Economic Benefits of Digital Object Identifier Applications in Content Marketing

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I. Using the DOI to Improve Profitability In Publishers' E-Commerce Operations

A Framework for ROI Analysis

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Overview

This White Paper, the first in a series, quantifies potential returns on publisher investments in implementing the Digital Object Identifier (DOI). It focuses on benefits applicable to publishers' Internet direct sales and marketing capabilities, principally via their own web sites.

Our analysis indicates that, for a medium-sized book publisher, the return on investment of using the DOI could be as much as **12** times the cost of DOI implementation.

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To measure the DOI's potential impact on the profitability of publishers' content e-commerce operations, we focused on three key areas:

Discoverability - The DOI's impact on organic search engine rankings, and its ability to imbed persistent, managed links to publishers' own online catalogs from within all manner of digital media (e.g., other websites, e-newsletters, opt-in email, related digital products, articles and press releases, etc.);

User Experience - The DOI's MultiLinking™ capabilities (which can externalize the structure of a content e-commerce site in a single mouse-over menu) to improve a site's usability and overall e-commerce effectiveness;

Operational Efficiency - The DOI's ability to facilitate website content maintenance through use of the centralized link management services of a DOI registration agency such as Content Directions.

In the following pages, we discuss the potential benefits of the DOI in relation to current practice. Then, for a hypothetical book publisher, we describe scenarios for DOI implementation, and model the potential ROI derived from increased revenues and decreased costs (Table 1).

Table 1: ROI Model for Content E-Commerce Operations

	Area of DOI Impact	Key Measures
Revenue Growth	Discoverability	More e-store traffic from potential buyers
	Site Usability	Higher conversion rates – turning visitors into buyers
	Merchandising	Selling more to each visitor to the site
Cost Reduction	Web Content Maintenance	Increased IT and editorial productivity

Source: EPS

Compared with (and/or in addition to) alternative investments in improved e-commerce effectiveness, our analysis indicates that the Digital Object Identifier can be an efficient tool for increasing the effectiveness of content e-commerce. Other sets of scenarios could illustrate smaller publishers' benefits from relatively small investment in DOI-enabling services requiring a relatively small investment; for larger players, with broader cross-selling opportunities and more complex metadata environments, benefits could well be proportionately greater.

Revenue Growth Drivers

The potential for the DOI to increase sales rests on a combination of factors that work in concert to increase e-commerce effectiveness:

1. **Discoverability:** In most retail e-commerce businesses, visibility to web searchers is the key to online store visits and sales. Every day, web users interact with the major search properties to launch over 400 million queries for products, services and information solutions. For publishers' direct online channels, appearing as high as possible in search results is imperative to sales growth.

   Improvements in search rankings are most commonly obtained with techniques grouped under the heading of "Search Engine Optimization" (SEO). Traditional SEO services include keyword research and selection, meta tag development and implementation, linking strategy development and implementation, directory listing development and submission, web page submission, and campaign results reporting and analysis.

   A leading SEO provider, iProspect, prices its integrated search engine marketing campaigns at $12,500 to $40,000 per month (or $130,000 to $480,000 annually), with a 12-month commitment. (Pricing variables include the number and size of websites, and the number of products and services being promoted.)

   DOI Impact: The extensive cross-linking inherent in DOI MultiLinks™ that interconnect related objects tends to drive dramatically higher placement in search engine results. A "before" study, conducted by Content Directions using Google search terms based loosely on words from one major publisher's book titles, showed that 43% of 51 books tested were not found at all within the first 100 results (i.e., might as well not exist in Web terms). What's more, of the books whose search placement ranked 22nd or higher, 7, or 37%, had bad URLs (broken links)!

   Content Directions conducted a random test of the same publisher's titles after implementing the DOI. By performing similar keyword searches on Google, it found that of all DOIs tested: 22% achieved the number-one ranking in non-sponsored (i.e., "organic") results, 74% were found within the top five, 90% on the first page of results, and 90% within the first 2 pages.

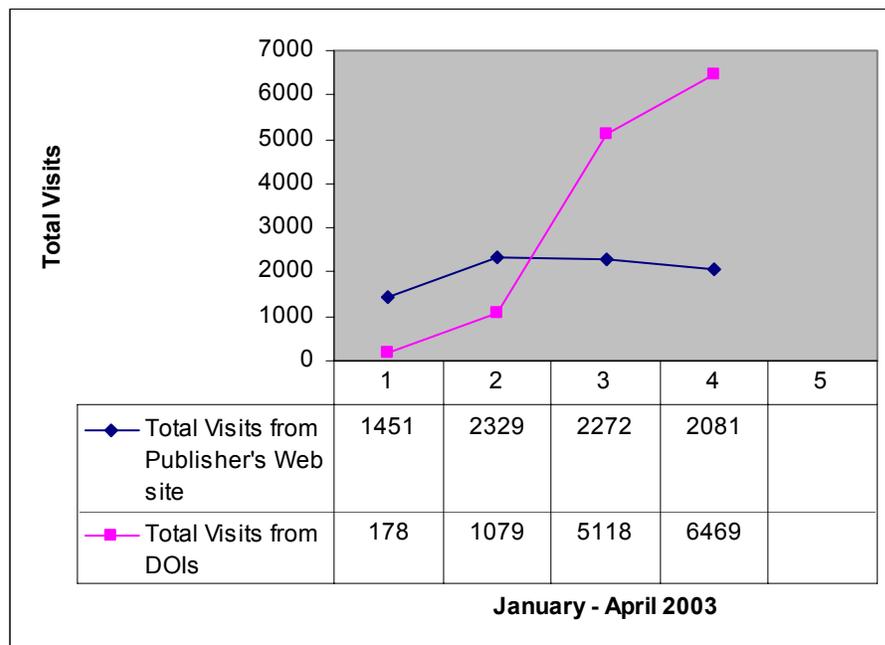### Table 2: Comparison of Search Result Rankings for Selected Book Titles, With and Without DOIs

Ranking	Before DOI	After DOI
#1 listing	6%	22%
Top 5 listings	12%	74%
First page	18%	90%
First 2 pages	20%	100%

Source: Content Directions

Table 2, which removes the bad URLs from the analysis since they provide no benefit to the owner even if they rank highly, and since bad URLs are themselves a problem solved by the DOI, demonstrates that the DOI listings were greater than 3 ½ times more likely to be the number one listing, greater than 6 times more likely to be in the top 5, and 5 times more likely to be included in each of the first two pages of search results. Even if the bad URLs were retained in the analysis (i.e., still given credit for their placement though they were broken links), the DOI listings still were greater than 3 ½ times more likely to be the number one listing, and 3 ½ times more likely to be included in each of the first two pages of organic search results.

The higher placement with the DOI makes sense for both users and search engine providers as both have an interest in searches that discover the most valuable, highest quality information. Indeed, DOI registration identifies content that has been deemed to be of value and whose validity and currency is actively managed.

Figure 1: DOI Traffic Report – Major Educational Publisher

	1	2	3	4	5
Total Visits from Publisher's Web site	1451	2329	2272	2081	
Total Visits from DOIs	178	1079	5118	6469	

January - April 2003

Source: Content Directions

Of course, the purpose of improved discoverability is to generate increased traffic, and other empirical evidence from DOI implementation confirms this. Figure 1 presents the findings of a study conducted by Content Directions on behalf of a major educational publisher, showing that during four months following DOI implementation, traffic coming to its publications from DOIs (for example, as discovered in search engines) increased steadily to more than three times the traffic volume from the publisher's own web site. This occurred without any action to promote the existence of the DOIs.

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2. **Conversion Rates:** Once a user visits a publisher site discovered by conventional means, she typically must navigate a series of options: identifying a product for potential purchase, learning more about the product, entering a checkout process, and completing the transaction. Research by the Nielsen Norman Group has demonstrated a strong correlation between improved site usability and conversion rates on e-commerce sites. Sites that have been redesigned for usability average a 100% improvement in sales / conversion rate, 150% increase in traffic/visitor count, 161% in measures of user performance and productivity, and 202% increase in the use of specific, desired features (Table 3).

Table 3: Average Improvement in Usability Metrics Following Site Redesign

Metric	Average Improvement Across Web Projects
Sales / Conversion Rate	100%
Traffic / Visitor Count	150%
User Performance / Productivity	161%
Use of Specific (Desired) Features	202%

Source: Nielsen Norman Group, 2003

DOI Impact: Compared to the shopping experience on most publisher websites, the DOI enables faster navigation through the informational stages of a considered content purchase. MultiLinks' cascading menus contain options relevant to each step, and can make content browsing and buying faster, more certain (because choices are immediately visible), and less subject to user error (especially those resulting from poor site design).

Another customer study by Content Directions correlated total hits with total sales on the publisher's site, and then compared this with the ratio for DOI-referred hits only. It found that a DOI-referred hit was nearly *twice* as likely to result in a purchase. A further study of the effect on both traffic and sales referred by DOIs was conducted with a major professional and trade publisher. Over an eight-month period following DOI implementation, book revenues from the site increased from essentially zero to over $3500 per month. Perhaps most tellingly, although total revenue remained relatively low, between the seventh and eighth month revenue continued to increase even though site traffic leveled (Figure 2).

Figure 2:
Traffic & Sales Referred by DOIs -
Major Professional & Trade Publisher

Hits and Revenue by Month
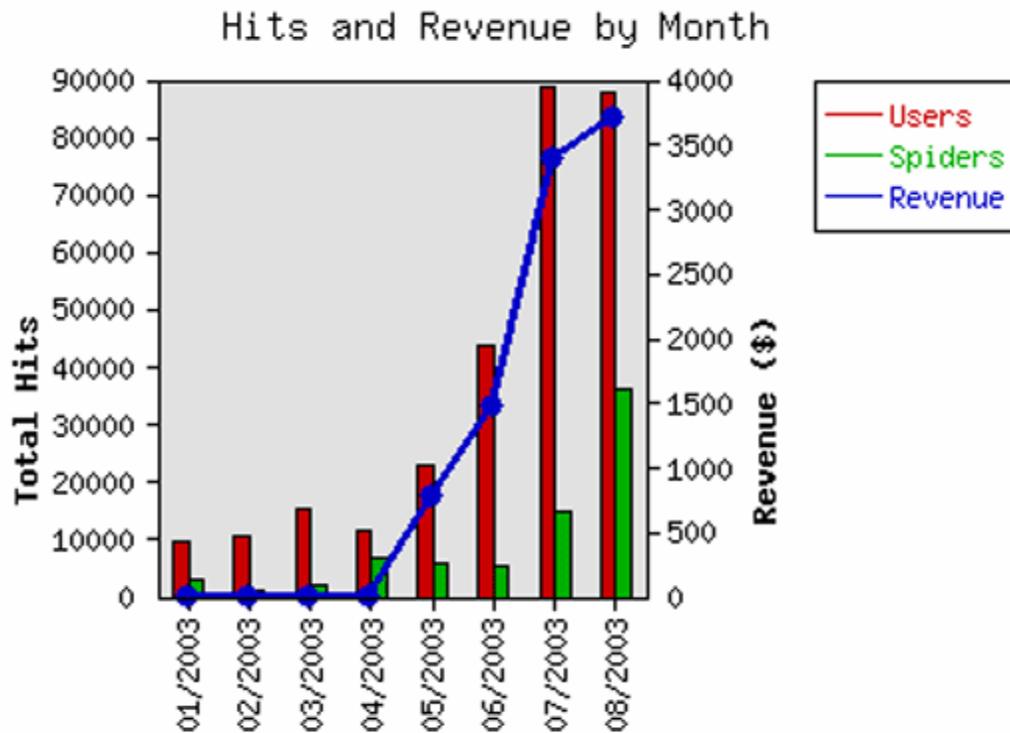
Source: Content Directions

3. **Average Sales Per Visitor:** In some respects, the ultimate test of an e-commerce site is the ability to provide a personalized, information-rich shopping experience that facilitates cross-selling and stimulates multiple product purchases. E-commerce software products such as Blue Martini, and many customer relationship management (CRM) initiatives, are designed for this purpose.

   DOI Impact: To date, no primary studies have addressed the DOI's impact on the number or total value of items in an online content buyer's shopping cart. However, given the ability of MultiLinks to provide one-click access to products associated with a customer purchase – whether by subject matter, author, or other metadata-enabled linkages – it seems reasonable to assume that this associative linking would result in more cross-selling and a fuller shopping cart per session.

Cost Reduction Drivers

1. ***Web Content Maintenance:*** Maintaining the consistency and integrity of links can be a significant ongoing element of publishers' costs of website operation. We have observed a wide range of sophistication among publishers in this regard. Some have developed fully templated, database driven sites on which many (though not all) functions associated with updating content and related links are handled automatically. Many others operate homegrown content management environments in which link maintenance consumes considerable staff time, as pages are moved, URLs are updated, and legacy content management systems are consolidated. The more extensively distributed the links to a publisher's site (on its other sites, affiliated sites, in marketing literature, etc.) the more onerous and time consuming the link maintenance requirements.

   A recent survey (sponsored by Thomas Technology Solutions) of management level executives at 117 STM, professional and scholarly reference, textbook, and trade publishers, provides considerable insight into the current state of content management in the publishing industry. Sixty-three percent (63%) of the respondents said they use in-house resources to transform material from print publications to Web formats; of these, nearly two-thirds deploy content to the Web using manual methods, with only a third using automated Web deployment. Only 16% of the companies surveyed currently use a commercially available content management system. The implications of this lack of process integration are not hard to imagine, and were confirmed by the respondents. "Content not easily repurposed for electronic products" was a "major problem" for 23% of respondents and a "minor problem" for an additional 42%. Twenty-one percent (21%) reported that their deadlines slip half the time, and four of ten viewed excessive overtime labor as a problem.

   DOI Impact: One of the defining attributes of the DOI is persistence. Publishers can manage each DOI link centrally through a registration agency, dramatically reducing the burden of finding and repairing broken links caused by changes in site architectures or content management systems. Link maintenance is effectively outsourced. Links to important content resources are permanent, regardless of editorial, organizational, or technical changes that previously might have required URL updating. Eliminating the threat of obsolete, broken links also encourages broader distribution of URLs (e.g., in PDF documents, industry directories, marketing correspondence, etc.) This, in turn, facilitates more selling, up-selling, and cross-selling opportunities.

Return on Investment Scenarios

The objective of this White Paper is to portray the potential economic benefits to publishers' e-commerce operations stemming from the DOI, and to provide a framework for more specific analysis of individual situations. No two publishers have identical catalog sizes, website strategies, content management infrastructures, or distribution networks. Still, it is possible to construct reasonably representative scenarios reflecting publishers' website operations. Four scenarios, corresponding to the four areas of opportunity already discussed, reflect various assumptions concerning current practice and the potential results of DOI implementation.

Each scenario illustrates the return on investment that is realizable with the DOI from a conceptual standpoint. In the same way, achievable results for a given publisher could be estimated by analyzing current operations and business results, and by identifying ways to optimize the results of DOI implementation.

Base Publisher Assumptions: All scenarios are based upon a common set of assumptions about the DOI implementation requirements and costs of a medium-sized publisher with:

- Three thousand titles
- Modern, but less-than-best-practice web content management operations
- Established e-commerce capabilities
- A current visitor rate of 80,000 per year
- A current conversion rate of 5%
- Online sales averaging $25 in value
- $100,000 in sales from in-house e-commerce operations

This hypothetical publisher is operating a functioning online store, and attracting a modest audience. At only $100,000 a year, however, the site fails to pay for itself. Amazon and other online booksellers have positively impacted the business's overall sales. The Web's growing convergence of search and e-commerce now is creating new opportunities for publishers to sell directly from their own catalogs, with potentially much higher margins. What will it take to establish a more effective and profitable direct sales presence on the Web? The scenarios that follow seek to address this question, including the DOI among alternative approaches.

DOI Implementation Costs: Content Directions estimates the first-year costs of DOI implementation for this publisher (including set-up and title-level DOIs) at approximately $20,000 to $100,000. For scenario construction purposes we use the figure of $50,000; this assumes some usage of optional analytics and value added services provided by CDI, such as affiliate tracking, access control, customer server-side software, traffic analysis, best practices and training, and business case / business strategy development. This implementation cost corresponds to a medium-sized publisher, although costs can vary widely for companies that may range from very small to very large. Ongoing annual costs are assumed for modeling purposes to be $1 per DOI, assuming no enhancements such as chapter-level DOIs (which require additional set-up fees).

Revenue Growth

1. *Improved Search Engine Discoverability*

The publisher seeks to dramatically improve its ranking on search results when users search on terms that are applicable to (and meta-tagged within) its online catalog.

Without DOI: After consideration of a number of piecemeal activities that could positively impact search rankings - and the level of coordination and resources needed - the decision is made to hire a specialized Search Engine Optimization agency to create a one-year, entry-level campaign at a cost of $130,000. This cost is the minimum pricing of market leader iProspect as described on page 3. To achieve even a 4 to 1 return on that investment, given our other assumptions (Table 4), would require a relatively low-traffic site to quintuple the number of visitors to its website.

With DOI: In the study described earlier (Table 2 and related analysis), book titles with DOIs were 5 times more likely to deliver active links within the first two pages of search results than titles without DOIs. We have applied a 4:1 ratio to the analysis shown in Table 4.

Table 4: Scenario of Comparative Returns on Improved Content Discoverability

Results	SEO	DOI
Base number of site visits (Base = Year 0)	80,000	80,000
Incremental site visits from improvement in search rankings	320,000 ((5X 80,000) – 80,000)	240,000 ((4X80,000) – 80,000)
Incremental sales (based on 5% conversion rate)	16,000	12,000
Average sale	$25	$25
Incremental revenues	$400,000	$300,000
Cost of improved discoverability	$130,000	$50,000
Net incremental revenues	**$270,000**	**$250,000**

Source: EPS

In this scenario, the ROI on investment in discoverability, DOI is competitive with the SEO's minimum acceptable performance. Although net revenue in this analysis is less, the DOI implementation is faster to market, and this first-year investment also pays for a variety of other benefits contributing to ROI, as portrayed in each of the three scenarios that follow.

2. *Higher Conversion Rates From Improved Usability*

After performing traffic analysis and a usability audit, the publisher sees opportunities to increase its online conversion rate by investing in site redesign to improve usability.

Without DOI: As we already have noted (in Table 3), web sites that have been redesigned for usability average a 100% improvement in conversion rates. Such site redesign engagements, however, whether undertaken internally or (usually preferred) by a website design firm, can be costly and time consuming.   Studies by both Nielsen Norman Group and IBM have estimated that the specific "cost of usability" is approximately 10% of total web site development cost. We estimate that the average cost of launching or re-launching a branded, scalable e-commerce-enabled publisher website is at least $1 million, putting the cost of usability at about $100,000. (In EPS' experience, few projects that change core navigational elements of a content-rich e-commerce site can be accomplished successfully for that figure.)

With DOI: Building on the gains derived from the discoverability investments made in the previous scenario (1), and assuming that the navigational/usability benefits of DOI are at least 50% as effective – for content products – as conventional site redesign, a comparison with/without DOI is shown in Table 4.

Table 5: Scenario of Comparative Returns on Improved Site Usability

Results	Site Redesign	DOI
Incremental site visits (base = scenario I)	320,000	240,000
Incremental sales (now assuming 10% conversion rate for redesign, 7.5% for DOI – vs. 5% base)	32,000	18,000
Net new sales (i.e., in addition to scenario 1)	16,000	6,000
Average sale	$25	$25
Incremental revenues	$400,000	$150,000
Cost of improved usability	$100,000	(already accounted for above)
Net incremental revenues	**$300,000**	**$150,000**

Source: EPS

We have included in our assumptions that conventional site usability enhancements would generate more new transactions. We should note, however, that such improvements typically would take place in the context of an entirely new site or major re-launch; hence the estimated usability-redesign costs may be either only periodically available, or very conservative indeed. By contrast, DOI implementation provides a substantial return on a much smaller (and already sunk) investment, and the returns are almost immediate - avoiding the opportunity cost associated with the development time required to re-launch a web site.

3. *Increased Size of Average Sale*

A publisher seeking to increase the "stickiness" and cross-selling effectiveness of an e-commerce site typically will consider, in addition to usability improvements, an investment in personalization or other capabilities intended to present the shopper with relevant additional items for purchase.

Without DOI: CRM implementations that help enable effective cross selling through development of user profiles and various personalization techniques (such as collaborative filtering) involve investment in both packaged applications and professional services for customization and implementation. A total cost of $600,000 might represent a typical entry-level initiative.

With DOI: MultiLinking™, Content Directions' application of the multiple resolution capability inherent to the DOI standard and its Handle System infrastructure, enables content buyers on the web to simply mouse over a link (or link-embedded object) to gain direct, contextual access to related products – whether by subject matter, author, or other metadata-enabled linkages. Although access to empirical data is lacking, it seems reasonable to assume that the availability of associative linking would result in more cross- and up-selling and a larger average total sale, as corresponding, now-conventional approaches have shown at, for example, Amazon.

We have assumed that related, personalized (or, in the case of DOIs, MultiLink-presented) product suggestions might result in an average 20% additional value of the sale – i.e. an additional purchase of equivalent value to the initial purchase by one out of five purchasers. In this case, we assume for both CRM and DOI that the investment to increase average purchase value is added to previous investments in search engine discoverability and site usability. The result is shown in Table 6.

Table 6: Scenario of Comparative Returns on Improved Merchandising Capabilities

Results	CRM/Usability	DOI
Total sales transactions	52,000	33,000
Increase in average transaction size	$5	$5
Incremental revenue (increased sale value only)	$260,000	$165,000
Cost of personalization	$600,000	(Already accounted for above)
Net incremental revenue	**($340,000)**	**$165,000**

Source: EPS

CRM and DOI scenarios are juxtaposed to provide additional context, rather than to draw a strict comparison. E-CRM investments have many additional drivers and benefits, and, as this scenario illustrates, their advisability depends substantially on the size of the base business that the CRM investment is intended to leverage. The investment in DOI already is accounted for in the first scenario.

Cost Reduction

4. *Reduced Web Site Maintenance Costs*

Without DOI: In addition to the content maintained in our hypothetical publisher's online catalog, we assume that (including navigation and landing pages) there are on average 5 additional web pages associated with each of the 3,000 book titles (for example, special material about the author, or supplemental material for use by students using a given title). Additional, associated legacy sites are managed separately and use different content management tools. Links to the publisher's overall catalog also are maintained on a number of affiliated sites operated by other divisions and their business partners.

Further, over and above both the dynamically-generated links on the publisher's web site and the links that point in an ad-hoc manual fashion to additional pages on the publisher's web site itself, inevitably there are also links on the publisher's web site that point elsewhere to other 3rd party sites: authors' sites, book reviews, partner sites, and very often retailer sites where the books can be purchased. These links are even more likely to experience "link rot," because they represent sites that the publisher does not control. Also, fixing or replacing these broken links with appropriate substitutes, or even re-writing the publisher's web pages when the broken links simply don't exist any more and so the referencing language on the page no longer makes sense, requires staff time beyond that of the publisher's Webmaster: because of the business or editorial judgments required, this requires time and attention by business people such as editorial, marketing or business-development/partnership-liaison staff.

In order to increase overall efficiency, the publisher decides to integrate its multiple content management tools within a single, homegrown system. This will require that new URLs representing the individual books in the catalog be assigned to and created within the relevant ancillary pages. Although this publisher (like many) is operating a website without template-based management of its catalog-exclusive content, updating all 15,000 pages can still be done programmatically - except for perhaps 5% of pages (750) that still require manual updating. Finding and fixing these exceptions – which can be difficult to find and can go unreported – represents an unproductive and open-ended use of IT resources.

More materially, ongoing maintenance is required. A mid-size publisher with a robust website may employ 3-5 people (on an annual basis perhaps 2 full-time equivalents) in quality assurance (QA) activities. Without DOIs, tools such as "link-checkers" or "pinging" programs also can be used to ensure that when content has been moved or updated, resulting in a broken link, the situation is identified and therefore can be remedied (manually). These tools, typically costing up to $10,000 (not including maintenance), can improve the productivity, but do not remove the necessity of quality assurance staff.

Table 7: Summary of Web Site Maintenance Potential Cost Savings

Elements	Time required	Personnel cost per day	Actual cost
Create script to update pages programmatically (CMS integration – one-time)	3	$600	$1,800
Find, fix URLs not automatically updated (CMS integration – one-time)	10	$400	$4,000
Ongoing link maintenance	1 FTE (ongoing – 1 year)	$455	$100,000
Link-checking software	NA	NA	10,000
Maintenance & licensing	NA	NA	$1,000 (ongoing)
TOTAL			**$115,800**

With DOI: Once this publisher has assigned and registered DOIs associated with each book in its catalog, URL changes can be made once, centrally, at the publisher's registration agency. All links to specific books then will be updated immediately to reflect the new URLs. Further, for an additional layer of QA, the DOI registration agency can ping the DOIs to detect any broken links. DOI pinging and centralized link management (i.e. making one change to update all instances of the DOI and its MultiLinks) may enable the reduction of 1 FTE – with overhead, easily a $100,000 per year cost - from this unproductive activity. *Not reflected in the estimated savings shown in Table 7 is the additional time saved by business, editorial, and/or marketing staff who no longer need to be consulted or otherwise involved in these link maintenance activities.*

Conclusions

This White Paper describes the potential attractiveness of investments in implementing the Digital Object Identifier. We have outlined what we believe to be reasonable assumptions about publishers' online bookselling operations. We have shown through a series of application scenarios how implementing Digital Object Identifiers could increase revenues by enabling greater discoverability, conversion rates, and cross selling, and reduce costs through improved content management.

As summarized in Table 9, our analysis indicates that a return on investment ratio of 12:1 could be an achievable target for a medium-size publisher's retail e-publishing operations. There also are other ways in which publishing businesses can be positively impacted (as forthcoming White Papers will illustrate), so this remains only a partial view of available business benefits.

Table 8: Summary of Profit Drivers from DOI Implementation

ROI Element	New Revenues or Cost Savings
Improved Content Discoverability	$225,000
Improved Site Usability	150,000
More Effective Cross-selling	165,000
Reduced Content Maintenance Costs	116,000
Total Return on Investment	656,000
DOI Implementation Investment	50,000
Net Return on Investment	**606,000**
Return on Investment Ratio	**12:1**

Our objective has been to suggest the scope of economic benefits that can stem from DOI implementation in the context of publishers' e-commerce operations, and provide a framework for more specific analysis of individual situations. Given the hypothetical nature of some of the analyses presented in this paper, any conclusions must be preliminary. DOI adoption (outside its particular use by the scholarly publishers participating in CrossRef) is taking place across a variety of content types, though at this stage few comparable case studies exist. Successful results always will depend upon effective execution of activities that are implicit in the scenarios.

Our analysis clearly supports the theory of economic benefits associated with employing the DOI in collections of valuable content. We hope that it lays the groundwork for more detailed analyses and case studies as more publishers register and leverage DOIs in the development, marketing, and management of content-based products and services.

About the Author
As Managing Partner of the US affiliate of Electronic Publishing Services Ltd (EPS), a London-based consultancy providing strategic assistance to publishers and other content providers, **Steve Sieck** advises EPS' global publishing clients in the US and contributes regularly to its ongoing analysis of information markets and industry trends. For over twenty years, at Scient, PwC Management Consulting and IDC/LINK Resources, he has helped content and enabling-technology providers develop new products, enter new markets, make strategic investment decisions and align organizational resources with strategic and financial objectives.

About EPS
With offices in London and New York, **EPS** helps its clients respond to the constant challenges of the publishing industry, providing informed market intelligence, trusted analysis, and strategic consultancy. We work with content providers of all kinds to assess new opportunities, devise effective technology-enabled strategies, and develop informed business cases for new products that leverage innovations such as the Digital Object Identifier.

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To see **who is using DOIs** to enhance their content's discoverability, increase their web site traffic and otherwise support their revenue goals, see: http://dx.doi.org/10.1220/demo21

To learn more about **The Benefits of DOI Linking vs. URL Linking**, see:
http://dx.doi.org/10.1220/edudoc3

To learn more about **how CDI brings value** to your business, see:
http://dx.doi.org/10.1220/edudoc8

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