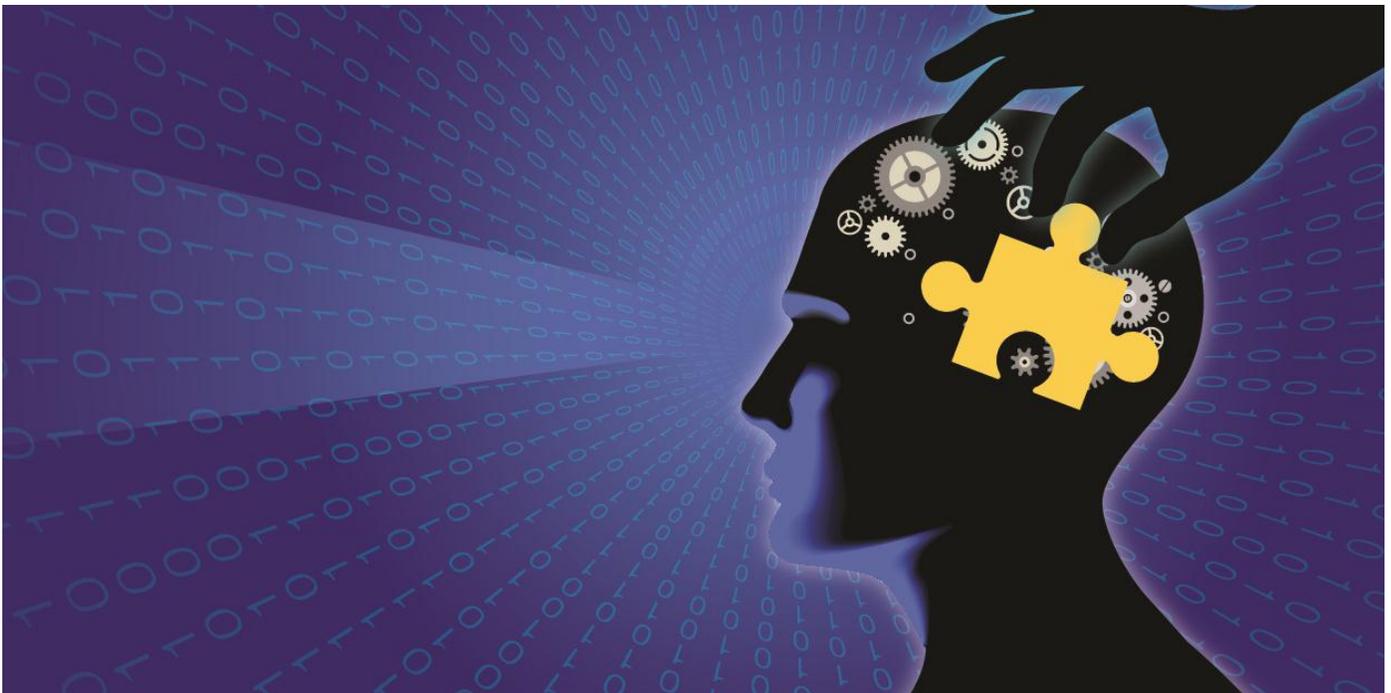




Towards A Postal Service Intellectual Property Strategy

December 18, 2013





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In the contemporary knowledge-based economy, a significant portion of the value of organizations consists of intellectual assets. Throughout its history, the Postal Service has either invented or contributed to the development of substantial intellectual assets such as the ZIP Code, optical character reader technology, address standards, and address management techniques, among other innovations. The ZIP Code alone has annual value of \$10 billion to the Postal Service and myriad other users in the public and private sectors, according to research by the United States Postal Service Office of Inspector General (OIG) and IBM. While the Postal Service has obtained legal protection for some of these inventions, recent OIG reports have found that the Postal Service has not extracted the full value of some of its intellectual assets.

These shortcomings point to the absence of an organization-wide strategy for managing intellectual property (IP), which are intangible assets that receive formal legal protection. The main types of IP are patents, trademarks, copyrighted works, and trade secrets. The lack of an organization-wide IP strategy risks a number of negative consequences, such as blocking access to public goods for American citizens and businesses, reducing

Highlights

The Postal Service has substantial intellectual assets, but lacks a formal, scalable, and organization-wide strategy for creating and leveraging them.

A proactive organization-wide IP strategy could use patents and other means to preserve access to public goods for American citizens and businesses, increase innovation in the postal value chain, and protect the ability of the Postal Service and its customers to conduct business.

Current intellectual asset management processes are relatively informal for a large organization. They should be standardized, aligned with an IP strategy driven by top management, and disseminated widely to employees.

The Postal Service should consider a combination of IP strategic models suited for both legacy technologies and innovative product areas.

As part of an overall IP strategy, several tactics, including filing for patents and selective use of defensive publishing to supplement patents, can help the Postal Service achieve a return on investment.

innovation in the postal value chain, and reducing the ability of the Postal Service and its customers to operate in both traditional and new product areas. For example under current patent law, if the Postal Service were to invent the ZIP Code today, but another inventor filed for a patent before the Postal Service, he could deny the Postal Service and its stakeholders the numerous benefits identified by the OIG.¹

In a recent illustration of the risks inherent in IP, industry sources and news outlets have reported that patent holders are pursuing legal action against mailers and other businesses for using bar codes and QR codes. Bar codes are a critical part of Postal Service and mailing industry operations, and the Postal Service requires mailers to use the Intelligent Mail Barcode (IMb) to qualify for discounts. Thus, such IP claims pose a potential threat to the entire industry.

A clear, organization-wide IP strategy could address these issues and position the Postal Service to form productive partnerships with other organizations. Given the recent OIG findings, highly publicized developments in patent law and business practices, and the importance of IP, the OIG retained external experts ipCapital Group, Inc. to evaluate the Postal Service's IP strategy and recommend any needed changes. The research team examined the Postal Service's intellectual asset management (IAM) processes by interviewing 18 current and former Postal Service executives and reviewing relevant internal documents. The consultants then performed a data-driven analysis of the Postal Service's patent portfolio, and the postal-related patents and patent applications of 48 selected companies across 15 technology categories and subcategories in the postal value chain. They also explored strategic models for IP development and approaches to producing a return on investment from IP. Based on this research, ipCapital provided suggestions on internal processes, strategies, and tactics.

Review of Intellectual Asset Management and Patent Portfolio

The IAM process review revealed that despite pockets of effectiveness driven by motivated inventors and IP attorneys, the Postal Service lacks a formal, scalable, and organization-wide strategy for managing and leveraging its intellectual assets. Employees are uncertain about which product or operational areas in which to focus their inventions and which potential patents would provide the most value for the Postal Service. Management should revise the IAM process, starting with widely disseminating an IP strategy aligned with the agency's product and business priorities to provide direction to inventors and attorneys. In addition, management should establish criteria for patenting or otherwise handling inventions, provide organization-wide best practices for managing and protecting IP, and provide employees a "toolbox" of ideation approaches in order to boost production of useful inventions.

¹ Recent changes in IP law, in the *Leahy-Smith America Invents Act*, reward the first inventor to file a patent application, even if another party came up with the invention first.

² Office of Inspector General United States Postal Service, *Revenue Generation Management*, Report No. HR-MA-

The data-driven analysis uncovered a relatively strong Postal Service patent portfolio in traditional postal technologies such as the “Track Trace Scan” and “Delivery” categories. Patent activity, however, has leveled off for both the Postal Service and other providers in the postal value chain since 2007. The decline could be related to the recession, maturation of the industry, a lack of internal resources for patent applications, or a blend of these factors. The Postal Service portfolio also lags behind many of its postal industry peers in patent categories that involve newer digital technologies.

Intellectual Property Strategies

At the strategic level, the Postal Service should consider a combination of five established strategic models identified by ipCapital. The five models are:

- 1) Legacy Technologies model – IP forms a minimal part of business operations and assets. Innovation is not considered a core business function or source of competitive advantage. IP development is often seen as unnecessary or obsolete.
- 2) High Technology model – An organization aggressively develops IP based on innovative technologies that are essential to its future business strategies.
- 3) Open Source Platform model – This approach is used primarily in software development. The IP rights holder makes the IP freely available for public use, allowing crowdsourced innovation and fast detection of software bugs.
- 4) Free Enterprise Platform model – The organization leverages its IP through licenses to the private sector, spurring innovation around the licensed IP. Proactive *enforcement* ensures that non-licensed entities cannot use the company’s IP without obtaining a license.
- 5) Military Platform model – Government agencies use this model to develop technologies in conjunction with the private sector. The private sector then commercializes the technology.

A combination of strategic models is appropriate because the Postal Service has a unique role as a government entity that is required to operate like a business. It also manages different types of technologies: legacy technologies that support its traditional mail and package business, and digital technologies that are relevant to the traditional business but require different tactics. The Free Enterprise Platform model may be suitable for older, established postal technologies. Under this approach IP could be used to preserve the Postal Service’s ability to conduct its traditional business freely (known as “freedom to operate” in IP jargon). The High Technology and Open Source Platform models are likely to be most appropriate for more innovative technologies such as the IMb and digital services, where the goals would be to deliver innovative products at low cost and to stimulate public engagement with those products (such as the recent requirement to use the IMb). The Open Source Platform model can also permit crowdsourcing of product ideas and software development.

An IP strategy can generally produce a return on investment (ROI) in six key ways:

- 1) Improving competitive advantage;
- 2) Increasing shareholder value;
- 3) Gaining transaction leverage (enhancing negotiating position);
- 4) Licensing IP for money;
- 5) Expanding and protecting a brand; and
- 6) Defining market boundaries (“protecting turf”).

For the Postal Service, another potential form of ROI is allowing postal stakeholders to operate with a reduced risk of patent lawsuits.

Intellectual Property Tactics

The Postal Service can use a number of specific tactics to implement an overall strategy and achieve the appropriate ROI. As part of the overall IP strategy, defensive publishing merits consideration as a low-cost tactic to protect IP from appropriation by other parties. Defensive publishing allows an inventor to publish a description of an invention in order to keep another party from patenting the invention. An organization can use this tactic selectively in order to help strengthen and support (not to replace) a core patent portfolio.

Postal Service management should align these tools with the Postal Service’s high-level goals such as revenue generation, cost reduction, operational efficiency, and providing universal service. Case studies of five leading organizations in IP provide examples of how to integrate IP tools to support corporate goals (Appendix E). A clear, proactive IP strategy can help the Postal Service maintain the right to use certain technologies, preserve citizen and private sector access to intellectual public goods, support innovation in the postal value chain, and position the Postal Service to form productive partnerships with other organizations.

Table of Contents

Introduction	1
Why the Postal Service Needs a Proactive IP Strategy	2
IP Background	3
High-level Analysis of Current Postal Service IP Strategy and Processes	4
Intellectual Asset Management Process Review	4
High-level Analysis of the Postal Service Patent Portfolio Position.....	6
Insights on Strategic Models and ROI for the Postal Service	9
Strategic IP Development	10
Review of Industry Best Practices for Achieving ROI.....	11
The Postal Service IP Strategy Should Use a Combination of Existing Strategic Models.....	12
Conclusion	17

Appendices

Appendix A	Companies Included in IP Analysis	18
Appendix B	Patent Analysis Technology Categories	20
Appendix C	Detailed Descriptions of ROI Type and Market Rationale	21
Appendix D	Company Examples of ROI Types	22
Appendix E	Five Case Studies of IP Strategies	25
Appendix F	Patent Terminology Glossary	35

Tables

Table 1	IAM Process Suggestions	6
Table 2	Postal Service Patent Portfolio Compared with Leading Service Providers in the Postal Sector	9
Table 3	Strategic Models.....	10
Table 4	Brief Summary of ROI Types and Relevant Company Examples.....	12
Table 5	Benefits and Drawbacks of Using a Combination of Strategic Models.....	13
Table 6	Exemplary Tactics per ROI Type.....	14
Table 7	Companies Examined	18
Table 8	Patent Technology Categories	20
Table 9	ROI Type and Market Rationale	21
Table 10	Profile of Swiss Post.....	26
Table 11	Pros and Cons of the Swiss Approach	27
Table 12	Profile of Google.....	27
Table 13	Pros and Cons of the Google Approach	28
Table 14	Profile of GE and Quirky.....	29
Table 15	Pros and Cons of the GE and Quirky Approach	30
Table 16	Profile of NASA.....	31
Table 17	Pros and Cons of the NASA Approach.....	32
Table 18	Profile of MPEG-LA	33
Table 19	Pros and Cons of the MPEG-LA Approach	33
Table 20	Important Definitions.....	35

Figures

Figure 1	Intellectual Assets and IP	1
Figure 2	Processes of Intellectual Asset Management.....	4
Figure 3	Total Postal-Related Applications and Patents of 48 Companies over 15 Years	7
Figure 4	Postal-Related Patents of 48 Companies by Technology Category and Sub-Category	8
Figure 5	Postal Service Patent Filings Over Time and Allocation by Category.....	8
Figure 6	Types of ROI From IP.....	11
Figure 7	Gillette Patent.....	22

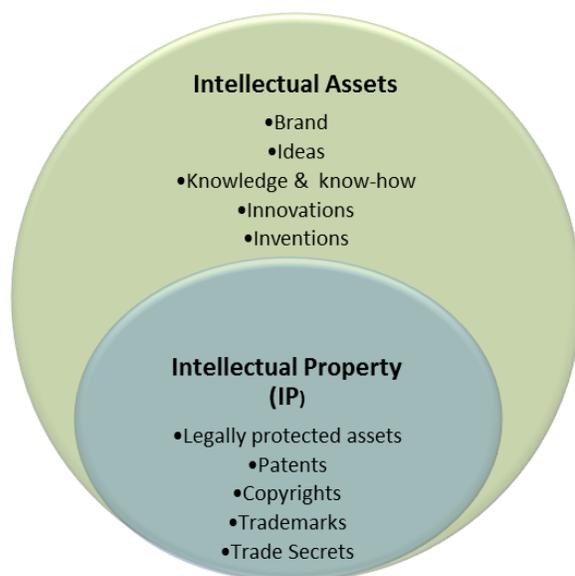
Towards A Postal Service Intellectual Property Strategy

Introduction

In the contemporary knowledge-based economy, a significant portion of the value of organizations consists of intellectual assets. Intellectual property (IP) law provides an inventor or creator exclusive rights to use, sell, or license such an asset. (Figure 1 shows the relationship between intellectual assets and IP). Throughout its history, the Postal Service has either invented or contributed to the development of substantial intellectual assets, such as the ZIP Code, optical character reader technology, address standards, and address management techniques, among other innovations. While the Postal Service has obtained formal IP protection for some of these inventions, recent OIG reports have found that the Postal Service has not fully extracted the value from some of its IP.²

The OIG retained external experts ipCapital Group, Inc. to review the Postal Service's current IP strategy and recommend any needed changes. ipCapital conducted an intellectual asset management (IAM) review of the Postal Service's internal processes for collecting its assets, converting them into IP, and taking advantage of the IP. The research team examined current Postal Service practices through interviews with management and a review of relevant internal documents, and conducted research into industry best practices and specific IP approaches. The consultants then performed a data-driven analysis of the Postal Service's patent portfolio, as well as the postal-related patents and patent applications of 48 selected companies across 15 technology categories and subcategories in the postal value chain. They also explored five strategic models for IP development and six methods of producing a return on

Figure 1: Intellectual Assets and IP



² Office of Inspector General United States Postal Service, *Revenue Generation Management*, Report No. HR-MA-13-004, September 26, 2013, <https://www.uspsig.gov/sites/default/files/document-library-files/2013/hr-ma-13-004.pdf>, Office of Inspector General United States Postal Service, *Postal Service Patent Management*, Report No. DA-MA-10-004, August 24, 2010, <https://www.uspsig.gov/sites/default/files/document-library-files/2013/DA-MA-10-004.pdf>, and Office of Inspector General United States Postal Service, *Postal Service Patent Management Continuation*, Report No. DA-MA-11-002, April 8, 2011, <https://www.uspsig.gov/sites/default/files/document-library-files/2013/DA-MA-11-002.pdf>.

investment from IP. The research team produced suggestions on internal processes, strategies, and tactics.

The IAM process review revealed that the Postal Service would benefit from a formal, scalable, and organization-wide strategy for managing and leveraging its intellectual assets. Postal Service employees, particularly legal personnel, use a combination of prescribed processes and ad hoc decision-making to capture innovations and obtain formal IP protection.

The research findings suggest that the Postal Service should pursue a combination of strategic models because of its unique role as a government entity that is required to operate like a business. It also manages different types of technologies: legacy technologies that support its traditional mail and package business, and digital technologies that are relevant to the traditional business but require different tactics. Going forward, the most suitable models for innovative technologies are likely to be the high technology and open source models. These models can help ensure that the Postal Service and key stakeholders have the ability to operate in innovative product areas that are potentially lucrative or otherwise benefit the Postal Service and the public.

Why the Postal Service Needs a Proactive IP Strategy

A recent OIG report found that the ZIP Code produces as much as \$10 billion in annual value to society, supporting critical functions in real estate, insurance, finance marketing, the mailing industry, and government services. The OIG noted that “the ZIP Code was established as an open use product publicly available from the outset.”³ The Postal Service did not obtain a patent on the ZIP Code, and only filed for a trademark ten years after deploying it. If the Postal Service were to create the ZIP Code today, it is conceivable that a third party inventor could patent key portions of the technology. Under recent changes to U.S. patent law, the inventor who is first to file for a patent, rather than the first one to invent the item or process, owns the invention.⁴ Thus, unless the Postal Service quickly filed for patent protection or took other measures to protect its invention, the third party could prevent the Postal Service and others from using the ZIP Code, or impose unreasonable costs on the Postal Service and the public for its use. These concerns would arise whether the preferred Postal Service strategy is to protect and monetize the ZIP Code, or to share it freely.

³ Office of Inspector General United States Postal Service, *The Untold Story of the Zipcode*, Report No. RARC-WP-13-006, April 1, 2013, <https://www.uspsoidg.gov/story/risk-analysis-research-center-papers/untold-story-zip-code>.

⁴ *Leahy-Smith America Invents Act*, Public Law 112-79, Sec. 3. See also “USPTO publishes final rules and guidelines governing first-inventor-to-file,” US Patent and Trademark Office, February 13, 2013, <http://www.uspto.gov/news/pr/2013/13-10.jsp>.

More recently, websites reported that patent owners are pursuing legal action against several mailers and other businesses for the use of bar codes and QR codes.⁵ The OIG has not evaluated the details of these cases or the strength of the patent owners' claims. Hypothetically, however, one potentially disturbing outcome is that mail users could be barred from using the bar code or QR codes or required to pay licensing fees to the patent holders. Such a result could be very harmful to the postal community. Barcodes are used on most commercial mail, and are at the center of the Postal Service's Intelligent Mail Barcode (IMb) program designed to improve operations and data collection. The Postal Service, the mailing industry, and marketers are trying to increase the value of mail through innovative uses of QR codes. These legal issues show how the IP positions of players in the postal "ecosystem" affect the Postal Service's bottom line. The Postal Service could use certain tactics including obtaining patents, open source development, or defensive publishing to preserve the rights of mailers and others in this ecosystem to use technologies such as bar codes. This would help to maintain the value of the mail and preserve the Postal Service core mail business.

IP strategy, then, is about more than monetizing IP through licensing or lawsuits. A proactive strategy can also help the Postal Service and its customers maintain the right to use certain technologies, preserve citizen and private sector access to intellectual public goods, support innovation in the postal value chain, position the Postal Service to form productive partnerships with other organizations, and allow postal stakeholders the freedom to operate and benefit from new technologies.

IP Background

The main types of IP are patents, copyright, trademarks, and trade secrets. We focus on patents in this paper, but many of the processes, tactics, and strategies we describe can be used for the other types of IP. The core of IP strategy implementation is to review an organization's intellectual assets, identify protectable ideas that fit the appropriate legal categories, and seek to leverage the assets by protecting and/or monetizing them. The leverage is often executed through litigation, threats of litigation, or licensing programs that allow others to benefit from the protected IP. An organization should also be watchful for potential infringement of its IP, as well as, the potential for competitors to block its strategic moves or curtail its current activities through their use of IP. Such alertness can also reveal opportunities to license critical technologies owned by other organizations, or to challenge patents before the U.S. Patent and Trademark Office (USPTO) either prior to or after the patents are issued.

A patent gives inventors the right to exclude others from using or selling the invention for a limited period of time. This monopoly status, granted by federal law, is a quid pro quo for making the invention available to the public. A third party infringes on a patent

⁵ Roger Smolski, "Use a Google short QR code in a URL and get sued," 2d-code, June 17, 2013, <http://2d-code.co.uk/get-sued-by-using-a-google-short-url-in-a-qr-code/>, and David Rosendahl, "Could you be sued for using a bar code on direct mail?," April 26, 2013, <http://davidrosendahl.com/2013/04/26/qr-code-lawsuit-could-you-be-sued-for-using-a-barcode-on-direct-mail/>.

when, without permission from the IP owner, it makes or uses the invention; sells or offers to sell it within the U.S.; imports the invention; or induces another party to take any of these actions.⁶

High-level Analysis of Current Postal Service IP Strategy and Processes

In order to understand the Postal Service's current IP strategic position, ipCapital worked with the OIG to conduct an intellectual asset management (IAM) process review. Through a series of structured interviews, the research team determined the current methods used by the Postal Service to develop, capture, and monetize IP. They then performed a data-driven analysis of the Postal Service IP portfolio versus the portfolios of relevant organizations, and analyzed the results.

Intellectual Asset Management Process Review

The research team conducted in-depth interviews with 18 key IP stakeholders within Postal Service management. Interviewees were from various departments including Legal, Engineering, Product Development, Marketing, and Licensing. Interviews were held on-site and through teleconference.

The six main steps of IAM processes were used to structure the interviews (see Figure 2), to ensure that every IP related function was assessed.

Figure 2: Processes of Intellectual Asset Management



Source: ipCapital Group, 2013.

Findings from the IAM Process Review

Overall, the Postal Service IAM process lacks strategic guidance about where employees should concentrate their inventions and which inventions should be patented. There are, however, pockets of high functionality in which motivated inventors seek ways to protect and monetize their inventions.⁷ The legal department provides consistent support in the process, from educating groups on IP to working with inventors to evaluate and pursue potential patent applications. Interviewees reported that the Postal Service used to have a formal review committee to decide whether to file for patent protection for inventions, but this approach is no longer in place. Despite vigorous efforts by individual attorneys and inventors under the current informal approach, even experienced inventors find the IAM decision-making process to be

⁶ 35 U.S.C. § 271.

⁷ The Postal Service's Employee & Labor Relations Manual (ELM) § 630 encourages employees to develop innovations and offers monetary rewards for ideas submitted through the Postal Service Intranet.

unclear, and individuals lack a sense of what inventions would add most strategic value to the organization as a whole.

The Postal Service's implicit IAM strategy is to use intellectual assets to support cost-control, maintain the Postal Service's right to practice, and to focus on inventions that provide incremental improvements to existing services or processes. Although there are specific areas with many patents, innovation and IP activities are not strongly connected, and the overall volume of IP filings is low for an organization of this size. The focus on cost control is not surprising, given the current financial challenges faced by the Postal Service.

The current IAM approach utilizes relatively informal processes executed through personal interaction between attorneys and inventors, and features a small pipeline of inventions. The IP legal team is active but small, with one full-time patent attorney (an additional four IP attorneys report to the Chief Counsel for IP) and little administrative support. The Postal Service does retain external patent counsel when needed. Unlike some other large organizations, however, the attorneys do not have substantial ongoing support from non-attorney IP experts (such as patent agents, technical and licensing personnel, or knowledge management experts) to file patent applications and to help capture, evaluate, and process useful innovations. ipCapital found the IAM process to be more consistent with a small company or startup than a large organization.

There is, however, significant potential for process improvement: internal groups are creative and consistently work together to solve complex, technical problems. The review of the IAM process led to the suggestions in Table 1.

The overarching message of these suggestions is to develop a more structured and formal IAM process that is appropriate for the size and mission of the Postal Service. This process should include periodic, widespread internal education for employees on the importance of IP, and best practices for generating, capturing, and protecting ideas and inventions. Management should select appropriate IP approaches for different product or operational areas based on the broader organization's strategy, and communicate those approaches clearly to employees. In addition, as the Postal Service continues to lose a large number of experienced employees due to retirement, management should put a premium on harvesting their vast stores of knowledge through formal exit interviews. The Postal Service can develop some of this knowledge into valuable IP. If the Postal Service does not focus on capturing this knowledge, it will be lost or used by other organizations. As employees engage with companies seeking to do business with the Postal Service, management should also provide guidelines for sharing and gathering information, including widespread use of non-disclosure agreements (NDAs) before meetings with outside parties.

There is no single appropriate organizational structure for IAM processes. One common approach is to designate employees reporting to the chief information officer or chief technology officer to discover, vet, and rank innovations, feed inventions into the patent pipeline, and work closely with the general counsel on patent filings (see, for example, the NASA case study in Appendix E). If the Postal Service is going to keep up with

today’s rapid pace of innovation, it likely needs more financial resources and personnel, either internal or external, to support its IAM processes. Increased patent activity, if any, should focus on the technology and product areas that Postal Service management considers key to the future of the Postal Service (such as the IMb, track and trace capabilities, and high priority digital products).

Table 1: IAM Process Suggestions

High Priority	Medium and Low Priority
Define an appropriate IP strategy to align use of IP with overall organizational strategy	Clarify the documentation process and check to ensure consistent documentation practices are used organization-wide
Define and implement an organization-wide set of IP best practices to ensure transparency and high quality IP generation	Regularly review portfolio, and divest or out-license under-used IP assets
Identify and offer a “toolbox” of ideation/creation approaches to allow groups within the Postal Service to establish a broad pipeline of invention concepts to consider*	Develop a clear, codified trade secrets policy
Define criteria for disposition of inventions <ul style="list-style-type: none"> • Determine decision makers for patenting, including foreign filing decisions, and, • When pipeline warrants it, re-establish an IP review committee process 	Define sensible IP performance metrics to be tracked (e.g. patent/product utilization); begin collecting and communicating metrics to groups and management
Create a defensive publishing process and educate groups on this low-cost protection approach	
Use exit interviews to capture knowledge of departing employees	
Establish and disseminate IP criteria and procedures for meeting with external parties (such as vendors and potential partners), sharing and gathering information, and for soliciting and handling ideas from external parties <ul style="list-style-type: none"> • This should include widespread use of NDAs 	
Consider devoting greater resources to IP for generating and harvesting inventions, filing patent applications, and related legal activities	

*The “toolbox” might include ideation software, facilitation processes, and checklists for brainstorming, capturing, and developing new ideas.

Source: ipCapital Group and the OIG, 2013.

High-level Analysis of the Postal Service’s Patent Portfolio Position

ipCapital analyzed public data on the patent portfolios of the Postal Service and 48 companies in the postal value chain. (See Appendix A for the full list). In total, 2,311

patent families, representing 7,482 individual patent records, were screened and placed in 15 different postal technology categories defined by ipCapital in consultation with the OIG (See Appendix B for search categories and definitions).⁸

Findings on Overall Postal Sector Patent Portfolios

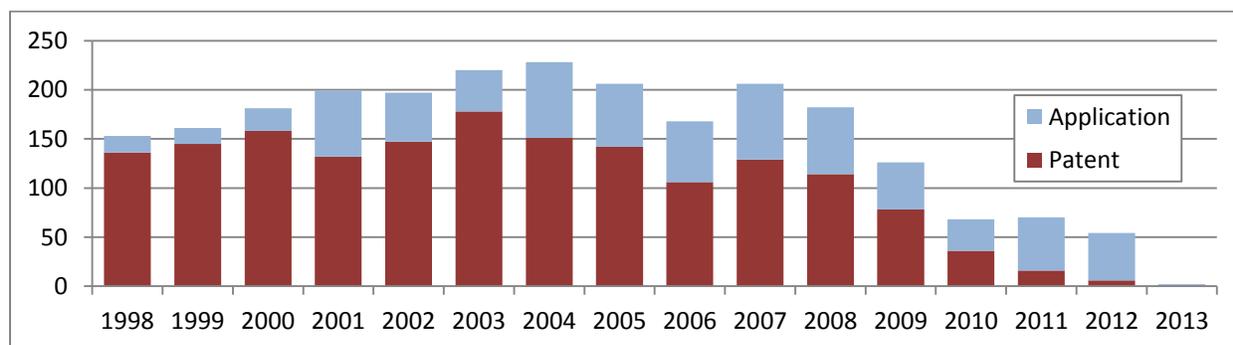
The analysis shows that the Postal Service and other companies have made significant IP investments in postal-related technologies in the last 15 years (see Figure 3).

However, the rate of filings has steadily declined since the 2007 peak, with 2010 filing rates at only 30 percent of the 2004 filing rates.⁹ It is not clear why the number of filings from these specific companies is decreasing. Declining filing rates often occur due to reduced IP budgets in a difficult economic environment, mature markets experiencing more incremental improvements (making it more difficult to identify novel, patentable solutions), or a general reduction in research and development (R&D) investment within an industry toward new and/or disruptive products and services.

Overall, the majority of IP filed by these companies has been focused on Postage and Payment technologies, with Sorting and Sorting sub-technologies (Machines, Methods, and Systems of Sorting) and Digital Mail/Email also highly represented in filings (Figure 4).¹⁰

Categories that include digital or combined physical and digital technologies, including Email and Digital Mail, had the most growth during the study period. Postage Machines and Inks saw a steady decline in IP filings.

Figure 3: Total Postal-Related Applications and Patents of 48 Companies over 15 Years



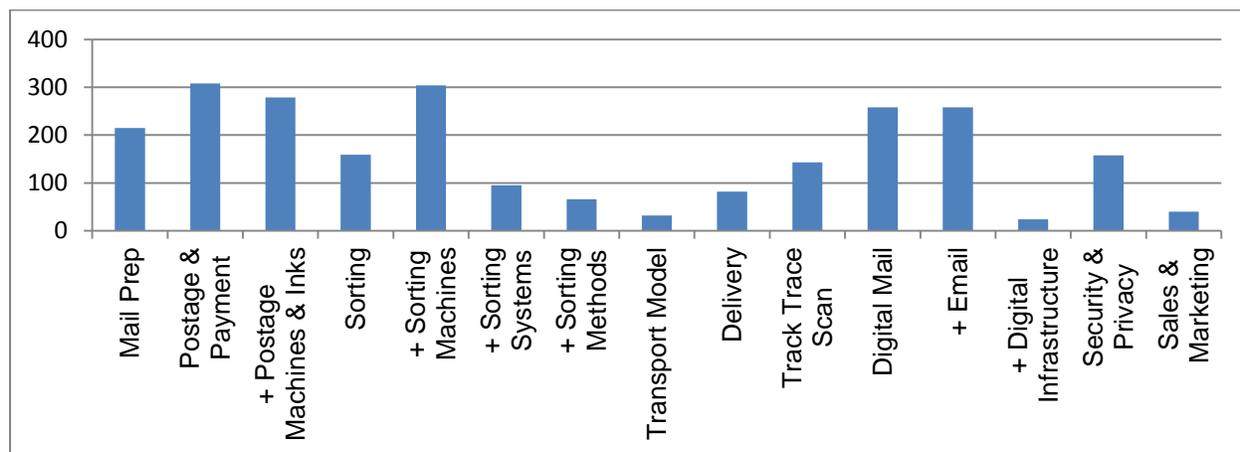
Source: ipCapital Group, 2013.

⁸ A patent family is a grouping of all similar patents filed by the same assignee in different jurisdictions or forms.

⁹ Filing rates from 2011 onwards are not conclusive, due to the 18-month blackout rule imposed by the United States Patent and Trademark Office.

¹⁰ Specific IP filings may be mapped to multiple relevant categories as applicable.

Figure 4: Postal-Related Patents of 48 Companies by Technology Category and Sub-Category

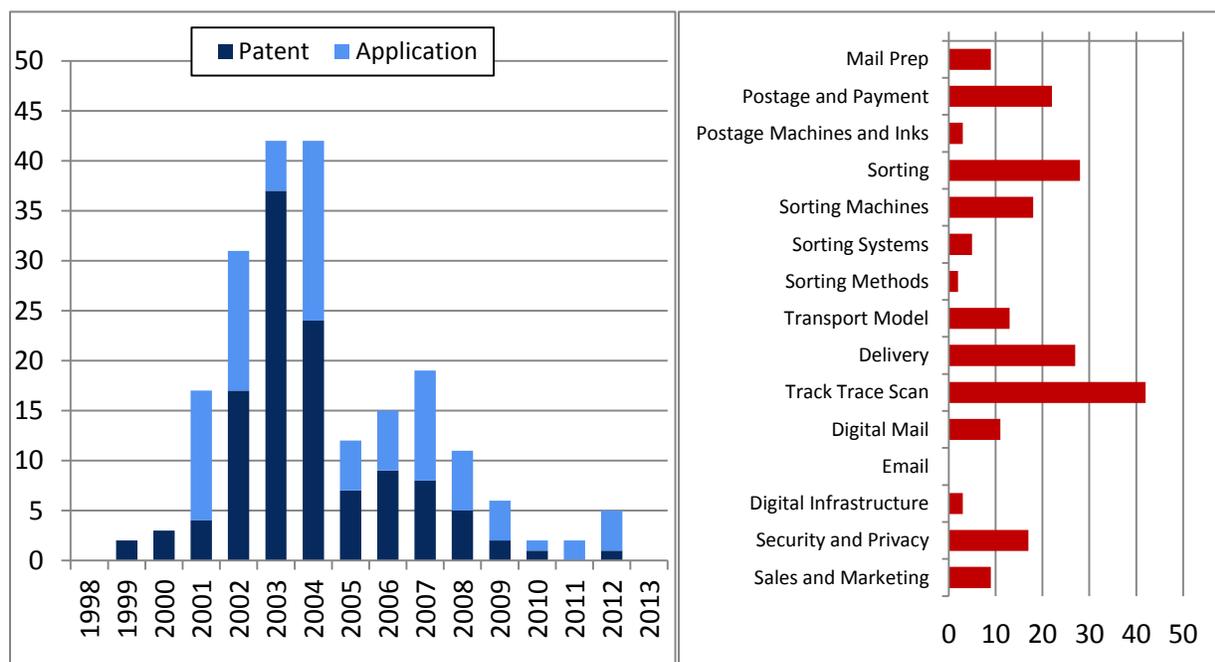


Source: ipCapital Group, 2013.

Findings on the Postal Service Patent Portfolio

The Postal Service portfolio analysis indicates a strong IP position in three technology areas: the Track Trace Scan sector, where the Postal Service is the top IP holder with 42 patents; the Transport Model category, in which the Postal Service holds 14 patents (UPS follows with a portfolio of four in this category); and the Delivery category, which the Postal Service leads with 27 patents (see Figure 5 below). These areas of strength are consistent with the focus of the Postal Service business practices.

Figure 5: Postal Service Patent Filings Over Time and Allocation by Category



Source: ipCapital Group, 2013.

The Postal Service IP data reveals both strengths and opportunities with respect to IP development and realization of value. Overall, the Postal Service filings show significant strength (in terms of the number of patent filings) in multiple categories of the traditional value chain, focused on hard copy mail. Newer digital growth categories show the Postal Service positioned in the middle of the pack, with lower filing volumes overall. The Track Trace Scan category, however, includes a number of Postal Service filings that could be used as the basis to create products and services backed by IP protection. Some well-timed, focused IP investment could lead to IP leadership positions in these areas.

Table 2: Postal Service Patent Portfolio Compared with Leading Product and Service Providers in the Postal Sector

Company	# of Patent Families in the 15 Categories (1998-2013)*	Category with Most Patents
Pitney Bowes	646	125 in Postage Machines and Inks
Siemens	259	99 in Sorting Machines
Neopost	217	62 in Postage Machines and Inks
USPS	209	42 in Track and Trace

* Some double counting is possible because the patent families have been associated with multiple categories where relevant. The main value of this table lies in its comparative properties.

Insights on Strategic Models and ROI for the Postal Service

The research team supplemented the internal IAM process review with external research to gain a broader view of IP trends and behaviors. The team conducted the external research in three parts:

- The research team explored a selected group of strategic models for IP development. These approaches can be used by companies to structure the management of IP to support their organizational strategy. Each model is applicable to different market contexts and organizational goals.
- Six methods of creating return on investment (ROI) from IP were identified. Each ROI model can be used in concert with an appropriate strategic model, to amplify the impact of an overarching IP strategy on the success of the organization.
- Finally, the team compiled case studies of companies that have successfully implemented IP strategies and gained value from their IP portfolios.

Together, the external research illustrates the variety of inputs, models and factors that need to be considered in determining an IP strategy, and the potential impact of implementing it. When applied specifically to the Postal Service, these models and best practices help to identify the best course of action in building an effective IP strategy.

Strategic IP Development

A well-defined, appropriately chosen strategic model is the cornerstone of an effective IP strategy, increasing the quality of innovation and the return on innovation investment.

Each model has an effect on invention, innovation, and patent creation, each with benefits and drawbacks, and different requirements for success. The five strategic models are highlighted in Table 3. For each strategic model, an existing company example and the specific potential applicability to the Postal Service were also identified in Appendix E.

Table 3: Strategic Models

Model Name	Summary Description	Applicability to the Postal Service
Legacy Technologies Model	This model often represents the default path for mature markets and low technology industries. IP forms a minimal part of business operations and assets. Innovation is not considered a core business function or source of competitive advantage. IP development is often seen as unnecessary or obsolete due to commoditization. Existing IP is typically not leveraged to develop secondary revenue streams for the business.	Limited to closely defined, non-competitive business areas, where a strong IP position does not bring significant ROI.
High Technology Model	IP is developed and leveraged to provide protection and support to its technology, products and services. Typically, a legacy model transitions to a high technology IP strategic model in the context of significant industry disruption. New businesses entering high-technology markets adopt this strategic model to compete effectively with other high-technology firms. Leading firms use a variety of strategies to ensure continued competitive advantage and freedom to practice.	Applicable where the Postal Service competes directly with others, so it can: <ul style="list-style-type: none"> • Differentiate products • Secure freedom to operate • Increase secondary revenues
Open Source Platform Model	A company opens up its IP to others, spurring innovation in that technology area. This creates an innovation 'ecosystem', in which other innovators develop its own contributions to the platform, while being protected by the freely available IP. This approach creates rapid network effects, increasing the adoption of the company's technologies and approaches, ideally to increase its revenue. There are two primary approaches: (1) open source models, and (2) open innovation models. Open innovation is a more closely managed process of IP development, while open source patents are simply made freely available.	Postal Service could open all or selected parts of portfolio to Open Source or Open Innovation models. IP use could be managed via agreements not to sue, restrictions on how technology is used, or other covenants. Open innovation would be particularly well suited to emerging business areas such as digital services.

Model Name	Summary Description	Applicability to the Postal Service
Free Enterprise Platform Model	<p>The company leverages its IP through licenses to the private sector, spurring innovation around the licensed IP. Proactive enforcement ensures that non-licensed entities cannot use the company’s IP without obtaining a license.</p> <p>The organization determines which sections of the IP portfolio are available for licensing, and under which terms the licensing of IP occurs. Variables include:</p> <ul style="list-style-type: none"> • Areas of portfolio available for licensing • Exclusive or non-exclusive licenses • Licenses only to companies in different markets 	<p>To increase revenue in key business areas or using very high value patents.</p> <p>Potentially, in a ‘patent ambush,’ this tactic is used to license key IP that exists as part of an industry standard.</p>
Military Platform Model	<p>IP is jointly developed with partners, with the federal institution retaining US rights, or rights for use in its particular business area. The IP can then be licensed out to the private sector, non-profits and government entities, creating secondary revenue streams.</p>	<p>Postal Service could use the military platform to develop innovations and IP with non-US partners, or Postal Services from other countries.</p>

Source: ipCapital Group, 2013.

Review of Industry Best Practices for Achieving ROI

The best practice use of strategic IP models calls for selecting one or more target return on investment (ROI) mechanisms for IP and designing the IP strategy and tactics to match. Generally, the ROI approach is chosen based on the best fit for the company’s business objectives and needs.

To select an appropriate ROI, the company will typically consider factors including:

- What are the overarching strategic goals of the organization?

Example: Does the company seek to generate revenue from non-core areas of business?
- What is the nature of the value chain and market in which the company operates?

Example: If suppliers are aggressively moving into a company’s space, this heightens the need to develop protective IP in that area.

Figure 6: Types of ROI From IP



Source: ipCapital Group, 2013.

- What is the general culture/philosophy of the company?

Example: Is there a drive to create all invention inside the company, or more of a collaborative environment to work with multiple partners?

- What is the internal process for IP generation?

Example: Does the company have the team and skills to develop IP for out-licensing?

Based on these types of factors and behaviors, ipCapital observed six general categories of ROI from IP, as shown in Figure 6.

Table 4: Brief Summary of ROI Types and Relevant Company Examples

ROI Type	Brief Description	Company Example
Improve Competitive Advantage	IP is used to increase and protect market share, and avoid commoditization of products and services.	The Gillette Company
Define Boundaries	IP is used to create a barrier around the market, preventing would-be competitors from offering competing products.	Qualcomm
Expand and Protect Brand	IP is leveraged to expand on the value and utility of the organization's brand identity.	Dyson
License IP	The organization out-licenses its IP to customers, suppliers, competitors and, if desired, into non-core market applications.	General Electric
Gain Transaction Leverage	IP is used to increase the position of the organization in negotiations and transactions.	Boeing
Increase Shareholder Value	IP is used to generate, grow and protect income, increasing the net present value (NPV) of future cash flows.	AOL

Source: ipCapital Group, 2013.

Implications, tactics, activities, and priorities can vary significantly across the types of ROI, and multiple ROIs may be applicable to any given organization. Table 4 provides a brief definition and company example for each ROI, and Appendix D provides additional information on each ROI type, including a more detailed definition, market rationale, and a more in-depth company example for each.¹¹

The Postal Service IP Strategy Should Use a Combination of Existing Strategic Models

Opportunities may exist for the Postal Service to use multiple strategic development models, and multiple ROI types, depending upon the specific product or technology area. The Postal Service is in a unique position as a government agency with

¹¹ See Appendix D for greater detail on each ROI and descriptions of the company examples.

commercial functions. In addition, it must manage a physical side of the business (e.g. sorting, mail handling, and delivery) and a growing digital side of the business (e.g. track, trace and scan, digital services, and address management) which is relevant to the core mail and package businesses.

Further, the postal ecosystem consists of companies that are quite different in size and nature depending upon the technology focus; these firms must be taken into consideration in choosing and implementing an IP strategy model.

Therefore, the most appropriate approach for the Postal Service is to use a combination of existing models. Management should apply different models to different segments of the organization or the market depending on need. The specific choices and balance of models is based on factors including the technology type, licensee type, the value of patents in any given area, or the strategic importance of innovation types.

Table 5: Benefits and Drawbacks of Using a Combination of Strategic Models

Benefits	Drawbacks
<ul style="list-style-type: none"> • Allows focused application of the appropriate strategy to the most applicable aspect of the business • Takes into account the large scale and diversity of Postal Service operations — a ‘one size fits all approach’ may not be a good fit 	<ul style="list-style-type: none"> • Using various strategic models involves more management (and potentially more cost) than a single, uniform model • Allocation of different models has to be reexamined periodically to ensure relevance

A combination of models would provide strategic flexibility for the Postal Service

Using a combination of IP models allows the Postal Service to choose from a variety of strategic approaches and tactics given the nature of each business area. In particular, this is relevant to the distinction between the legacy-technology based physical delivery aspects of the business, as compared to the growing digital, high-technology aspects of the business.

Businesses based on older technologies may be more suited to using strategies such as Free Enterprise Platform Model, with a focus on developing and licensing IP to industry competitors and collaborators. The primary roles of IP in these lines of business are to protect the Postal Service’s freedom to operate, to ensure ongoing protection when collaborating with other industry participants, and potentially, to create stable secondary revenue streams. The choice of strategic model and mechanism of IP ROI should be based on those primary objectives.

Conversely, in high technology business areas, such as digital services, identity management, and other innovative offerings, the priority for the Postal Service is to deliver innovative products at a relatively low cost and to create public engagement with those products. The Open Source Platform model would work in tandem with those goals, allowing the creation of a product ecosystem with many stakeholders engaged in the development of product offerings, using Postal Service IP. Use of ROI mechanisms such as Expand and Protect Brand, alongside Improve Competitive Advantage, allows

the Postal Service to use its IP to communicate its commitment to innovation in the postal sector. Due to the more innovative nature of these emerging technologies, the Postal Service can more actively leverage development mechanisms to ensure it maintains a position at the forefront of the technology.

Table 6: Exemplary Tactics per ROI Type

ROI Type	Exemplary Tactic	Definition/Details
Improve Competitive Advantage	<ul style="list-style-type: none"> Patent-Part, Publish-Part 	<ul style="list-style-type: none"> Companies patent the pioneering part of invention and publish enabled descriptions (defensive publishing) of incremental improvements around the base invention Particularly useful to safeguard against others creating a “picket fence” around your base patent by obtaining their own patents
	<ul style="list-style-type: none"> Participate in standards setting 	<ul style="list-style-type: none"> Cooperate with other organizations (such as other posts through the UPU) to develop common technical standards based on shared IP
Define Boundaries	<ul style="list-style-type: none"> “Picket Fence” 	<ul style="list-style-type: none"> Intentional development of inventions related to a core patent, which can be patented or published to create a barrier to entry for other companies
Expand and Protect Brand	<ul style="list-style-type: none"> “Brand Maestro” 	<ul style="list-style-type: none"> Companies proactively align their technical IP with their brand characteristics Often the two are misaligned and don’t take advantage of opportunities to synergize
License IP	<ul style="list-style-type: none"> Buy or License-In 	<ul style="list-style-type: none"> Companies license in key technologies and IP to speed their Open Innovation Processes
Gain Transaction Leverage	<ul style="list-style-type: none"> Non-Core Joint Venture 	<ul style="list-style-type: none"> Companies partner with others outside own industry to jointly develop IP Particularly useful in areas outside of “true” core competencies
Increase Shareholder Value	<ul style="list-style-type: none"> IP Story to Analyst 	<ul style="list-style-type: none"> Companies develop the IP Story around a product or technology and message it to Wall Street Helps to build the story of being a true innovator and supports growth

Source: ipCapital Group, 2013.

The Postal Service can use a variety of IP tactics to support the strategies and ROI types

Each ROI can be linked to a set of IP tactics to support achieving that goal. There are many common IP tactics in use per each ROI. A short exemplary list has been included in Table 6. These are provided as examples and are not necessarily the ones that Postal Service should use. In fact, different tactics may be selected for different projects, technology, or product areas as appropriate. The nature and number of IP tactics are really only limited by the creativity of the team devising and employing them.

Some common sense tactics involve an organization protecting turf in a lucrative space by developing and patenting many key technologies in that area. (See the “picket fence” tactic in Table 6). Another tactic is to use IP to protect an organization’s brand by aligning patent filings with important brand characteristics. (See the “brand maestro” tactic in Table 6). In addition to these approaches, the Postal Service can also use a less obvious set of tactics to prevent other companies from blocking the ability of the Postal Service and stakeholders to innovate.

Defensive publishing merits consideration in conjunction with patents as part of an overall IP strategy.¹² Defensive publishing is used to protect intellectual assets from appropriation by other parties. The tactic is based on the legal requirement that an invention be “novel” in order to receive patent protection. USPTO patent examiners search for “prior art” to determine whether an invention meets the novelty requirement. If an invention has been previously described in sufficient detail in a publication or publicly available repository, this constitutes “prior art,” and another party cannot patent the invention. An organization may decide to publish an article or explanation regarding an invention in order to prevent other parties from later gaining exclusive rights over the invention.

Defensive publishing is a way to preserve an organization’s right to practice in a particular area. For example, IBM used its Technical Disclosure Bulletin from 1958 to 1998 to publish descriptions of its inventions in order to keep other parties from patenting them and it continues to publish through other channels.¹³ These publications supplement IBM’s massive patent portfolio — one approach involved obtaining a patent and then publishing about extensions to the patented technology, so that third parties could not patent those extensions and reduce the value of IBM’s patent.¹⁴ Defensive publishing is a potentially low cost tactic for supporting a key patent, especially

¹² The Postal Service raises several cogent concerns regarding defensive publishing. Most notably, its attorneys reckon that defensive publishing provides weaker protection than a patent. The OIG acknowledges these concerns and notes that pursuing patents and defensive publishing are not mutually exclusive tactics and should be used to reinforce each other as part of an overall IP strategy. For example, IBM reports that it has led the U.S. in the number of patents received for *20 consecutive years*, while it also considered the leading practitioner of defensive publishing (see footnote 12). “20 Years of IBM Patent Leadership,” IBM Press Kit, January 10, 2012, <http://www-03.ibm.com/press/us/en/presskit/40033.wss>. See also the “patent-part, publish-part” tactic in Table 6, which describes using the two approaches together. Moreover, available resources limit the number of patents that the Postal Service or any organization can obtain, while the number of valuable ideas and innovations is much larger than the number of patentable inventions. In sum, for technologies that are key to the Postal Service’s business strategies, filing a patent application is likely to be a superior tactic, while defensive publishing should be considered as a way to support a key patent, when a patent is infeasible, or a patent would have a smaller direct payoff for the Postal Service.

¹³ See “Corporate and Institutional Backfiles: IBM Technical Disclosure Bulletin”, *IP.com*, <https://ip.com/search/collections-pad-backfile.html>, “Non-Patent Prior Art Collections: Technical Disclosure Bulletins (TBDs),” *Delphion*, <http://www.delphion.com/products/research/products-priorart>, and Ashlee Vance, “Patent king I.B.M. will give away more ideas,” *New York Times*, January 14, 2009, http://bits.blogs.nytimes.com/2009/01/14/patent-king-ibm-will-give-away-more-ideas/?_r=2.

¹⁴ Richard Poynder, “On the defensive about invention,” September 25, 2001, <http://www.richardpoynder.co.uk/On%20the%20defensive.htm>.

compared to the legal costs associated with filing multiple applications and litigating patents.¹⁵

The Postal Service would have to use defensive publishing carefully, because publication also prevents the author himself from patenting an invention. It is a sensible tactic for supplementing patents where an organization wants to preserve IP rights for itself, business partners, or various stakeholders. Where the Postal Service has a strong proprietary interest in a technology, it should generally file a patent application rather than publishing.

The Postal Service can also preserve its own rights and the rights of its customers and complementary service providers to use IP by participating in technology standards, particularly in product areas in which compatibility and interoperability help to increase network effects.¹⁶ Standards stimulate network effects by allowing a wide variety of complementary products to interconnect with a network and each other. For example, the TCP/IP Internet protocols, the QWERTY keyboard, and the VHS standards allow different elements (such as two or more computers, typists and typewriters, or a video tape and VCR) to work together, and facilitated growth in their respective industries.¹⁷

Multiple technologies are often needed to produce a single product or a suite of products. Without agreement on a common standard, then, warring IP holders (or even a single firm or individual) can fragment a market by preventing companies and end users from participating.¹⁸ Companies develop standards jointly to overcome this problem. Standards organizations often require participants to disclose any IP relevant to a standard and to license it to participants on fair reasonable and nondiscriminatory terms. The Postal Service is a member of the Universal Postal Union (UPU), and participates in its standard setting committees. For products (including complementary products that the Postal Service itself does not sell such as QR codes, bar codes, and augmented reality in mailings) with strong network effects, the Postal Service should

¹⁵ Figures on the costs of patents and defensive publishing vary widely, but practitioners and scholars routinely cite lower costs as a reason to use defensive publishing to supplement patents, rather than relying solely on patents. See Jeff Lindsay, "Don't Overlook the Power of Defensive Publications," *Innovationedge*, February 12, 2010, <http://innovationedge.com/2010/02/12/publications/>, and Poynder, "On the defensive about invention,"; Joachim Henkel and Stefanie Pangerl, "Defensive Publishing: an empirical study," *Danish Institute for Research in Industrial Dynamics*, May 2008, <http://www3.druid.dk/wp/20080004.pdf>; , p. 20, Stephen Merrill, Richard Levin, Mark Meyers, National Academies of Science, *A Patent System for the 21st Century*, National Academies Press, Washington, DC, 2004, <http://www.nap.edu/openbook.php?isbn=0309089107>; p. 38, and Sara Boettiger and Cecilia Chi-Ham, "Defensive Publishing and the Public Domain" in *Intellectual Property Management in Health and Agricultural Innovation: a handbook of best practices*, MIHR, PIPRA, Oswaldo Cruz Foundation, bio-Developments International Institute, Ithaca, New York, 2007, <http://www.iphandbook.org/handbook/chPDFs/ch10/ipHandbook-Ch%2010%2001%20Boettiger-Chi-Ham%20Defensive%20Publishing.pdf>, p. 892.

¹⁶ See Carl Shapiro and Hal R. Varian, *Information Rues: A Strategic Guide to the Network Economy*, Boston, MA: Harvard Press, 1999, p. 229. Network effects (also called network externalities) are present when the value of a product to one user depends on how many other users there are, and are a common characteristic in high technology and digital-based products. Shapiro and Varian, p. 13.

¹⁷ Shapiro and Varian, pp. 185, 229, and "Brief history of the Internet", *Internet Society*, <http://www.internetsociety.org/internet/what-internet/history-internet/brief-history-internet>.

¹⁸ Even when several organizations agree on a standard, a third party can assert a patent claim and try to prevent participants in the standards body from using the technology. However, broad standards make it harder for outsiders to block participants in the standard.

consider strengthening its participation in standards setting bodies, or leading new standards efforts.

In addition, forming patent pools — a tactic in which two or more organizations agree to license to each other patents relating to a particular technology — provides many of the same benefits as standards setting. (See Appendix E for a case study of the MPEG-LA patent pools). Finally, another potential tactic for addressing attacks such as the bar code infringement claims is to challenge the validity of the claimant's patent. The America Invents Act expands the ways that third parties can challenge and invalidate a previously granted patent.¹⁹

Case Studies

In adopting a strategy that utilizes a combination of IP strategic models, the Postal Service can learn from a diverse range of organizations who have demonstrated success with best-fit approaches. Appendix E analyzes five entities, evaluating their impact on the market and how their proven strategies may be applicable. From General Electric/Quirky's use of crowdsourcing to Swiss Post's focus on a strong and centralized innovation development process and Google's use of open source licensing, the Postal Service could choose among these varying approaches based on which technologies and product categories are targeted by management for further development or protection.

Conclusion

The Postal Service has the opportunity to take better advantage of its intellectual assets, including the innovations of its employees, and technical capabilities built over many years. The existing intellectual assets are available to build a unique and effective IP strategy for the Postal Service to support its current operations and future growth. The IP strategy must consider each major product and technology area within the Postal Service, and the approach and tactics selected should correspond to the distinctive differences between those areas. While some investment is required, tactics such as defensive publishing are cost-effective and can supplement patents without significant capital investment, a paramount concern given the Postal Service's financial position. A flexible IP strategy approach that combines existing models, in concert with appropriate ROI mechanisms, will provide the most effective path to extract value from the significant IP assets held by the Postal Service, and to align the future development of valuable IP with organizational goals.

¹⁹ Deborah Sterling and Eldora L. Sterling, "New options for challenging patents under the America Invents Act," *National Law Review*, <http://www.natlawreview.com/article/new-options-challenging-patents-uspto-under-america-invents-act>.

Appendix A Companies Included in IP Analysis

Table 7: Companies Examined

Companies Examined	Sector	Country
ABOL	Shipping Software	USA
Amazon	Online Retail	USA
Amber Road (f/k/a Management Dynamics)	Global Trade Management Software	USA
Bell & Howell	Consumer Electronics	USA
Borderfree/ FiftyOne	International Commerce	USA
Canada Post	Postal Services	Canada
Cleveron (Estonia)	Parcel Delivery	Estonia
Deutsche Post (incl. DHL)	Postal Services	Germany
Digital Postal Mail	Digital Postal Services	USA
DST Output (a/k/a DST Systems)	Information Processing and Management	USA
DYMO Endicia (incl. Newell Rubbermaid, Esselte)	Online Postal Services	USA
EchoMail	Email Management Software	USA
Escher	Retail and Message Based Software Solutions	United Kingdom
FedEx	Package Delivery/Courier Services	USA
Fiserv	Financial Services Technology	USA
Francotyp-Postalia	Mailing Services Vendor	Germany
Google	Internet Services	USA
GrayHair	Business Mail Management	USA
Hearst (incl. Manilla)	Mass Media	USA
Honeywell	Commercial and Consumer Products	USA
Huntington Bank	Online Banking	USA
IBM	Technology and Consulting	USA
InPost (Poland)	Postal Services	Poland
Intermec – RFID	Information Management Solutions	USA
Keba	Industrial Services	Austria
La Poste (incl. Poste)	Postal Services	France
Lockheed Martin	Aerospace/ Defense/ IT	USA
Lyngsoe	Software Development/ Postal Solutions	Denmark
Monticello	Online Postal Services	USA
NCR	Computer Hardware/ Electronics	USA
Neopost	Mailroom Equipment Manufacturing	United Kingdom
Newgistics	Parcel Delivery	USA
Parascript	Document Recognition	USA
PCI Group, Inc.	Document Delivery	USA
Pitney Bowes (incl. Volly)	Packing/ Mailing/ Shipping	USA
Postea (incl. IGI and Proiam)	Logistics Solutions	USA
Quad/Graphics Inc.	Commercial and Industrial Printing	USA
RPost	Email Security Services	USA
Satori Software	Online Postal Services	USA

Companies Examined	Sector	Country
Siemens	Engineering and Electronics	Germany
Solystic (Northrop Grumman)	Postal Sorting Solutions	France
Stamps.com	Internet Based Postage Services	USA
Swiss Post	Postal Services	Switzerland
TZ (incl. Telezygology)	Parcel lockers and Data Security	Australia
UPS	Package Delivery/Courier Services	USA
VanDerLande	Logistics Equipment	USA
VISA	Financial Services	USA
Voltage	Data Security	USA

Appendix B Patent Analysis Technology Categories

Table 8: Patent Technology Categories

Technology Categories	
Mail Prep	Preparation of envelopes, packages, automatic addressing. Generally, prior to interaction with the Postal Service.
Postage and Payment	Devices, methods or systems for setting or determining postage. Stamps, fraud detection, postage-related tax.
Postage Machines and Inks	Machines (including security inks) for processing postage/franking. Inventions ancillary to postage machines.
Sorting	All general sorting inventions. OCR, addressing, geocodes, ZIP codes. Miscellaneous sorting.
Sorting Machines	Machines or devices that sort mail or aid the sorting process.
Sorting Systems	Systems, schema, or other methodologies for sorting mail.
Sorting Methods	Specific activities underlying or assisting sorting machines or systems.
Transport Model	Moving post between the Postal Service facilities. Route optimization, dynamic routing, carrier selection, international interfacing.
Delivery	All activities leading to delivery to final destination. Mail carrier equipment, virtual PO boxes, parcel lockers, post-receiving processing.
Track Trace Scan	Tracking mail through the postal system, proof of delivery and verified delivery.
Digital Mail	Email box, digital identity, hybrid mail.
Email	Email.
Digital Infrastructure	Servers and other physical or digital infrastructure.
Security and Privacy	Authentication, proof of identity, safety, damage, digital signatures, cryptography.
Sales and Marketing	Promotions, coupons, sales, returns.

Appendix C Detailed Descriptions of ROI Type and Market Rationale

Table 9: ROI Type and Market Rationale

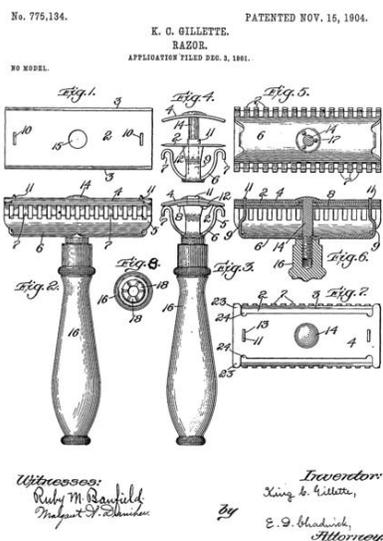
ROI Type	Description	Market Rationale
Improve Competitive Advantage	IP is used to increase and protect market share, and avoid commoditization of products and services. IP rights allow the organization to define industry standards, which allows a sustained advantage over other market competitors.	Widely applicable to most competitive contexts. Particularly relevant in mature and crowded markets, where competitive advantage can be driven by IP-based differentiation.
Define Boundaries	IP is used to create a barrier around the market, preventing would-be competitors from offering competing products. Boundaries can be defined in a number of ways, e.g. through the creation of a patent thicket, through the ring fencing of a market, or through a standard-setting patent ambush.	This tactic is particularly powerful in new or emerging marketplaces. An up-front, targeting IP investment will yield significant long-term returns.
Expand and Protect Brand	IP is leveraged to expand on the value and utility of the organization's brand identity. The development of IP is aligned with key characteristics of the brand and is used to communicate expertise and dominance in the technology area.	Most impact in markets where brand image & perception of expertise are drivers of company success, e.g. consumer goods companies, or startups where brand is used to communicate with investors.
License IP	The organization out-licenses owned IP to customers, suppliers, competitors and if desired, into non-core market applications. Patents can be mined from the existing IP portfolio or created for licensing.	Allows access to multiple and often varied markets. Provides mechanism to collect revenue from non-core businesses.
Gain Transaction Leverage	IP is used to increase the position of the organization in negotiations and transactions, e.g. by increasing bargaining power with partners, through the sale of intellectual assets, the establishment of joint ventures, and the trading or pooling of IP rights.	Provides leverage in partnerships and agreements; IP can be used as non-cash stake.
Increase Shareholder Value	IP is used to generate, grow and protect income, increasing the NPV of future cash flows. It therefore increases the value of the firm as a whole, through targeted IP investment that supports business operations.	Applies primarily to publicly traded companies; can also be used to show value to private investors. Has been effectively used link innovation and IP to growth.

Appendix D Company Examples of ROI Types

Improve Competitive Advantage: Gillette

King C. Gillette founded the Gillette Company in 1904, to manufacture and market men's safety razors. Procter and Gamble acquired the company in 2005. The brand value of the company is estimated at \$16.8 billion, and annual sales are \$8.3 billion.²⁰

Figure 7: Gillette Patent



Source: Wikimedia Commons, 2013.

Gillette uses IP to increase and protect the competitive advantage of its razor and blade products in a crowded marketplace. It holds an 80% share of the US safety razor blade market, and has maintained its competitive advantage through significant IP investment ever since its first, market-creating patent in 1904.²¹

Define Boundaries: Qualcomm

Qualcomm is a \$20 billion semiconductors company, founded in 1985. It is primarily engaged with the design and manufacture of digital communications products, including CDMA and OFDMA technologies.²²

Qualcomm uses IP to ring-fence wireless data, owning a patent thicket covering CDMA, 2G and 3G wireless data technology. It holds the most “mobile patent applications out of any corporation in the world”, meaning any competitor or other market actor wanting

to engage in the mobile data space has to pay a “hefty royalty” to do so.²³ In 2013, Standard and Poor listed Qualcomm as the third-fastest growing technology company in the US.²⁴

²⁰ “Gillette,” *Forbes*, October 2012, <http://www.forbes.com/companies/gillette/>.

²¹ Jack Neff, “Gillette Feels Market Share Is Not the Best That It Can Get,” *Advertising Age*, September 24, 2012, <http://adage.com/article/news/gillette-feels-market-share/237379/>.

²² “Qualcomm,” *Forbes*, May 2013, <http://www.forbes.com/companies/qualcomm/>. Code division multiple access (CMDA) is a technology used to distribute wireless radio signals. It is commonly used in cell phone communications. See “Glossary”, CTIA, <http://www.ctia.org/resource-library/glossary/archive/cdma>. Orthogonal Frequency Division Multiple Access (OFDMA) is a key technology used in transmitting large amounts of digital data. It plays an important role in wireless broadband. See “History of OFDMA and How it Works”, *Webopedia*, http://www.webopedia.com/DidYouKnow/Computer_Science/2005/OFDMA.asp, and “OFDMA: A landmark technology,” *Runcom*, <http://www.runcom.com/Technology>.

²³ “Qualcomm: The King of Patents,” *Seeking Alpha*, August 22, 2011, <http://seekingalpha.com/article/289046-qualcomm-the-king-of-patents>.

²⁴ Steve Brachmann, “Qualcomm: Diversified Innovation and Aggressive Patenting Leads to Success,” *IP Watchdog*, August 14, 2013, <http://www.ipwatchdog.com/2013/08/14/qualcomm-diversified-innovation-and-aggressive-patenting-leads-to-success/id=44640/>.

Expand and Protect Brand: Dyson

Dyson Ltd is a British technology company, founded in 1993. It designs and sells innovative vacuum cleaners, bladeless fans, heaters, and hand dryers. Annual Dyson revenue is £1 billion (\$1.6 billion).²⁵

Dyson leverages IP and innovation as a core part of its brand positioning in the vacuum cleaner and air management market. It follows a two-part strategy to protect the brand: firstly, through a focus on invention and patenting in communications, and secondly through vigilant monitoring of infringement, and enforcement of existing IP.

License IP: GE

GE is a U.S. diversified technology and financial services company, founded in 1892. Its segments include Energy Infrastructure, Aviation, Healthcare, Transportation, Home & Business Solutions, and GE Capital. It is number 4 on the Forbes Global 2000. Sales were \$147 billion in 2012.²⁶

GE used selective licensing of IP to drive dominance of the domestic wind turbine market. Given GE's IP-based control of the market, competitors were limited to three options: they could license the technology at "exorbitant" rates, avoid the patents by using antiquated technology, or face infringement lawsuits.²⁷ This control of the market allowed GE to extract a considerable ROI from its IP.

Gain Transaction Leverage: Boeing

The Boeing Company is a U.S. aerospace company, founded in 1916. Total sales in 2012 were \$81.7 billion. Boeing operates in five segments: Commercial Airplanes, Military Aircraft, Network & Space Systems, Global Services and Support, and Boeing Capital Corporation.²⁸

Boeing used IP to increase its transaction leverage and protect its interests with partners in the development of the 787 Dreamliner. IP was used to maintain control of the highly complex, outsourced production process, with over 1,000 patents leveraged alongside trade secrets to protect Boeing's position while engaging a complex network of value chain participants.

²⁵ "Dyson sales and profits boosted by US and Japan," *BBC News*, September 7, 2012, <http://www.bbc.co.uk/news/business-19515485>.

²⁶ "General Electric," *Forbes*, May 2013, <http://www.forbes.com/companies/general-electric/>.

²⁷ Susan Decker, "Mitsubishi Heavy Told to Pay GE \$170 Million Over Turbines," *Bloomberg*, March 8, 2012, <http://www.bloomberg.com/news/2012-03-08/mitsubishi-heavy-told-to-pay-ge-170-million-over-turbines.html>.

²⁸ "Boeing," *Forbes*, May 2013, <http://www.forbes.com/companies/boeing/>.

Increase Shareholder Value: AOL

AOL Inc. is a U.S.-based web services company, with 2012 sales of \$2.19 billion. It was founded in 1985. AOL stock reached a high of \$90 in 1999, at the peak of the web boom. It is now at \$35.²⁹

AOL increased shareholder value by \$700 million over analyst predictions when it divested its IP portfolio to Microsoft in 2012. Market capitalization immediately jumped by \$700 million due to the previously under-valued IP, bringing an immediate return to shareholders.

²⁹ "AOL, Inc.," *Google Finance*, <https://www.google.com/finance?q=NYSE:AOL>.

Appendix E Five Case Studies of IP Strategies

The research team developed five case studies to highlight organizations that have effectively monetized IP assets and/or developed successful IP strategies. These five case studies are Swiss Post, Google, GE and Quirky, NASA, and MPEG-LA. Cases were drawn from a number of industries, including the postal and logistics industries, to illustrate different IP strategic approaches. Examining these companies highlights IP approaches that emphasize internal innovation to promote diversification, use of open source development, crowdsourcing, and partnerships.

Key points from the cases that are applicable to the Postal Service include:

- Swiss Post: A focus on strong innovation development processes will lead to higher output of new products and services. However, maintaining awareness of IP ownership in new launch areas is important to avoid IP disputes.
- Google: The Postal Service could identify a set of patents to be made available for use by others through an open source license and a guarantee of no enforcement. The benefit would be increased adoption and expansion around that particular technology area.
- General Electric/Quirky: Some form of crowdsourcing could be used by the Postal Service to increase flow of ideas, and could also provide a controlled mechanism for working with smaller entities and/or individual inventors.

Case Study 1: Swiss Post

Swiss Post is the national postal service of Switzerland. It was founded in 1849, and in 2012 restructured to become a public company owned by the Swiss Confederation.

Swiss Post represents an example of a public, national postal service successfully navigating changing regulatory context and consumer preferences by using innovation to drive development of profitable services.

Table 10: Profile of Swiss Post

Profile	IP Issues
<ul style="list-style-type: none"> • 2012 profits \$932 million; Public company, state-owned • Diverse & international product offerings: consumer finance, public transportation, hybrid mail, and online identity protection • 4 market units: communications, logistics, retail finance and public transportation • 2012: Moved from government agency status to publicly owned company • Used new entrepreneurial freedom as public company to drive further innovation 	<ul style="list-style-type: none"> • Need for profitability; decline of first class mail • Expansion to U.S. met with RPost suit for patent infringement • Create innovative new approaches while protecting existing market
Approach	
<ul style="list-style-type: none"> • Centralized Innovation Management program, oversight by Chief Innovation Officer • Each internal department is allocated 0.15% of forecasted departmental revenue to invest in innovative projects • Open innovation using Postidea & ActionJam external ideation platforms, alongside idea incubator 'PostLab' in partnership with universities • Partnership agreements underpin success: only partner with small companies, generally startups, lowers risk 	

Source: Swiss Post Ltd.³⁰

IP Result, Market Impact

For Swiss Post, innovation has driven the low-risk diversification of services while protecting the core business in a changing environment. The PostIdea platform has resulted in positive ROI idea generation, and innovative products have consistently been brought to market. The focus on innovation and IP has brought continued profitability, and increased brand value. Reflecting this, in 2011 the Universal Postal Union awarded Swiss Post the title of Most Innovative Service Provider of e-Postal Solutions.³¹

³⁰ "Swiss Post achieves solid annual result," March 3, 2013, *Swiss Post Ltd.*, <http://www.post.ch/en/post-startseite/post-archive/2013/post-mm13-jahresergebnis-post/post-jobs-und-karriere-news.htm>, "Innovation management: Enabling innovations," Swiss Post Lt., <http://www.post.ch/en/post-startseite/post-konzern/post-konzern-uebersicht/post-konzern-innovationen/post-konzern-innovationsmanagement.htm>, and Andrea Stucki, "When, why, and how is open innovation open to postal companies," November 19, 2010, Second Annual Conference on Competition and Regulation in Network Industries, Center for European Policy Studies, <http://crinet.com/2010/2010%20post%20d.pdf>.

³¹ "Innovation: what we are thinking today about the markets of tomorrow," *Swiss Post Ltd.*, <http://www.post.ch/en/post-startseite/post-konzern/post-publikationen/post-dossiers/post-dossier-innovation.htm>.

Table 11: Pros and Cons of the Swiss Approach

Pros	Cons
<ul style="list-style-type: none"> • Successfully used innovation to drive diversification of product offerings • Navigated hybrid IP system: internal development, partnerships, open innovation 	<ul style="list-style-type: none"> • Did not adequately landscape existing IP when expanding internationally; led to an infringement suit by RPost

How applicable to the Postal Service?

Swiss Post was able to change from a traditional government agency to a government owned corporation, which allowed more entrepreneurial freedom. While the Postal Service is unlikely to do this (it is generally barred from offering new nonpostal products), studying Swiss Post's approach to centralized and well-executed innovation and IP processes remains applicable to and useful for the Postal Service.

Case Study 2: Google**Table 12: Profile of Google**

Profile	IP Issues
<ul style="list-style-type: none"> • Internet giant specializing in search, cloud computing, software and online advertising • Profit \$10.74 billion in 2012 • Acquired Motorola Mobility for \$12.5 billion in 2011, primarily for 17,000 patent portfolio 	<ul style="list-style-type: none"> • Google as a patent titan in industry • Large portfolio, seeks to drive innovation in non-core business areas
Approach	
<ul style="list-style-type: none"> • 89 patents made available to any non-commercial (open source) developers • Patents concern data center management, web browser development • Google pledges to not enforce infringement of any of these patents, as long as products created are not monetized • Ensures open competition in this business area 	

Source: Google.³²

Google is a U.S. computer services giant with 2012 sales of \$50 billion.³³ Its business is focused on information processing and delivery, including search, advertising, and operating systems. In addition to a traditional IP strategy used for much of its business,

³² "2013 Financial tables," *Google*, <http://investor.google.com/financial/tables.html>, and Dan Costa, "Why Google is buying Motorola Mobility," *PC Magazine*, August 15, 2011, <http://www.pcmag.com/article2/0,2817,2391094,00.asp>.

³³ "Google," *Forbes*, <http://www.forbes.com/companies/google/>.

Google recently opened 89 patents to free use by the open source software community, pledging not to enforce infringement.³⁴

IP Result, Market Impact

The eventual market impact of the open source patent pool has not yet been realized, due to its recent establishment. The expected result is that Google's standing as a platform is improved, due to its integration with freely available technology developed using the open source patents. Google has had great success with the open source Android mobile phone operating system, achieving a market share of more than 60 percent of smartphones.³⁵ The ubiquity of the Android system provides a broad platform for Google-branded applications such as Gmail, as well as a platform for third party apps sold through the Google Play store. Open source patents also create positive public relations and increase Google's standing in certain technology and business communities.

Table 13: Pros and Cons of the Google Approach

Pros	Cons
<ul style="list-style-type: none"> • Allows organic, low-cost development of ecosystem around non-key patents • Opens up positive public conversation about IP use • Could be particularly appropriate for public goods, and information goods with strong network effects. 	<ul style="list-style-type: none"> • Not a direct monetization strategy (though could create indirect monetization through market growth)

A similar approach was deployed by Open Invention Network (OIN), which is an open source patent protection network centered on Linux technology. IBM, NEC, Novell, Philips, Red Hat, and Sony launched OIN in 2005. The network makes more than 600 patent families available royalty-free to licensees. In return, the licensee agrees not to assert any of its own portfolio against Linux-based technologies.³⁶ It has been highly successful as a defense of the Linux space from patent enforcement, increasing use of Linux as a platform. The network covers over 1,000 pieces of software.

Open source IP represents a low-cost method to increase innovation on a non-core platform.

³⁴ "Open patent non assertion pledge: Patents in the service of open source", *Google*, <http://www.google.com/patents/opnpledge/patents/>.

³⁵ Ingrid Lunden, "Android, Led By Samsung, Continues To Storm The Smartphone Market, Pushing A Global 70% Market Share," *TechCrunch*, July 2013, <http://techcrunch.com/2013/07/01/android-led-by-samsung-continues-to-storm-the-smartphone-market-pushing-a-global-70-market-share/?ncid=tcdaily>.

³⁶ Roger Parloff, "Amid the patent wars, a powerful act of non-aggression," February 13, 2013, <http://tech.fortune.cnn.com/2013/02/13/amid-the-patent-wars-a-powerful-pact-of-non-aggression/>.

How applicable to the Postal Service?

Open source approaches have traditionally been used in software development. Achieving scale in software development is often faster and cheaper through open source than other approaches, because a wider range of developers contribute to improving the software, fixing bugs faster, and accelerating the time from conception to release. Open source IP programs would be most applicable to postal-related software technologies.

The Postal Service could use open source patent pools as an alternative to defensive publication. In addition, the Postal Service could invent a platform software product and invite others to build on top of it; thus gaining more rapid adoption and market share in a new area using this approach.

Case Study 3: GE and Quirky

Quirky is a U.S. startup founded in 2009. It hosts an online community that votes on invention ideas, then manufactures and distributes finished products. The company raised \$68 million in venture capital in September 2012.³⁷ GE is using Quirky as a platform to crowdsource new product designs.

Table 14: Profile of GE and Quirky

Profile	IP Issues
<ul style="list-style-type: none"> • Partnership between product development startup Quirky and consumer goods giant GE • Encourages individual inventors to innovate on GE technologies, using GE IP • Project showcased on publicly available website & development platform 	<ul style="list-style-type: none"> • GE seeking low cost, low risk, crowdsourced product development • Inventors seeking measure of IP protection, development support
Approach	
<ul style="list-style-type: none"> • Defined primary focus of partnership: <ul style="list-style-type: none"> ○ Home automation technology, smartphone controlled devices, “the internet of things” • Inventors can submit ideas, leverage GE’s dominant patent portfolio • Product development process managed through Quirky’s crowdsourcing engine: determines design, name, price, and other specifications • If product moves through to market, inventor, Quirky and GE share profits 	

³⁷ Donna Fenn, “Quirky gets backing from Andreessen Horowitz and Kleiner Perkins,” New York Times, September 7, 2012, <http://dealbook.nytimes.com/2012/09/07/quirky-gets-backing-from-andreessen-horowitz-and-kleiner-perkins/>.

IP Result, Market Impact

The development process is still ongoing: the website platform is open, and ideas are being submitted, and several products were recently released for sale to the public.³⁸

The collaboration structure is promising: mutual benefit is created for all market participants on an appropriate and accessible platform. However, the scale of this project's impact is likely to be negligible in the context of GE as a whole. For that reason, this project can be thought of as a kind of pilot.

Table 15: Pros and Cons of the GE and Quirky Approach

Pros	Cons
<ul style="list-style-type: none"> • Capitalizes on strong, trustworthy brand • Outsources R&D processes, and some of the risk • Creates consumer engagement and interest around the product 	<ul style="list-style-type: none"> • Quality of products not guaranteed (though GE does retain control over what reaches market)

How applicable to the Postal Service?

Crowdsourced invention may not be as relevant to the postal industry as it is consumer goods; individual inventors may have less hands on experience with postal technologies. For that reason, crowd-sourcing initiatives would be most applicable for public-facing technologies. However, the concept of a large entity defining a program and a process to work with small companies and/or individual inventors is very applicable to the Postal Service.

Case Study 4: NASA

NASA uses a combination of IP development and monetization approaches (licensing, partnering, open innovation), depending on need.

³⁸ "Quirky + GE," *Quirky*, 2013, <http://www.quirky.com/shop/quirky-ge>.

Table 16: Profile of NASA

Profile	IP Issues
<ul style="list-style-type: none"> Federal agency, responsible for science and technology related to air and space Portfolio includes over 1,000 active patents Innovation driven through 10 NASA Research Centers, each holding its own IP portfolio 	<ul style="list-style-type: none"> Federal agency status requires cost-effective innovation Differing IP needs depending on agency focus: core tech or portfolio asset Infringement lawsuits can be brought by DoJ (rare)
Approach	
<ul style="list-style-type: none"> Combination of approaches to IP management: <ul style="list-style-type: none"> <u>Licenses</u> allow partners exclusive, partially exclusive or non-exclusive rights to NASA IP, negotiated through research centers. Transaction is purely monetary, with licensee compensating NASA for use of IP. <u>Partnership Agreements</u> represent active NASA participation in IP/technology development, working with a partner. Various models for partnership depending on mutual need, including shared-resource partnerships, or co-development of technologies. <u>Open Innovation</u> through partnership with InnoCentive provides low-cost, crowd-sourced responses to carefully selected research questions. NASA can spinoff inventions as commercial products, not competing with NASA work, e.g. Memory foam, scratch resistant lenses 	

Source: NASA.³⁹

IP Result, Market Impact

NASA Open Innovation Statistics

Seven InnoCentive challenges attracted:

- 2,900 solvers from over 80 countries
- Average of 419 solvers per challenge
- 221 completed solutions submitted to NASA

NASA deemed the project a complete success

FY2010 IP Statistics

- 1,722 New inventions disclosed**
- 144 Patent applications filed**
- 129 Patents issued**

In FY 2010, NASA negotiated 271 income bearing IP licenses, of which 122 were exclusive. Those licenses brought in \$3.9 million in licensing income. 4,276 partnership agreements were also negotiated in 2010.⁴⁰

³⁹ “NASA technology transfer portal,” NASA, <http://technology.nasa.gov/>, and “NASA technologies available for licensing,” and “NASA Technologies Available for Licensing,” NASA, http://www.nasa.gov/offices/oct/communications/rss_licensing.html.

⁴⁰ “Federal Laboratory Technology Transfer, Fiscal Year 2010: Summary report to the President and Congress,” *National Institute for Standards and Technology*, August 2012, http://www.nist.gov/tpo/publications/upload/Fed-Lab-TT_FINAL.pdf.

The Open Innovation initiative was highly successful: all seven of the challenges issued had useable responses. Two of seven were given full awards, while five of seven received partial rewards. NASA plans to continue Open Innovation programs through collaboration with Random Hacks of Kindness (RHoK) and the popular 'SpaceApps' events.⁴¹

NASA's General Counsel's office administers the agency's IP program in conjunction with the Innovative Partnerships Programs (IPP). The General Counsel establishes agency-wide criteria for invention reporting, patent application preparation, and filings with USPTO, and handles litigation and the specific legal terms of licensing negotiations.⁴² The IPP, which reports to the Chief Technology Officer, is responsible for collecting inventions from NASA scientists and contractors, as well as initiating licensing negotiations and IP-related partnerships with the private sector. IPP supports all of NASA's mission directorates, and is embedded in each of NASA's field offices.⁴³

Table 17: Pros and Cons of the NASA Approach

Pros	Cons
<ul style="list-style-type: none"> • Adaptable depending on particular technologies and NASA needs • Well suited to working with small businesses and individual inventors 	<ul style="list-style-type: none"> • Licensing revenue is not particularly high, due to NASA's research focus

How Applicable to the Postal Service?

While both government agencies, there are large differences between the two entities. NASA is research focused and a federal cost-center and the Postal Service is operations focused and is required to be financially self-sustaining. However, the use of a combination of strategies for IP and innovation management can be adapted to the Postal Service needs. NASA appears to have assessed its innovation and IP needs, and implemented varied tactics to respond to those specific needs; the Postal Service should do the same.

Case Study 5: MPEG-LA

MPEG-LA is a firm created to operate patent pools in particular technology areas. It originally covered internet video patents (MPEG), and has subsequently branched out to different patent pool 'programs' covering digital standards, including self-organizing wireless networks (Wireless Mesh), and digital television.⁴⁴ Future plans include

⁴¹ "InnoCentive investigation of the challenge driven innovation platform at NASA," *InnoCentive, Inc.*, October 25, 2010, http://www.nasa.gov/pdf/572344main_InnoCentive_NASA_PublicReport_2011-0422.pdf.

⁴² "Office of the General Counsel: Overview," NASA, <http://www.nasa.gov/offices/ogc/commercial/index.html>, and "Innovation transfusion request for information," NASA, http://www.nasa.gov/offices/ipp/innovation_incubator/innovation_transfusion/it_request_prt.htm.

⁴³ "Innovation partnerships program," NASA, November 19, 2009, http://www.nasa.gov/centers/dryden/news/X-Press/aerovations/dynamic_ipp.html.

⁴⁴ "Justice department approves proposal for joint licensing of patents essential for meeting video technology standard used in electronics and broadcast industries," *Department of Justice*, June 26, 1997, http://www.justice.gov/atr/public/press_releases/1997/1173.htm.

creating ‘programs’ in more diverse technology areas, including e-commerce and education.⁴⁵

The company monetizes the IP that they hold by issuing licenses to companies wishing to use technology standards that include MPEG-LA patents.

Table 18: Profile of MPEG-LA

Profile	IP Issues
<ul style="list-style-type: none"> • 1,000 patent pool for MPEG video standards, broadly issues licenses • Allows patent holders to monetize IP, keeping standard open to market participants 	<ul style="list-style-type: none"> • Monetize IP while pushing increased adoption of standards • Push to dominate emerging technologies
Approach	
<ul style="list-style-type: none"> • Form ‘programs’ of patent pools available to diverse markets, from e-commerce to education, with core business focus in MPEG & H.264 video codec standards • Issues licenses to market participants, monitor for infringement from non-license holders • IP revenue from licenses and infringement awards, constant expansion to new tech markets 	

IP Result, Market Impact

MPEG-LA’s strong patent pools have attracted many high profile licensees, including Google. Patent owners include Apple, Panasonic, Cisco, and Samsung.

Table 19: Pros and Cons of the MPEG-LA Approach

Pros	Cons
<ul style="list-style-type: none"> • Greater enforcement power, compared to each company asserting its own patents • Allows a licensee to buy into an entire technology • Self-sustaining monetization of patents, separate from routine business operations 	<ul style="list-style-type: none"> • Could invite criticisms of troll-like behavior, especially by any entity that is a target for enforcement • Requires an entity to form and manage the patent pool

MPEG-LA has had a significant market impact. The H.264 pool has driven adoption of the most commonly used video codec standard, which is integrated into Blu-Ray, YouTube, iTunes, and Adobe Flash platforms.⁴⁶

MPEG-LA has successfully created a market dynamic where only license holders or patent holders are able to navigate the patent thicket.

⁴⁵ “About: Revolutionizing intellectual property rights management,” *MPEGLA*, <http://www.mpegla.com/main/Pages/About.aspx>.

⁴⁶ “AVC/H.264 introduction,” *MPEGLA*, <http://www.mpegla.com/main/programs/AVC/Pages/Intro.aspx>.

How applicable to the Postal Service?

The MPEG-LA model represents one potential component option for a hybrid IP strategy: that of building a patent pool with other patent holders.

This model would be particularly powerful in key technology areas where joining forces with other market players would create mutual benefit.

Additionally, a patent pool arrangement would allow the Postal Service to externalize patent infringement monitoring/enforcement to a newly created pool management entity.

There are various ways that the Postal Service could construct a patent pool. The Postal Service could lead the creation of a third party postal licensing organization that specializes in patent pools. Alternatively, an in-house IP licensing program focused on patent pools could be explored.

Appendix F Patent Terminology Glossary

Table 20: Important Definitions

Term	Definition
Crowdsource	To obtain information or input into a particular task or project by enlisting the services of a number of people, either paid or unpaid, typically via the Internet. ^a
Defensive Publication	An intellectual property strategy used to prevent other parties from obtaining patents on an innovation. The strategy involves disclosing a detailed, enabling description and/or drawing of the innovation in such a way that it enters the public domain, becoming prior art. ^b This is a way of attempting to block future patent applications at a relatively low cost.
Ideation	The structured formation of ideas or conceptions, often by using specialized software and processes.
Intellectual Asset Management (IAM)	The practice of managing intellectual assets, including intellectual property such as patents, trademarks, and registered designs, as well as organizational intellectual assets such as trade secrets, contracts and specialist know-how. ^c
Open Innovation	A carefully managed process to generate innovations, where external parties are used in combination with internal management to generate ideas in response to predefined problems or opportunities.
Open Source	The practice of making public certain parts of intellectual property portfolios or institutional knowledge, in order to further the development of technologies using those standards. The organization or company releasing the IP does not typically retain significant control over how the IP is used, apart from broad restrictions such as 'not for-profit applications.'
Patent Ambush	Patent monetization strategy where an organization develops standards for a particular technology type, then (after standard development) reveals that they own a patent to a core part of the technology. This forces users of the technology standard to pay a licensing fee to the organization.
Patent Family	A patent family a group of patents covering the same invention and disclosed by a common inventor, patented in multiple countries or with multiple types of applications (e.g. continuations, divisionals).
Patent Pool	A patent pool is a consortium of at least two companies or organizations, agreeing to cross license their patents relating to a particular technology.
Patent Thicket	An overlapping set of patent rights requiring that those seeking to commercialize new technology obtain licenses from multiple partners, or, a dense set of patent rights held by a single party, that requires extensive licensing to navigate, i.e. 'invent around' processes are largely not possible. ^d

Term	Definition
Ring-Fencing	The practice of protecting a particular technology by extensively filing patents adjacent to core technologies, creating a 'ring fence' of protection around the technology.
Enabled Description	The description of an invention in sufficient detail that a person skilled in the technology is capable of making and using that invention, independently of other input or contact with the inventor. This is the pre-requisite for the level of description in a patent disclosure, and this requirement is also present for effective defensive publications. This is because an enabled description will then form prior art, preventing the invention from being patented in the future.

^a "Definition of crowdsource in English," *Oxford Dictionaries*, http://www.oxforddictionaries.com/us/definition/american_english/crowdsource.

^b To constitute prior art, the defensive publication must meet legal requirements for specificity, or "enablement."

^c What are intellectual assets, anyway?," *ingot*, 2010, http://moodle.venta.lv/moodle/pluginfile.php/12162/mod_resource/content/0/IP_identification/What_are_Intellectual_assets.PDF.

^d Carl Shapiro, "Navigating the Patent Thicket: Cross Licenses, Patent Pools, and Standard Setting in *Innovation Policy and the Economy*," eds. Adam B. Jaffe, Josh Lerner, and Scott Stern, (Cambridge, MA: The MIT Press), <http://faculty.haas.berkeley.edu/shapiro/thicket.pdf>, pp. 119-150.

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