trade-marks Act, *supra* note 164, at § 53.2.

168. See, e.g., *Mr. Submarine Ltd. v. Amandista Invs. Ltd.* (1987), [1988] 3 F.C. 91, 98 (Can. C.A.) ("If, indeed, a right of action for infringement arises under section 19 on the taking of the registered mark, without reference to any likelihood of confusion or of such depreciation, it seems to me that it is only the taking of the mark as registered on which such an action could be maintained..."). See generally TERESA SCASSA, CANADIAN TRADEMARK LAW 359–60 (2010) (distinguishing section 20 from section 19).

169. See, e.g., *Tradition Fine Foods Ltd. v. Oshawa Grp. Ltd. et al.* (2005), 260 D.L.R. 4th 193 (Can. C.A.) ("A breach of s. 19 of the *Trade-marks Act* occurs only when the alleged infringer uses the identical trade-mark for the identical wares or services as registered."); *A & W Food Servs. of Can. Inc. v. McDonald's Rests. of Can. Ltd.* (2005), 253 D.L.R. 4th 736, 742 (Can.) ("The prevailing view is that s. 19 only covers use of an identical mark, not variations on it.") (emphasis added).

170. Bibic & Eatrdes, *supra* note 166, at 910.

171. See *Mr. Submarine Ltd.*, [1988] 3 F.C. 91; *id.* at 910 n.10 (referencing the case of *Syntex v. Novopharm Ltd.* (1989), 26 C.P.R. 3rd 481 (Can. F.C.T.D.)), the authors explain that "the case under section 20 would have been more difficult for the plaintiff to meet because of the need to prove confusion").

172. Trade-marks Act, *supra* note 164.

173. See Bibic & Eatrdes, *supra* note 166, at 909.

courts to invoke the doctrine of post-sale confusion. The amendment could be targeted narrowly at only the most egregious forms of deliberate commercial counterfeiting. Such a congressional compromise may prove to be the most appropriate solution because it achieves a balance between the interests of brand owners and the public.

VI. CONCLUSION

Consumer 3D printing has the potential to change the role of trademarks in our society. Currently, the judicially-created doctrine of post-sale confusion provides trademark owners with a powerful right. It allows trademark owners to pursue trademark infringement claims against competitors and counterfeiters in circumstances where no likelihood of confusion exists at the point of sale. Legal scholars are critical of this doctrine because it does not advance the consumer protection goal of trademark law.

An emerging 3D printing culture may further undermine the rationale for retaining this controversial trademark right. When consumers become the manufacturers of their own trademarked products, trademarks may cease to function as badges of origin in the conventional sense. Consumers may no longer make assumptions about a brand's quality and social status based on casual observations of trademarked products in the post-sale environment. The injury caused by post-sale confusion cannot exist when consumers no longer rely on trademarks to make these inferences.

In reaction to the growing prevalence of private acts of private counterfeiting, Congress could respond by amending the Lanham Act to expressly include post-sale confusion as grounds for finding infringement. However, a more tailored amendment that strictly prohibits intentional commercial counterfeiting may be more appropriate. Both the courts and Congress will be forced to consider how 3D printing will alter consumers' expectations of trademarks and what changes might be required to achieve the proper balance of rights in U.S. trademark law.

