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Characteristics of Competitive Intelligence Practice in R&D Driven Firms: Evidence from the UK Pharmaceutical Industry

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Abstract

The greatest proportion of Competitive Intelligence (CI) practice in the pharmaceutical industry is located within the R&D function (Halliday *et al* 1992). This paper reports on the results of an empirical study into the infrastructure of competitive intelligence practice within the industry. The study analyses and reports on the results from data and views gathered via questionnaire which addressed the questions of attitudes towards CI, methods of gathering CI, practitioner background, and problem areas.

Keywords

Empirical Study, Competitive Intelligence, Knowledge, R&D, Pharmaceuticals

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Introduction

As a result of the immense pressure placed on pharmaceutical companies to maintain their position in a highly dynamic market, there is an urgent requirement for organisations to keep abreast of all decision influencing factors, including competitors (Badr *et al*, 2006, Savioz & Sugasawa 2006). Some 10 years ago, Gilad & Smith (1998) drew attention to the poor state of competitor knowledge and competitive intelligence in the pharmaceutical industry and it would seem that little has changed.

The significance for R&D practitioners is that many scientists progress into competitive intelligence as their business awareness develops and as such, they bring with them unique skills which can further benefit the impact that CI can have on the firm's activities. This is a fragmented industry, characterised by many different types of firms which develop, manufacture and sell a vast array of products. While the companies themselves may differ, they all invest significant sums of money, particularly in research and development (R&D) to allow them to compete in the market.

As can be seen from Table 1 below, the top two firms in the UK ranking list of R&D expenditure are from the pharmaceutical sector with GlaxoSmithKline spending € 4,564 million, some 63% more than the second placed firm AstraZeneca with € 2,864 million (EUR 22348 EN, 2006).

1	GlaxoSmithKline	Pharmaceuticals	€ 4,564 million
2	AstraZeneca	Pharmaceuticals	€ 2,864 million
3	BAE Systems	Aerospace and defence	€ 2,108 million
4	BT	Telecommunications	€ 1,058 million
5	Unilever	Food products	€ 953 million
6	Rolls Royce	Aerospace & defence	€ 512 million
7	Royal Dutch Shell	Oil & gas producers	€ 498 million
8	Royal Bank of Scotland	Banking	€ 478 million
9	BP	Oil & gas producers	€ 425 million
10	HSBC	Banking	€ 356 million
11	Vodafone	Telecommunications	€ 299 million
12	Marconi/Telent	Telecommunications	€ 270 million
13	Shire	Pharmaceuticals	€ 243 million
14	ICI	Chemicals	€ 213 million
15	Smiths	Aerospace and defence	€ 209 million

Table 1 - Ranking of UK firms by R&D investment, 2006

As reported by Epsicom (2008) the UK is one of the leading pharmaceutical producers and exporters in the world. There are six main types of firm present in the UK market, the largest being global, research based pharmaceutical companies. Typically, these are large size, large scale firms with significant R&D investment, complex product portfolios and long product pipelines. These companies have capabilities across all therapeutic areas and usually have had numerous blockbuster drugs to their credit.

Medium sized companies tend to be specialists operating in niche markets. Many mid-sized firms find it difficult to compete with the large global players and can be prone to acquisition by the larger organisations. Mergers between smaller firms and larger players do sometimes take place, but to all intents and purposes the majority of mergers are absorption of the smaller firm into the larger corporate body.

Smaller organisations focus on specific research projects, typically biopharmaceutical activities. They are more likely to be funded by government grants or venture capitalists. These companies would not normally manufacture their newly developed products but seek to licence their intellectual property to larger companies. This further helps to subsidise their next project.

Generic pharmaceutical companies do not actively partake in any R&D. They opt for "me too" products and cash in when patents expire, typically producing a cheaper alternative.

Consumer Healthcare companies carry out some R&D but concentrate on 'over the counter' (OTC) products. Many of the large manufacturers also have a consumer healthcare division although this would tend to represent a smaller percentage of their overall interest.

Finally, Drug Delivery companies focus on developing novel modes of delivery for established products. These include line extensions, and improved formulations. More often than not these companies work in partnership with the larger pharmaceutical companies.

Many factors determine the choice and direction of a company's approach to R&D and therefore organisations are continually changing their CI strategy. In the 1960s the main trend of pharmaceutical R&D was towards the evolution of antibiotics (Handfield-Jones, 1965). This gave way to research on the central nervous system in the 1980s (Tofilon & Fike, 2000). This changed dramatically in the 1990s with the introduction of molecular biology and the formulation of various vaccines (Moss, 1991). R&D's focus looks set to change again with the emergence of biotechnology (Acharya *et al*, 2003) and the science of genetics (Knoppers & Chadwick, 2005, Wensley, 2008)

CI in Pharma

There is a generally held view is that CI is ubiquitous and beneficial to Pharmaceutical decision makers. One would expect to find sophisticated thinking, speed of action, innovative analysis and a skill set which went far beyond description and idle speculation.

It is also easy to think that CI in pharma has been heavily researched and that there is little left to learn. Even (blind) reviewers of this paper made comments to this effect. One reviewer said, "*In the US, the theme and the industry in question have been in the public gaze (for) years"*. Whilst this may be true, no citations were offered to support this opinion, and as this study was focused on CI practice in the UK pharmaceutical industry only, this was a mute point. A second reviewer noted that "*Author(s) refer to some outdated sources of information although both R&D activities and the pharmaceutical industry are, or should be, one of the most dynamic business areas"*. The use of the words "should be" is indicative here. Again, no citations were offered and it is very common to think that big pharma has been well

covered, when it has not been. The third reviewer had a converse view and noted that "*The research method and sample carry conviction and the research offers a comprehensive picture of CI activities in pharmaceutical companies in the UK"*. The true extent of published and publicly available empirical work in this area, specifically in CI practice in pharma, is that it is far from numerous. Our findings set out in the next section may well be surprising to some.

Theoretical and Empirical Foundation

The global pharmaceutical market is experiencing unprecedented changes which are adding to the competitive nature of the industry and these changes are occurring on a macro and micro level (Richardson & Luchsinger 2004, Bickerstaff *et al* 2006). A major problem facing the industry is a reduction in the amount of product output compared to R&D expenditure and as Dyer (2002a) points out, the industry may have reached saturation point in terms of the number of elusive 'blockbuster' drugs that can be developed. So, with little promise of finding a new 'blockbuster' drug, organisations are finding that their product pipelines are reducing, yet the cost of R&D is growing (DiMasi & Paquette 2004, Leahy & Neary 2007, Becker & Pain 2008). Coupled with this, is the fact that many of the 'blockbuster' drugs developed in the 80's and 90's are currently coming off patent and as such firms can expect stiff competition from the generic level of manufacturers (Dyer, 2002b, Becker & Pain 2008). It is within this context that an increased level of CI activity is not only desirable, but essential.

In looking at this from an internal, information exchange viewpoint, McMillan *et al* (1995) concluded that *"a policy of encouraging openness with scientific information be a superior strategy to secrecy, particularly in high-technology companies"*. Their model was subsequently tested with a longitudinal analysis of 20 large US pharmaceutical firms where it was found that 'openness' was a *"very strong predictor of R&D performance"*. From this it would seem that all firms, whether they are high or low technology in nature, need to be acutely aware of the information which exists within both their external and internal environments. The impetus then becomes how to use such information (Espositio & Gilmont, 1991) and to leverage internal knowledge for competitive advantage. This is particularly relevant for high-technology, R&D driven firms, the pharmaceutical sector being a prime example of such (McNair & Liebfried, 1993, Krol *et al* 1993, McMillan & Hamilton, 2000a).

Porter (1980) takes an external environmental perspective to intelligence gathering and argues that any executive who is focusing on the future must formulate and answer the following questions:

- What is driving competition in my industry?
- What actions are competitors likely to take and what is the best way to respond
- How will my industry evolve?
- How can my firm be best positioned to compete in the long run?

There are many views as to the exact meaning of the term Competitive Intelligence. Wright & Pickton (1998) differentiated between competit**ive** intelligence and competit**or** intelligence when they argued that competit**ive** Intelligence is the value that is added to the strategic

decision making process through the gathering and analysing of information, while competit**or** **i**ntelligence is the name given to information gathered relating to actual competitors. Here, we are using CI as the collective term for the *'activity of monitoring the competitive landscape in general and competitors in particular'*. McGonagle & Vella (2002) identified four distinct categories of CI: strategic, tactical, technology and target. The characteristics of each are given in Table 2.

McGonagle & Vella (2002) point out that, among others, two critical elements exist in all four orientations: 1) common sources of raw date and 2) a common set of tools and approaches employed to aid the understanding and interpretation of the raw data.

Type	Typical Pharmaceutical Sector Use
Strategy orientated CI	Providing insight into high level decisions on current and future strategy, external sense-making, patent tracking, future product decisions, sector commitment analysis, nurturing of M&A candidates, strategic alliances and joint venture partners
Tactics orientated CI	Focuses on current activities and near-term plans in the market place, not too distant a cousin of marketing intelligence or market research but more orientated toward the B2B environment, assessing sales support needs, testing of product linkages, improving service levels
Technology orientated CI	Potential for exploitation of opportunities resulting from scientific and technical changes to production processes and drug delivery methods, highly relevant where R&D and technological innovation is a key industry driver and a main source competitive advantage. Technology orientated CI in the pharmaceutical sector is key to delivering high returns from an efficient and efficient R&D effort
Target orientated CI	Typically looked at a named set of competitors, assesses their competencies, current and likely future activities, commitment to market segments, tracks patent applications and expiries, engages in game theory, scenarios planning and "what if" analyses

Table 2 - Four categories of CI practice

As one of the most competitive sectors in the European economy, with an output value of €160 billion, an export value of €95 billion, a trade balance in excess of €30 billion and responsible for between 580,000 and 600,000 jobs (European Commission 2005), it might be a reasonable expectation that the pharmaceutical industry would be fully aware of all the competitive forces around it and have proven processes and procedures whereby information on their competitors can be transcribed into meaningful intelligence.

More specifically, by introducing CI procedures, pharmaceutical firms can significantly improve their ability to predict and react to:

- changes in competitor portfolios
- competitor R&D investments
- clinical trial and patent applications
- M&A activity that could pose a threat
- positioning of competitive drugs
- sales policies adopted by medical representatives to major buyers
- shifting sales structures of competitors
- changing commercial priorities
- potential impact of upcoming competing drug launches
- potential legal pitfalls on own and competing drug launches
- impact of legislative changes in the global health sector

Canongia *et al* (2004) argues that CI, if implemented and used correctly, can confer on the company a high degree of 'technological foresight'. This is an important factor as it ties in neatly with the concept of innovation and many theorists believe that to be the only force capable of creating appreciable changes in the market. Canongia *et al* (2004) also re-states the opinion that the pharmaceutical industry is one driven by innovation and technological advancement in pursuit of competitive advantage.

The literature available on the application of CI in the pharmaceutical industry is somewhat limited although Lichtenthaler (2003) did examine technology intelligence processes. A major conclusion therefore, is that the literature does not address the practicalities of CI in terms of the sources used, the type of individuals who are engaged in CI, the departmental structure, or the levels of communication between other departments.

Table 3 presents an analysis of scholarly literature using "intelligence" as the first filter, then three sub-filters: "pharma", "R&D", and "science". Short magazine articles, text books and duplicates have been removed. The source for this search was the bibliography and categorisation of key CI scholarship produced in four parts by Dishman *et al* (2003), Fleisher *et al* (2003), Knip *et al* (2003) and Fleisher *et al* (2007). Table 4 presents the primary focus and authors of the articles identified.

	Pharma	*R&D*	*Science*	*Total*
Up to 1989	2 (a)	5 (b)	4 (c)	11
1990-1996	6 (d)	5 (e)	7 (f)	18
1997-2003	3 (g)	3 (h)	2 (i)	8
2003-2006	3 (j)	0	3 (k)	6
				43

Table 3 - Scholarly literature analysis

	Primary Focus	Authors
(a)	Patents as a forecasting tool	Mlodzik (1979)
	Bibliometric analysis of US research	Narin & Rozek (1988)
(b)	Patents and R&D	Pakes & Griliches (1980)
	Industrial R&D Practice in Japan	Mansfield (1988)
	R&D evaluation	Krogh *et al* (1988)
	Japanese R&D in the US	Herbert (1989)
	Information Specialists in R&D	Walton, Dismukes & Browning (1989)
(c)	Foreign Patenting	Soete & Wyatt (1983)
	Co-Citation Analysis Part 1	Small & Greenlee (1985a)
	Co-Citation Analysis Part 2	Small & Greenlee (1985b)
	Proprietary law in biotech research	Eisenberg (1987)
(d)	R&D Philosophy	Halliday, Walker & Lumley (1992)
	Patent based citation analysis	Smith & Narin (1993)
	Competitive analysis	McNair & Liebfried (1993)
	CI practice in UK pharma	Desai & Bawden (1993a)
	Role of the information professional	Desai & Bawden (1993b)
	Patent analysis	Steele (1994)
(e)	Assessing R&D capability	Klavans & Simon (1990)
	Technology fusion and new R&D	Kodama (1992)
	Scientific CI in R&D decision making	Krol, Coleman & Bryant (1996)
	Foreign R&D in the US	Serapio & Dalton (1993)
	Using R&D to manage competitors	Keiser (1994)
(f)	S&T indicators in strategic planning	van der Eerden & Saelens (1991)
	Monitoring S&T development	Ashton, Kinsey & Gunn Jr(1991)
	S&T scouting	Bodelle & Jablon (1993)
	Monitoring S&T for CI	Ashton, Johnson & Stacey (1994)
	S&T evolution	Mort (1994)
	Scientific openness vs secrecy	McMillan, Klavans & Hamilton III (1995)
	Competitive S&T intelligence	Albagli, Dawson & Hasnain (1996)
(g)	Information resources	Mullen, Blunck & Moller (1997)
	Lack of competitor intelligence	Gilad & Smith (1998)
	Bibliometrics to measure knowledge	McMillan & Hamilton III. (2000a)
(h)	Assessing an industry's R&D	Breitzman (2000)
	Management of Scientific Information	McMillan & Hamilton III (2000b)
	Assessing mergers via patent analysis	Breitzman, Thomas & Cheney (2002)
(i)	S&T Mapping	Kopcsa & Schiebel (1998)
	Science of business intelligence	O'Guin & Ogilvie (2001)
(j)	Stakeholder issues in biopharma	Nystrom & Lalanyee (2003)
	CI practice in South African pharma	Muller (2004)
	CI and decision making in pharma	Badr, Madden & Wright (2006)
(k)	S&T capability	Lane & Klavans (2005)
	Tools for IS&T analysis	Fleisher (2006)
	Managing S&T intelligence	Savioz & Sugasawa (2006)

Table 4 - Primary focus of the article and citation

The work of Desai & Bawden (1993a) looked at the application of CI in UK pharmaceutical firms. Their small scale study of 10 firms focused on the provision of CI within their sample and in particular the role of the CI professional. Their results indicated that 5 firms located the activity within the R&D function, 2 in Finance, 1 in Intellectual Property and 1 in Medical and Human Health Divisions. Interestingly, only 1 company indicated that they had a dedicated CI unit. With regard to staff, 6 of the respondents indicated that they had specialist CI staff, while the remaining 4 had a variety of staff from different disciplines who undertook CI activity, as and when required. Of the 4 which didn't have specialist staff, only 1 indicated that their firm would like to have specialist CI staff in the future. The types of sources used included sales figures, product portfolios, R&D portfolios, market information, company information and press sources.

Objectives and Methodology

The conclusion to be reached from the previous discussion is that there is an obvious gap in the body of knowledge regarding the opinions and practices of CI in the pharmaceutical Industry. While the literature indicates that the industry does use CI and that it is effective, there is little evidence which describe the exact practices which occur. Therefore, this study aimed to identify the current status of CI in the UK Pharmaceutical Industry and was formulated around the following objectives:

1) To identify the current status of CI activity in the industry
2) To identify the type of individual who is responsible for carrying out CI activities, including academic and employment background
3) To identify the most commonly used sources of CI in the industry
4) To identify the tools and techniques used to analyse CI
5) To examine the views of senior managers towards the practice and benefits of CI
6) To assess the impact of CI on other functional business departments

Population Identification

All UK pharmaceutical companies were identified using the FAME database and the SIC codes for 'research and development of pharmaceutical products' (Code 73.0) and 'manufacturing of pharmaceutical products' Code (24.4) as identifiers. From an original sample of 508 companies, filters were applied to remove subsidiaries of other firms. Several updates were run, the final one being immediately prior to despatch of the survey instrument and this revealed that 59 firms had ceased to trade.

Sample Size

A qualified sample of 196 firms constituted was identified. All firms listed contact details for the Marketing function and in a desire to have a common sample and a greater chance of the individual being both aware of the organisation's competitive activities, this contact level was selected. Following a reminder, a total of 53 questionnaires were received which represented an acceptable response rate of 23 per cent.

The characteristics of responding firms are given in Table 5

Turnover	*n*
< £1 billion	31
£501m - £1bn	4
£251m - £500m	0
£101m - 250m	3
< £100m	15
Total	53

Employees	*n*
> 1000	30
501 - 1000	10
251 - 500	2
100- 25-	7
<100	4
	53

Table 5 - Characteristics of responding firms

Survey Instrument

A self completion, structured questionnaires of 24 items was administered to the sample size.

Ideally, this method would be combined with ethnography so that the researcher could actually spend time with the managers who carry out CI activities. The benefits of this approach would be that the researcher could get insight into the beliefs, opinions and capabilities of CI managers from their point of view as well as observe the relationship between CI and other business functions. It was not anticipated that managers would not agree to this and the constraints of the study did not permit such an approach.

A contact list of all the pharmaceutical companies in the UK was obtained using the FAME database using SIC code for 'research and development of pharmaceutical products' and 'manufacturing of pharmaceutical products' as identifiers. This first returned a sample of 508 companies. The necessary vetting process revealed that several entries were subsidiaries of other companies with identical trading addresses, and the update showed that 59 had ceased to trade. Consequently, 196 firms constituted the final sample. Whilst all firms had contact details from CEO level down, each company showed contact details for the Marketing Executive. It was then deemed desirable to take a common sample of such executives. It was also thought that such an individual would have a greater chance of being aware of the organisation's competitive activities and would at least be interested in participating.

Despite response rates for postal questionnaires usually being low, the sensitivity of the research topic suggested that this method of enquiry, with the promise of anonymity if desired, would provide respondents with a level of comfort they might need in encourage them to disclose their views.

The questionnaire was 'structured' in nature and consisted of 24 questions, 23 of which were 'closed' with the respondent choosing between possible answers using a Likhert scale. One question was 'open' where the respondent was free to respond in their own words (Wright & Crimp 2000). Questions 1-3 focused on providing a general overview of the organisations CI activities in terms of the name they actually gave to the process.

Questions 4-8 focused on the type of individual who usually carried out CI activities. The questions included enquiring about their current and previous job titles, special areas, length of time involved in CI and their CI training record. The purpose of these questions was to identify if there was a typical profile of the CI individual. As the pharmaceutical industry is

wholly dependant on R&D it was important to determine if these individuals are more likely to be involved in CI activities as opposed to the traditional view of CI being integrated into the wider business function.

Questions 9-15 focused on the practical aspects of CI and related to the acquisition, accessibility, storage and dissemination of CI as demonstrated in the CI cycle. Questions 16 – 19 related to the attitudes and contributions of other individuals in the organisation to the CI process from senior management level to other functional levels. Questions 18-23 aimed to classify the company by size to help facilitate the analysis of results and draw comparisons between large, medium and small scale organisations.

The final open question, asked respondents to give their personal opinions as to the future development of CI in the UK pharmaceutical industry. At the conclusion of each questionnaire, respondents were asked if they would be willing to take part in a 10 minute telephone interview. The aim of this was to capitalise on those respondents who wished to expand on their views thereby adding greater depth to the results. Respondents were also offered an executive summary of the results. Each questionnaire was accompanied by a cover letter which explained who the researcher was and the purpose of the research.

Questions 1, 2, 7, 9, 10, 11, 12, 13 and 14 were adapted from Badr (2003) and questions 16, 17 and 19 were adapted from Wright *et al* (2002)

Three copies of the questionnaire were sent to the 196 firms identified as a relevant sample. Following a reminder, a total of 53 questionnaires were received which represented an acceptable response rate of 23 per cent. In depth telephone interviews were carried out with those who had indicated a willingness to take part. Telephone interviewing was preferred due to time constraints for both parties and the geographical location of the willing respondents. The interviews were semi-structured in nature where a list of topic areas was prepared beforehand in order to direct the flow of the conversation but the respondents were allowed to develop their ideas and speak widely on issues of interest. This approach was successful as the event proved comfortable for both the interviewee and the researcher.

Headline findings

The key findings from this study are given in Table 6 below and the links between questions asked and the objectives of the study are also provided.

Objective	*Element*	*Common Response Given*	*%*
1	Name given to intelligence gathering activities	Competitive intelligence	47.2%
1	Current status of CI in your organization	Intend to develop separate CI function	37.7%
1	Longevity of carrying out CI	Between 5-7 years	30.2%
1	Reason for practicing CI	Industry awareness	90.6%
2	Current job title	Marketing manager	28.3%
2	Previous position and employer	R&D manager with the same firm	34.0%

2	Specialist area of expertise	Science	45.3%
2	Formal Training in CI	None	49.1%
2	CI education	Personal reading	60.4%
3	Sources used for CI - positive	Customers (sometimes)	49.1%
3	Sources used for CI - negative	Consultants (rarely)	39.6%
4	Analytical techniques used - positive	SWOT (often)	34.0%
4	Analytical techniques used - negative	War games/role playing (never)	67.9%
5	Senior managers' views of CI - positive	CI is an essential input to SDM	83.0%
5	Senior managers' views of CI - negative	CI makes little measurable contribution	56.6%
6	View of other departments towards CI - positive	CI was good for the company's situation	58.5%
6	View of other departments towards CI - negative	CI incurs more work for us	47.2%

Table 6 - Key findings and relationship to objectives

Conclusions

In linking back to the original research objectives it can be seen that the current state of CI practice is fragmented and embryonic. The background and experience of those practicing CI comes largely from marketing, IT, technology and R&D. The sources and analytical tools most used by practitioners were customers, suppliers and distributors. Least often used were consultants and social contacts. In terms of analysis, SWOT dominated. Close behind was nothing more sophisticated than CSF analysis, competitor profiling and financial analysis. Finally, the views of both senior management and other departments of the contribution which CI made to the firm's overall progress were mixed. Most commonly, respondents thought that other departments accepted CI was of good use to the company's situation, but a significant number reported that other departments believed that the practice of CI only incurred more work for them.

It is clear that until and unless, all functions within the firm learn to co-operate, cross-fertilise and engage in collaborative learning, a fully fledged CI function will struggle to emerge. It is about understanding what CI activity in an R&D driven environment can do for the firm and appreciating the contribution which intelligence can bring to the decision making table.

It is also about capitalising on all the many sources of human and technical intelligence residing within the firm and actively managing this for the common good. CI is an activity that has been embraced wholeheartedly by other key industries such as consumer goods, telecommunications, engineering and even service industries. From the evidence of this study it is quite amazing that pharmaceutical firms, given their devotion to technological advancement and absolute requirement to capitalise on knowledge, are lagging behind in the achievement of full integration of scientific and management objectives.

It is just possible that big pharma may not be quite as "intelligent" as many of its observers would like to think. Maybe the industry is falling into the trap of actually believing its own publicity, thinking that the super-charged world they live in is reality, and that the industry is indestructible. Time will tell, but with the economic pressures which are to be faced in 2009 and beyond, it would certainly be wise for pharmaceutical firms to put as much effort into developing a sophisticated and robust approach to its intellectual assets as it does to its brand and fixed assets.

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