

Product Search Optimization

6 Critical Data Strategies for Driving Online Revenue



Introduction

We recently interviewed an online retail customer whose experience revealed a clear need for Product Search Optimization: “I search for casters (wheels) and they show me office chairs. I search for a chain cutter and they show me chains. I mean, I’m trying to *cut* a chain! Then I search for o-rings and they tell me they don’t have any (a null search result). I just bought some from them last week! If the search box were an employee at a branch it would be ridiculous.”

It’s poignant to think of the search box as an employee. At many online retailers¹ the search box services millions of customers a month. In addition to direct customer interactions, the search box increasingly serves as a resource to customer service personnel. How much does the search box cost an organization each time it fails to effectively comprehend or misinterprets the request of a customer or employee? How can the search box be trained?

Online retailers have begun maximizing search effectiveness and establishing competitive advantages by building structured data that allows search engines to function like knowledgeable employees. Although technology is a critical enabler of product search effectiveness, technology alone cannot effectively route customers to products without structured product search data. This document explores six primary data strategies that market-leading online retailers are currently employing to drive conversion rates², customer search satisfaction, and, ultimately, online sales. They include:

- Noun Modifier Pairs
- Search Term Synonyms
- Search Term Routing Maps
- Manufacturer Part Number Cross-References
- Product Gap Logs
- Normalized Product Attributes

These initiatives are popular because they can increasingly be tied directly to the bottom line, with readily calculable return on investments often exceeding optimistic projections. “Residual” benefits including increased customer satisfaction and product breadth awareness are less readily tied to immediate gains, but impact the bottom line over time. In short, Product Search Optimization is a wise investment.

¹ Throughout this document “Online Retailers” will be used as a general term to refer to organizations selling items to customers online.

² ByteManagers considers a conversion rate the percentage of searches leading to an online purchase. Conversion Rates can also be thought of as the percentage of user sessions resulting in an online purchase.

Search: The First Line of Business

As a culture we have begun to enter keywords into search boxes with unprecedented frequency. U.S. Internet users conducted 6.9 billion “core” searches³ in February 2007, a 19 percent increase over February 2006.⁴ Our experience indicates that most successful online retailers field over 1 million searches annually, often numbering in the tens of millions for larger retailers. As the likes of Google and Yahoo continue to train our population to search for information using keywords, the stakes are high for share of search – not only between search engines, but also between competitors within industries.

Site Search Technology

Effective Site Search technology is critical to effective online commerce. There are a handful of site search technology providers (perhaps two) that can enable an organization to effectively leverage each of the data strategies described herein. However, online retailers have become increasingly aware that technology, though critical, is not a “silver bullet” for product search effectiveness.

Site Search algorithms rely entirely on an organization’s existing data to determine how customer searches are routed and how searches are refined. If the data being leveraged is poorly structured or incomplete, search results will always reflect these inadequacies.

Below are six data strategies currently being leveraged by online retailers to optimize product search, drive online sales, increase customer satisfaction, and gain market share from competitors:

1) Noun Modifier Pairs

Noun Modifier Pairs are simple, structured statements that reflect the gist of “what a product is” and as a collective form the most granular product classification system available to an organization. They often correspond to specific statements that a customer might use when attempting to locate a product in a store. Examples of Noun Modifier Pairs include “Combination Wrench,” “Cordless Drill,” and “Running Shoes.”

Though Noun Modifier Pairs lack specific product information that is often essential to customers, they tend to correspond very closely to customer search terms. Noun Modifier Pairs are the building blocks of search oriented product data, and are foundational components of:

- Taxonomy
- Synonym Tables
- Auto Generated Descriptions
- Product Attribute (Schema) Normalization
- Search Result Organization
- Cross-Sell Identification

³ “Core” searches are considered searches conducted on major internet search engines, but do not include searches on corporate websites.

⁴ Source: comScore Networks' qSearch

Though conceptually simple, Noun Modifier Pair identification and normalization are a complex data challenge for organizations with a large number of unique products. Rules for the creation of these data elements must be applied consistently across the product portfolio and incorporate knowledge of customer search habits.

2) Search Term Synonyms

Existing technologies exhibit varying degrees of efficacy handling customer misspellings (“florescent” vs. “fluorescent”), spacing variations (“hole saw” vs. “holesaw”), and pluralization (“wrench” vs. “wrenches”). However, they consistently fail to identify search synonyms (“Fuzz Buster” vs. “Radar Detector”).

There is no logic that will identify the equivalency of “fuzz buster” to “radar detector.” The search algorithm must be told that these terms are equivalent. In our experience, the number of unique customer search terms in a given year is often 10 to 20 times the number of unique products offered by an online retailer, meaning that, on average, customers use 10 to 20 different search terms to locate each product. This presents a data challenge to online retailers that cannot be met with technology alone. Online retailers serious about driving product search relevancy and conversion rates actively maintain thousands of search synonyms that are leveraged directly by their site search algorithm.

3) Search Term Routing Maps

When a customer at a store asks for “screws” it does not become an exercise in logic. A reasonable employee ascertains that the customer is looking for screws sold individually or in packs, and is not concerned with the thousands of items in the store that contain screws.

In order to approximate this experience online, frequent search terms often bypass “logic” and route directly to relevant Noun Modifier Pairs or Taxonomy nodes. In order to build these maps, leading online retailers are creating thousands of search term routing “maps” that bypass logic and route frequent search terms directly to relevant products identified by a human employee.

When Routing Maps are used in conjunction with synonym tables, online retailers often achieve dramatic increases in customer search satisfaction and conversion rates. Conversion rates can be tied directly to online revenue (see Appendix: Product Search Optimization Example).

4) Manufacturer Part Number Cross-References

Customers routinely search for items that online retailers do not carry. Invariably, these searches end in null or irrelevant search results. Manufacturer part number cross-references can help online retailers route many of these searches to reasonable substitutes that may be of interest to the customer. For example, if a customer is looking for at 6-foot ladder from a manufacturer that a retailer does not carry, they may be interested in the 6-foot ladder that the retailer does carry.

In our experience, the prevalence of manufacturer part number searches varies widely by industry. Naturally, industries exhibiting a high frequency of part number searches (e.g. electronics, industrial supplies, hardware) stand to gain the most from cross-referencing initiatives.

Some online retailers are investing heavily in building manufacturer part number cross-reference databases. These initiatives often involve the purchase of third party databases in addition to building their own content through the review of search logs.

The inclusion of a manufacturer part number cross-reference database into a search algorithm can often achieve dramatic gains in conversion rates, since most of the searches affected were formerly null or irrelevant and, subsequently, had conversion rates of zero. Like synonyms and routing maps above, the impact of these data initiatives can be tied directly to online conversion rates, and thus directly to online revenue.

5) Product Gap Logs

Many customer searches are null or irrelevant for a very good reason: the product or product type is not offered by the retailer they are searching with and no reasonable substitute is available. Synonym tables and manufacturer part number cross-references cannot fix this issue. However, some online retailers recognize that these searches represent vital business intelligence, and have begun capturing structured information about products customers are searching for that they do not offer.

Product Gap Logs are often built in conjunction with processes used to identify product synonyms and manufacturer part number cross-references. They capture essential information about the product gap that is used to effectively route qualified product line expansion leads to designated Product Managers. Revenue resulting from these initiatives can be tracked over time.

6) Normalized Product Attributes

Online retailers often source similar products from multiple manufacturers, each of which provide product information using their own unique product information structure and nomenclature. This becomes an information organization challenge for retailers and affects their ability to assist customers in “drilling down” within search results.

The most frequent customer search terms are often “broad strokes” that can refer to a large number of items (e.g. “wrench” or “chairs”). Even when a retailer effectively routes these searches, customers are often left to sort through long lists of potentially relevant products. Structured product attributes allow customers to effectively drill down and isolate the exact product they are looking for. They also assist in providing meaningful “Product Compare” views.

When an online retailer only allows customers to drill down using brand names and price ranges, it's usually because they have not effectively structured and normalized product attributes across manufacturers.

Conclusion

Each of the techniques above is currently being leveraged by online retailers to drive online sales and steal market share from competitors. Due to the number of products and product types offered by online retailers today, these initiatives require significant investment in time and resources, including rigorous planning, program management, and measurement of ROI. To effectively leverage this new data, these initiatives are often accompanied by investment in technology and third party resources.

Although the emergence of these techniques and their associated costs would appear to exacerbate the inherent advantages of industry-leaders with economies of scale, many such organizations have been slow to embrace these concepts. This has enabled nimble middle-tier distributors and retailers to stay one step ahead of larger competitors in the battle for customers, particularly in business-to-business marketplaces where competition remains service driven.

About ByteManagers, Inc.

In addition to helping customers tackle the product search optimization challenges described above, ByteManagers provides data consulting and services including product information enhancement, taxonomy creation, and competitive pricing analytics.

Headquartered in Chicago, ByteManagers' production team is fortified with industry domain experts who fully comprehend the strategic use of data within an organization and industry. With more than 500 projects executed successfully since 1999, ByteManagers is dedicated to repeatable, predictable, and sustainable results.

About The Author

Eli Cooley has been a Solutions Architect with ByteManagers since January 2007. He's spent several years in management consulting and trading industrial supply and retail stock options for a hedge fund. Before joining ByteManagers, he worked as an independent consultant for a Fortune 500 industrial supplier where he helped build the cross reference and product search optimization practices. He earned a B.A. in Mathematics from Northwestern University and a Masters in Financial Engineering from the University of Chicago.

Appendix: Product Search Optimization Example

The following is an example of ROI metrics calculated for an initiative involving Search Synonyms, Noun Modifier Creation, and Routing Maps. In this example conversion rates are increased by routing search terms to relevant results.

“Boat Bottom Paint” is a substance applied to the bottoms of boats to inhibit the growth of organisms that attach to the hull.

Before

Customers use multiple keyword queries to refer to these products. Many customer searches lead to null or irrelevant results, as they are each treated separately by the search algorithm. Search terms that produce irrelevant results produce conversion rates of zero.

Sample Search Metrics (Before)

Search Term	Search Result	# Searches	Conversion Rate	Average Order Value	Total Revenue
boat bottom paint	relevant	100	6%	\$25	\$150
boatbottom paint	not relevant	40	0%	-	\$0
ship bottom paint	not relevant	40	0%	-	\$0
shipbottom paint	not relevant	20	0%	-	\$0
antifouling bottom paint	partially relevant	40	4%	\$25	\$40
anti-fouling paint	partially relevant	60	3%	\$25	\$45
antifouling paint	not relevant	80	0%	-	\$0
fouling paint	partially relevant	20	3%	\$25	\$15
Total		400	2.50%	\$25	\$250

After

Search Synonyms allow the search algorithm to recognize that these terms all refer the Noun Modifier Pair “Boat Bottom Paint,” which is mapped to a node of the product taxonomy. Relevant search results drive conversion rates, which drives online revenue.

Sample Search Metrics (After)

Search Term	Master Noun Modifier pair	Forced Routing Node	search result	# searches	conversion rate	average order value	Total Revenue
boat bottom paint	Boat Bottom Paint	Paints & Painting Supplies > Marine Paints > Boat Bottom Paint	relevant	100	5%	\$25	\$125
boatbottom paint			relevant	40	5%	\$25	\$50
ship bottom paint			relevant	40	5%	\$25	\$50
shipbottom paint			relevant	20	5%	\$25	\$25
antifouling bottom paint			relevant	40	5%	\$25	\$50
anti-fouling paint			relevant	60	5%	\$25	\$75
antifouling paint			relevant	80	5%	\$25	\$100
fouling paint			relevant	20	5%	\$25	\$25
Total				400	5%	\$25	\$500