PROCEEDINGS OF THE 7TH ASIS SIG/CR CLASSIFICATION RESEARCH WORKSHOP

CLASSIFYING THE QUESTIONS OF SMALL BUSINESS OWNERS:
A TOP-DOWN & BOTTOM-UP APPROACH

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ABSTRACT

A classification scheme of business information needs was developed through question analysis of a set of business requests posed by small business entrepreneurs in the state of Maryland. Existing business classification schemes were examined for use in the project and while an existing scheme could be used for subject/industry analysis, no classification scheme was found to be adequate for the information requirements. This classification of business requests can be used to enhance communication between intermediaries and their clients, provide an understanding of user needs, assist in the development of search strategies, and provide a basis for correlating information requirements with industry, age of industry and purpose of request.

INTRODUCTION

This paper will present results of exploratory research on the development of a classification of the information requirements of business requests based on the results of an in-depth question analysis. The purpose of the classification of requests is to provide information professionals with an understanding of information needs, to permit segmentation of the overall user group into smaller homogeneous groups, to enhance communication between intermediaries and entrepreneurs by normalizing vocabulary, and to facilitate the development of search strategies. While existing business classification schemes already exist, none was judged adequate to fulfill the objectives of this project.

PROJECT BACKGROUND

Through a project funded by the National Institute of Standards and Technology (NIST) and the State of Maryland and managed by the Dingman Center for Entrepreneurship, small business entrepreneurs in the state of Maryland were given access to online searches performed by student searchers in the College of Library & Information Service (CLIS) at the University of Maryland. A major objective of this project was to increase the awareness among entrepreneurs of the importance of information to their success. The searches were performed either free of charge or at a token cost. In all cases the searches were performed within the context of a real-world contractual setting, meeting market standards of timeliness, quality, and overall professionalism. Five types of requests were received from the entrepreneurs: literature on a given topic, lists of companies with their addresses, vendors of projects, patent and trademark information, and identification of experts.
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The data for the classification project consist of 354 real requests made over the course of one year, from October 1, 1994 to September 30, 1995. The requests were made in writing using a request form. During the question analysis phase of the project, several written requests were found to contain more than one conceptual request and were divided into single concept requests, yielding a total of 372 requests. [Example: "Identify: 1) small/regional competitors of UPS, Federal Express, and Airborne Express; 2) courier services all over the U.S.]

EXISTING CLASSIFICATIONS

The decision to develop a classification for the business requests was made after a review of existing business classifications showed them to be inadequate for the objectives of this project. Four types of business classifications were identified in the literature: classifications for business literature, classifications for end-user interfaces, classifications of business problems, classifications of business requests.

- **Business Literature Classifications**: The classifications generated for business literature were broad and, thus, inappropriate for the more specific nature of an information request (Harvard University Graduate School of Business Administration, 1960; Vernon & Lang, 1979).

- **End-user Interface Classifications**: One example of categories developed for use in a front-end information retrieval system was found (Zuca & Corcoran, 1986; O'Leary, 1987). This interface, Business Connection, purports to offer end-users with options of types of data. This categorization was developed on the basis of frequent uses of DIALOG databases. The resulting categories presented are not appropriate for classifying business requests because they represent implemented search strategies and not the requests themselves. For example, a searcher interested in financial information on a company would first select the "Financial Screening" category; then they would select either "Screens on balance sheets" or "Screens on income statements." The "Screens on income statements" would then present the user with a list of specific choices, including net sales, cost of goods sold, gross profit, etc. By contrast, of the financial requests received in this project, none requested one specific piece of financial data.

- **Classifications of Business Problems**: A review of the business literature revealed several classifications of business problems (Dandridge & Sewall, 1978; Terpstra & Olson, 1993). Business problems are of a broader nature than business information requests; that is, one business problem may generate one or more business requests. The request form used in this project requested information on the purpose of the request which in this case is more or less synonymous with business problem. Examples of the broad purposes included marketing, management/planning, product development/ modification, etc.

- **Classifications of Business Requests**: While several classifications have been developed for business requests, those identified were ultimately judged inadequate for one or more of the following reasons:

  > their classes fail to be mutually exclusive (Trott, 1986):
  > marketing information

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ANALYSIS OF BUSINESS REQUESTS

A "bottom-up" approach was applied to develop a means of classifying the information requirements expressed in the specific requests. For this purpose, the breakdown of wh-question types as described by Belkin & Vickery (1985) proved useful: who, where, when, how, why, what, which and whose. Each request was broken down into one or more wh-questions. Table 1 contains examples that illustrate the request analysis. The table shows the written request as received and the questions into which the request was broken down. These questions were grouped and analyzed, resulting in a preliminary classification that is shown in Table 2. The classification consists of the facets (who, what, where, when, why, how); a subcategory (identify, perform); an optional specification of the category (e.g. company, person); values (e.g. Values for perform process: builds, develops, distributes, etc.).

In developing the classification, it was necessary to normalize vocabulary. In the analysis, it became evident that different users often were saying the same thing with different words. That is, the surface structure of the requests varies when in fact their deep structure was the same. To track the normalization of the vocabulary, a table was maintained of the relationship between raw and analyzed questions. (See Table 3.)

During the analysis, it became clear that not all simply stated questions were in fact basic questions. Thus, in addition to tracking raw and analyzed questions, normalization of questions involved breaking down composite questions into basic questions. A set of nine composite questions emerged. The composite questions and their tentative definitions are listed in Table 4. The definitions of the composite questions are based on formal definitions of terminology found in standard business dictionaries, specific detailed requests posed by clients, and experiences with business reference requests.
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To complete the information analysis of the requests, a subject classification was needed. A "top-down" approach using an existing classification scheme was used to determine the general subject area of the request in terms of both the general industry area of the search and the product/service of interest within that industry. [Predicast’s systems of Product, Event, and Country Codes produced by Information Access Company, 1994 was selected.] Each request was assigned a single occurrence of a "host industry." Additionally, a request could be assigned an "applied industry", in those cases when the question involved the use of a product originating in one industry but used in another industry. [Example: "Looking for databases on energy efficiency projects implemented in manufacturing companies."]

CONCLUSIONS

The analysis of the information requirements of a set of business requests posed by small business entrepreneurs has resulted in a classification of business requests. This classification can be used to enhance communication between intermediaries and their clients during question negotiation by normalizing vocabulary and standardizing definitions of composite questions. It can also enhance the understanding of user needs when combined with the subject classification. The classification, which can also be applied to search parameters, will facilitate the development of search strategies. Eventually, the classification will be used to correlate information requirements with subject (industry), age of industry, and purpose of the request.

REFERENCES


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<table>
<thead>
<tr>
<th>Question</th>
<th>Rating</th>
</tr>
</thead>
<tbody>
<tr>
<td>Work force in the educational software market, growth potential, and recent developments</td>
<td>1</td>
</tr>
<tr>
<td>Who are competitors</td>
<td>1</td>
</tr>
<tr>
<td>Where located</td>
<td>1</td>
</tr>
<tr>
<td>When is growth potential</td>
<td>1</td>
</tr>
<tr>
<td>What are recent developments</td>
<td>1</td>
</tr>
<tr>
<td>Who performs</td>
<td>6</td>
</tr>
<tr>
<td>What are advancements</td>
<td>8</td>
</tr>
<tr>
<td>Demand</td>
<td>7</td>
</tr>
<tr>
<td>What are demographics</td>
<td>9</td>
</tr>
<tr>
<td>What are leads</td>
<td>5</td>
</tr>
<tr>
<td>What are market leaders</td>
<td>4</td>
</tr>
<tr>
<td>What database systems are used</td>
<td>4</td>
</tr>
<tr>
<td>What databases systems are used and how does one establish a network marketing</td>
<td>3</td>
</tr>
<tr>
<td>How to establish</td>
<td>2</td>
</tr>
<tr>
<td>Where are leads</td>
<td>1</td>
</tr>
<tr>
<td>Where are suppliers</td>
<td>1</td>
</tr>
<tr>
<td>Suppliers of materials that are endangered</td>
<td>1</td>
</tr>
<tr>
<td>Suppliers of materials that are endangered</td>
<td>1</td>
</tr>
<tr>
<td>Suppliers of materials that are endangered</td>
<td>1</td>
</tr>
</tbody>
</table>

Table 1. Partial Table of Requests and Analyzed Questions
<table>
<thead>
<tr>
<th>Selected Questions of Small Business Owners: A Top-Down and Bottom-Up Approach</th>
</tr>
</thead>
<tbody>
<tr>
<td>Vendors for motor, wheel unit and micro controller:</td>
</tr>
<tr>
<td>Vendors for motor, wheel unit and micro controller:</td>
</tr>
<tr>
<td>Companies and technology used in the mobile x-ray business:</td>
</tr>
<tr>
<td>Companies and technology used in the mobile x-ray business:</td>
</tr>
<tr>
<td>Trends in ready mobiles and how retailers expect to get it:</td>
</tr>
<tr>
<td>Trends in ready mobiles and how retailers expect to get it:</td>
</tr>
<tr>
<td>Where located:</td>
</tr>
<tr>
<td>Where located:</td>
</tr>
<tr>
<td>How to distribute:</td>
</tr>
<tr>
<td>How to distribute:</td>
</tr>
<tr>
<td>What is sale of the art:</td>
</tr>
<tr>
<td>What is sale of the art:</td>
</tr>
<tr>
<td>How to market:</td>
</tr>
<tr>
<td>How to market:</td>
</tr>
<tr>
<td>Production costs, size, and distribution channels of medical imaging industry:</td>
</tr>
<tr>
<td>Production costs, size, and distribution channels of medical imaging industry:</td>
</tr>
<tr>
<td>Production costs, size, and distribution channels of medical imaging industry:</td>
</tr>
<tr>
<td>Production costs, size, and distribution channels of medical imaging industry:</td>
</tr>
<tr>
<td>Software packages:</td>
</tr>
<tr>
<td>Software packages:</td>
</tr>
<tr>
<td>How much is cost: Retail:</td>
</tr>
<tr>
<td>How much is cost: Retail:</td>
</tr>
<tr>
<td>How to raise:</td>
</tr>
<tr>
<td>How to raise:</td>
</tr>
<tr>
<td>How to raise:</td>
</tr>
</tbody>
</table>

Table 1. Partial Table of Questions and Analyzed Questions
Table 2: Preliminary Classification of Requests

All Questions: Grand Total = 744

1. Who = 226 (30%)
2. What = 232 (31%)
3. Where = 155 (21%)
4. When = 0 (0%)
5. Why = 6 (1%)
6. How = 125 (17%)

I. Who: Who (person or company) fills given condition?
   Total = 226

   1.1 Who is/are (Identification): Who (company/person) meets given criteria?
      Subtotal = 27

      1.1.1 Who (company/business) meets given criteria? (9)
            competitors (6)
            can be acquired
            top companies (2)

      1.1.2 Who (specific person/people) meets given criteria? (18)
            CEO (2)
            contact (7)
            contact (implicit)
            expert (6) [composite question]
            is author (2)

   1.2 Who performs: Who performs given process or action?
      Subtotal = 199

      1.2.1 Who (company) performs process or action? (168)
            brokers offshore
            builds
            develops
            distributes (13)
            exports (3)
            franchises
            funds (2)
            grows
            imports (2)
            lends
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licenses
manufactures (34)
needs (2) [could be person]
owns
performs/provides [service or function] (56)
produces (4)
publishes (3)
researches
sells (27)
retails (2)
sells (22)
wholesales (3)
subsidizes
succeeds
supplies (10)
uses product

1.2.2. Person: Who (generic person/people/group) performs action? (31)
buys (14) [PROBLEM -- RELATIONSHIP TO WHAT IS MARKET]
holds patent [person or company] (14)
lives in
uses service [could be company]
works for

2. What: What property or condition does entity have?
Total =232

2.1 What is/are industry/service?
Subtotal = 65

analysis [composite question]
industry (18)
service (5)
failures
projections
statistics
trends [composite question] (38)

2.2 What is company?
Subtotal =9

analysis [composite question]
profile [composite question] (8)
2.3 What is product?
Subtotal = 6

- nature of product
- [product] analysis [composite question]
- product (2)
- product development
- produced

PROBLEM

2.4 What is market?
Subtotal = 44

- analysis [composite question] (3)
- [composite] (23)
- market: future
- market: potential (3)
- market: segment
- trends [composite question]? (13)

2.5 What are finances?
Subtotal = 12

- financial analysis [composite question] (2)
- economic indicator
- financial implications
- financial status
- financial trends [composite question]
- investments
- sales
- spending habits
- valuations
- values (2)

2.6 What is legal status and/or procedure?
Subtotal: 13

- legal aspects (2)
- patent (3) [composite question]
- [patents] held (2)
- procedure
- protocol
- regulations (2)
- rules
- standards
2.7 What is/are ? (identification other than person or company)
   Subtotal = 67

   advancements [composite question]
   administrative aspects
   air quality
   application(s) (2)
   background (13) [composite question]
   commodities
   composition
   databases
   demographics (7) [composite question]
   distribution analysis [composite question]
   distribution channels (2) [composite question]
   effects
   fashion trends [composite question]
   health issues
   information: technical
   information: trade show
   initiative (2)
   opportunities
   patent (3)
   [patents] held (2)
   pitfalls
   popular languages
   problems (3)
   process
   profile
   program
   prospects [as a business venture]
   qualifications [implicit] (4)
   recent developments
   requirements (2)
   solutions
   state of the art (2)
   status (2)
   technologies
   training courses/videos

2.8 What is? (recipient of action?) (16)

   needed
   offered
   provided
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sold
used (9)
visited
written (2)

3. When: When did given entity take place or exist?
   Total = 0

4. Where: Where is given entity located?
   Total = 155

   Where Located? = 155
   company [implicit] (154)
   service

5. Why: Why does given event occur?
   Total = 6

   [company] fails
   is [something] done
   is [something] negligent
   [company] succeed (3)

6. How: How is given entity quantified?
   Total = 125

   6.1 How is given entity assessed?
      Subtotal = 4

      ranked (3)
      accepted

   6.2 How large is given entity?
      Subtotal = 83

      6.2.1 How Many = 21
      businesses [comprise industry]
      children enrolled
      commercial buildings
      condominiums
      employees (2)
      franchises
      garden apartments
      hours [used daily]
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immigrants
people (7)
people [do something] PROBLEM
buy (5)
might buy
[businesses] provide
responses
stores
units sold

6.2.2 How Much (60)
capacity
cost [any] (27)
charge: product
charge: admission
cost: delivery
cost: equipment
cost: forecasted
cost: membership fees
cost: operating
cost: per BTU
cost: production (2)
cost: retail (13)
cost: start up (4)
ed earned
exists
exported
growth (3)
growth: potential
growth: rate
growth: forecasted
imported
market share (2)
profit(s) (2)
residue
revenue (2)
revenue
revenue: annual
salaries
sales (10)
spent (5)
time
value
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6.2.3 How often does given event occur?
Subtotal = 2

[businesses] fail
[cities] visited

6.3 How is given process performed?
Subtotal = 38

advertise
apply
become [a lender]
contact (3)
contract
control
distribute
establish
franchise
manufacture
market (3)
market internationally
measure productivity
operate
organize
perform (7)
produce
provide
raise
run [a business]
sell direct
share space
start (3)
structure
use (2)
### Table 3. Partial Listing of Raw and Analyzed Questions

<table>
<thead>
<tr>
<th>Raw Question</th>
<th>Analyzed Question</th>
</tr>
</thead>
<tbody>
<tr>
<td>Recent Developments</td>
<td>what are trends</td>
</tr>
<tr>
<td>Who supplies</td>
<td>who supplies where located (implicit)</td>
</tr>
<tr>
<td>what are prices</td>
<td>how much is (retail) cost</td>
</tr>
<tr>
<td>who recycles</td>
<td>who performs where located (implicit)</td>
</tr>
<tr>
<td>how gets₁</td>
<td>how distributed who distributes</td>
</tr>
<tr>
<td>how gets₂</td>
<td>who sells</td>
</tr>
<tr>
<td>how survive</td>
<td>what are financial trends</td>
</tr>
<tr>
<td>any articles on description</td>
<td>background</td>
</tr>
<tr>
<td>market information</td>
<td>company profile</td>
</tr>
<tr>
<td>customer demographics</td>
<td>what is market analysis</td>
</tr>
<tr>
<td>any details</td>
<td>who buys</td>
</tr>
<tr>
<td>what is background</td>
<td>company profile</td>
</tr>
<tr>
<td>what is pricing</td>
<td>any information on</td>
</tr>
<tr>
<td>who are customers</td>
<td>how much cost</td>
</tr>
<tr>
<td>business aspects of</td>
<td>who buys</td>
</tr>
<tr>
<td>how to create</td>
<td>how performed</td>
</tr>
<tr>
<td>players</td>
<td>how start</td>
</tr>
<tr>
<td></td>
<td>competitors</td>
</tr>
</tbody>
</table>
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customer segment  market segment

who requires  who needs

who pays for  who is market

market data  what is market

market information  what are market trends or
what is market analysis
(depending on temporal qualifiers)

company background  company profile

all information on company  company profile

recent advancements  advancements

financial position in recent years  financial trends

size of industry  how much consumed

all information on industry or service  industry or service analysis

information process  how performed

examine success  why successful

willingness to pay  how much paid

retailers  who sells

industry information  industry analysis

information on problems  what are problems

information on business prospect  what are prospects as a business venture

industry trends  what are trends

statistics  how much

what is demand  what is market

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process
all information available
all statistics to produce profit
possibility of providing
revenue statistics
industry reports
acceptance
builders
what are factors leading to failure
what are factors leading to success
what areas are hot
literature "on"
what are membership fees
what is demand
what is market size
how performed
what is background
how to produce profit
how to provide
how much earned
what is industry analysis
how widely accepted
manufactures
how fail
how succeed
what is state of the art
what is background
how much is cost: membership fees
what is market
how big is market

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Table 4. Composite Questions

1. WHAT ARE TRENDS (recent past, present & future)

What are MARKET TRENDS
   How big is market
      How big is potential market
   Who is potential market
      Who are potential buyers
      Who are potential sellers
   What is market
      Who buys/uses
      Where are buyers
      How much consumed
      What are market segments

What are FINANCIAL TRENDS
   How much cost
   How much earned
   How much sales/rental
   How much lost

What are SALES TRENDS
   How many sold (units)
   How much sold ($$$)

Who SELLS/PROVIDES/MANUFACTURES
   Who are competitors
      How much is market share
      What are prices
   Where located

What are TECHNOLOGICAL TRENDS

How RUN (OPERATED)
   How much charged

What are INNOVATIONS

What are RESEARCH & DEVELOPMENT TRENDS?

What is STATE OF THE ART

What is FUTURE FORECAST

What services offered/What products sold
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2. WHAT ARE DEMOGRAPHICS

What is gender
what is race
what is profession
what is education
how old
how much earn

3. WHAT ARE ADVANCEMENTS

What is design

How made

4. WHAT ARE DISTRIBUTION CHANNELS

Who distributes
How distributed

Where distributed

5. WHAT IS COMPANY PROFILE

where located
how many branches/locations
what is financial status:
how much earned
how much market share
what sales
what is produced/provided
who are officers/contact
what are legal activities
what are plans
what is relationship to other companies
what is private/public status
how many employees

6. WHAT IS BACKGROUND INFORMATION

how much charge
how done
what is
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7. WHAT IS PRODUCT/INDUSTRY/SERVICE/MARKET/FINANCIAL ANALYSIS

what are problems/concerns
what is future growth
what are success/failures
what are risks/opportunities
what is market
   Who buys/uses
   Where are buyers
   How much consumed
   What are market segments
      who sells/provides/manufactures
what are costs

8. WHAT IS PATENT

what is number
who holds patent
when was patent issued
what is design/process

9. WHO IS EXPERT

how to contact
what are qualifications?