

Case summary

The primary objectives of the project are twofold: to develop a comprehensive overview over the installed base of healthcare IT systems in acute/general hospitals (excluding long stay psychiatric or geriatric) by major segments as defined in Europe at a level of detail that cannot be satisfied by currently available secondary data or market intelligence; to assess the future development of healthcare IT in hospitals. The primary objectives are fulfilled by: Mapping supplier application profiles, mapping hospital application profiles, assessing progress towards eHealth, and identifying practical transition steps. Overall, the information supplied by this project shall enable strategic planning for Marketing and Sales functions of leading suppliers of healthcare IT systems and related services by supplying in-depth information on the current situation, which in conjunction with the data on future developments will allow accurate projections for the market potential at segment level and in connection with in-house sales data for own sales in the short to medium term future.

Background and Objectives

Objectives

The purpose of the study was to measure the current and future use of ICT and issues surrounding ICT deployment in acute/general hospitals in Western (WE) and Eastern Europe (EE), and some countries in the Middle East (ME) and Africa (AF).

Background Information

One of the main eEurope initiative targets set by the European Commission was to set up a 'World Class' market information service to meet the needs of participants (users or suppliers) in the market for healthcare ICT. The Commission DG Information Society has accepted joint proposals from Deloitte working with Silicon Bridge Research and data information intelligence to develop such a service, to be known as Health Information Network Europe (HINE).

Although the eHC targets primarily at healthcare related industries, it is also intended to inform and assist strategic planning and investment decisions for public authorities, payers, healthcare providers, health professionals, citizens, patient groups and other healthcare stakeholders. The main intention was to be the premier European source of market information for healthcare IT, help senior executives to anticipate and understand healthcare industry changes and enable meaningful comparison between European and other global eHealth markets.

Type of activity

- [x] Measuring eHealth / ICT availability and use
- [x] Measuring attitudes towards eHealth and eHealth use
- [x] Data gathering with the aim of eHealth market sizing
- [] Evaluation of an eHealth application / Service

The eHospital – Assessment of Current Healthcare IT Application Profiles and Future Outlook for eHealth in European Hospitals

Executing agency



Deloitte Belgium
(<http://www.hineurope.com>) in collaboration with dii GmbH (www.dii-healthcare.com)

Year of publication

Since 2004

Year(s) of available data

2004, 2005, 2006, 2007

Geographic coverage

All countries covered at least once:
Austria, Belgium, Bulgaria, Czech republic, Denmark, Estonia, Finland, France, Germany, Hungary, Israel, Italy, Latvia, Lithuania, Netherlands, Norway, Poland, Portugal, Romania, Russia, Spain, Saudi Arabia, South Africa, Sweden, Switzerland, Turkey, UAE, UK,

Further information

not yet available online

Budget

Budget in 2004: 900 Int in WE -	€ 135.000,-
Budget in 2005: 1000 Screener; 500 Int in EE -	€ 133.000,-
Budget in 2006: 789 Int in WE&ME -	€ 116.000,-
Budget in 2007: 315 Int. in EE, ME & AF -	€ 75.000,-

Main Actors

data information intelligence GmbH (dii)

Status: independent market research agency & consultancy

General Role: dii is a private, internationally active research and consulting company specialised in generating healthcare market data, delivering information for business solutions and providing market intelligence within the segments of Medical Imaging, Healthcare IT, Diagnostics and Medical Devices.

Role for the study: the dii team was responsible for the research design, the English master questionnaire development (in cooperation with HINE) and its translations, the fieldwork, data analysis and the reporting of the survey results.

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Health Information Network Europe (HINE)

Status: An independent Health Information Network comprising different subscribers / sponsors, "HINE" emerged from a co-operation of Deloitte and Silicon Bridge Research.

General Role: HINE is assisting its subscribers in fostering eHealth roll-out by means of one stop access to key eHealth information. In this respect, HINE provides neutral strategic and business insights into the European and worldwide market under the supervision of the HINE Governing Board of the subscribers.

Role for the study: HINE was the ordering customer of the eHC between 2004 and 2007.

Implementation

Data gathering approach

All data were gathered by means of a standardised questionnaire implemented in a specifically designed CATI system in order to allow for telephone interviewing, accurate quality control and efficient project management.

The questionnaire was slightly adapted each year (e.g. the scope of functionalities covered was expanded from 15 to 25) and consisted of a variety of open and closed questions, ratings, multiple choice, etc. (see annex for latest version).

All in all, more than 3,000 interviews with acute hospitals were realized in 36 countries worldwide.

The interviewing process was prepared by country specific background research to determine the universe (i.e. number of hospitals) and information such as system and functionality definitions and healthcare IT system supplier information.

Sampling and fieldwork

The universe consisted of acute hospitals in the respective countries. In larger countries the universe was restricted to acute hospitals with more than 100 beds, in smaller countries the cut-off by size varies.

The target respondent within the hospital were the Chief Information Officers (CIOs), alternatively IT Managers or IT Administrators.

Universe data has been compiled from secondary sources and the dii database. Based on these data, a representative (where possible statistically relevant) random sample of institutions was drawn from the universe with a quota on region and stratified by size (2 to 3 size segments according to the number of beds) and ownership (public, private-for-profit, non-profit).

The sampling was developed by dii and authorised by HINE; the fieldwork was largely conducted by dii team members and only in some cases by external market research agencies (e.g. in PT, TR, SA) under stringent quality control of each interview by dii.

An average response rate of 1:5 (1 interview out of 5 contacts) was achieved ranging between 1:2 in Nordic countries and 1:20 in UK. All interviews were collected via phone and entered into a custom programmed CATI mask, allowing easy access for quality control purposes, analytical evaluation and supplier check.

Sampling and fieldwork practice including quality control guidelines have been adequately updated from year to year taking experiences and improved universe data availability into consideration.

Timing

The timing varied each year, but generally the projects were commissioned around June/July and completed by the end of the year.

On average, questionnaire development and adoption (always in co-operation with HINE and its subscribers) took up to two weeks.

The entire project set up never exceeded two weeks for CATI programming, questionnaire translations and sampling preparation (contact management and desk research).

The actual amount of time per interview (from recruitment to quality control) was 4 hours on average. The entire fieldwork ranged between 6 to 10 weeks depending on the amount of interviews and countries.

The analysis and report writing was processed within a maximum of 3 days per country, following an initial set-up of 5 days for the first country.

Analysis and Reporting

Due to stratification by size and ownership the sample was self weighting.

The research data is analysed by means of statistical software (Stata) and Excel spreadsheets. Detailed tables are developed according to segmentation and research topic; key findings are visualised by charts.

To allow meaningful interpretation, the findings from primary research are projected onto the universe at segment level. Then, the projections are added up to receive a total.

To allow for judgement of data reliability, the numbers of relevant responses are shown for each assessment topic at segment level.

In the past, results have been published in detailed Excel and Word reports per country and are available through a subscription with HINE. In the future, results will be published at aggregated European level, country level and also at the level of selected assessment topics (e.g. by functionality such as PAS, RIS/PACS, EPR, influencing factors on ICT deployment, IT budgets, etc.), but only in Excel format (including explanations, interpretation aids, etc.).

Results will be available through dii, HIT.net and COCIR.

Evaluation of implementation aspects

Quality Criteria	Score	Explanation
1. Relevance and transferability		
"The indicators clearly refer to eHealth."	●●●●	The survey is exclusively covering topics related to ICT deployment in acute hospitals.
"The indicators cover the respective issues/topics in sufficient depth."	●●●●	Research depth was determined in cooperation with HINE and the industry.

"The indicators allow regular measurement in the same context in the future".	●●●●	The survey has already been conducted over a period of 4 years and twice in 11 countries.
"The indicators can be applied to a different national context."	●●●●	The survey has already been conducted in 36 countries.
2. Accessibility of information		
"The publication of the study presents enough methodological information to enable the reader to judge its validity. (i.e. information on sample size, weighting etc.)"	●●●●	8 pages introduction covering Objectives, Methodology, Segmentation and Research Topics, Base and Respondent Populations, Definitions, Report Structure and Data Reliability Sub-sample size per assessment topic / question
"The research results have been published in English"	●●●●	Only available in English
3. Validity of measurement		
"The concept of eHealth used by the study is clearly expressed and therefore understandable for a variety of survey respondents."	●●●●	Ambiguous terms such as "eHealth" or "HIS" were not mentioned in the questionnaire so as to avoid respondents' individual interpretations of such terms. Instead, terms and definitions were developed that refer to concrete eHealth applications and use cases.
"The operationalisation of the indicators has been validated before use."	●●●●	Questionnaire development included multiple discussion sessions with eHealth experts from HINE and Silicon Bridge as well as HINE subscribers. The draft questionnaire was tested in pilot interviews in selected countries in 2004 as part of the regular fieldwork and necessary modifications were integrated into the English Master Questionnaire. Based on the outcomes of the first census in 2004 and increasing information needs, the English Master Questionnaire was expanded in 2005 and only slightly modified thereafter.
"The likelihood of social desirability bias/context bias is avoided as much as possible"	○●●●	Context bias is unlikely due to the nature of the questions, and impacts of social desirability bias were attempted to be eliminated by providing definitions. However, some social desirability bias may have occurred for the availability of certain software functionalities. E.g. Spanish respondents perceived their hospital intranets as "dedicated decision support systems".
"In the case of a multinational study: appropriate translation procedures of survey instruments are used."	●●●●	The Final English Master Questionnaire was translated by dii into the local language spoken, except for NL and some Nordic countries, where English is well accepted and understood. As a next step for quality assurance, the translated questionnaire versions were back-checked by native interviewers. Suggestions and amendments to the translations were made (if necessary). The final translated questionnaire versions in the countries surveyed can be provided as Word documents.
"The instrument follows the general rules for questionnaire design:" Question wording: simple, unambiguous, defining unclear terms Question wording: single stimuli Question wording: factual, not hypothetic Question wording: clear time and actor reference Question wording: neutral, not suggestive Question content: respondent has necessary knowledge and information in order to answer the questions	●●●●	No particular deviations from these rules were found in the instrument

Population validity

Sampling frame quality: The definition of the universe has been based on intensive efforts since the beginning in order to accurately set sampling targets and ensure accurate reflection of market realities.

However, since address sets offered by market leading database providers and official statistics were not found to offer the expected quality and reliability, an internal database was developed based on a screening and classification process of all hospitals in most countries under review. A specific sample building tool was developed only for this purpose.

As a result, the eHC universe calculations have been adapted to the newest data available each year.

High sampling frame quality can hence be assumed and is improving further.

Data collection quality: High internal quality control standards are applied to the eHC: each interview transcript is undergoing quality control by specially trained team members, ensuring high completion rates, translation, plausibility and comprehensiveness of open responses, etc.

Special care was given to the proof of existence of suppliers, correct spelling of their names and cross-checking against their product portfolio.

In addition, the specifically programmed CATI (incl. e.g. skip patterns, plausibility checks, interviewer prompts, definitions, etc.) contributes to the high quality of data.

Non-response rate documentation: Deviations from (or rather compliance with) the sampling frame is documented by Project Management in tables comparing target and actual sample at sub-segment level.

Non-responses are documented by showing the number of valid responses (N) for each assessment topic / question. However, N smaller than the sample do not necessarily mean non-responses, since a question or assessment topic may simply not apply to a respondent. Thus, Missings are differentiated from Not applicable and Don't Know.

Respondent load

The average length of an interview is 40 minutes. Depending on the level of development within the area of IT interviews took between 15 minutes and up to 1.5 hours. The burden for the IT responsible within the hospital imposed by the actual interviewing time can be considered as medium to high.

Conclusions and learning points

From the point of view of the ordering customer / funding organisation

Strengths

The eHospital Census is a leading-edge market research activity in the eHealth field in Europe, and was the first one to be conducted with this level of quality and geographical coverage. It offers the means to develop an objective and unbiased source of installed-base and plan for investment information captured at the hospital side. Its results are used largely by HINE subscribers (major industry players) and reported as the best source in Europe.

Weaknesses

The eHospital Census demonstrated its uniqueness across Europe and was up to now unchallenged. Although not to be recorded as a weakness, we could think to switch to a more

Census-type activity gathered on a continuous manner and therefore allowing easy comparison and benchmark year-after-year.

Facilitators

Rather than relying on questionable and un-harmonised product categories, the eHospital Census was built based on process and assessing their respective level of automatisation. Also, each assessed process was well defined.

Constraints

When the eHospital Census activity expands its scope to emerging market such as Eastern Europe and Middle East countries, it was hard to capture the relative market maturity and to compare. Although development might be very different, end-users might report similar level of developments. Although the research method demonstrates already a level of sophistication, we could think to assess level of usage.

Usefulness of Activity

Reliable market data is the fundamental basis for every planning decision across the healthcare IT industry.

The hospital IT market is constantly changing and therefore tracking and tracing its evolution is crucial for the industry as well as for policy makers and procurers.

The HINE project (Deloitte Belgium in collaboration with DII) delivers data, based on customer oriented market research.

From the point of view of the implementing organisation

Strengths

The survey provides a comprehensive overview over the installed base, future use and surrounding issues of healthcare ICT by major acute hospital segments at a level of detail that cannot be satisfied by available secondary data or market reports. The information is comparable across the countries covered. The concept was developed from the start with the aim of regular updates.

The concept of "eHospital" was operationalized in a way to cover concrete ICT applications and ICT use cases in a way that is in line with the daily practice and experiences of CIOs and IT managers. This process was strengthened by expert support.

Despite the fact that the survey addressed a narrowly defined and difficult to reach target group, a relatively high share of the universe and posed a medium to high burden on respondents, the field work was carried out with great success at high quality. As a result, on average 40% of respondents participated in the first repetition round.

Weaknesses

By its very nature, the survey covered only acute hospitals. The wider eHealth arena, however, comprises a large number of further actors that also often interact electronically (e.g. through patient data exchange) that remained uncovered by the survey.

Some of the eHealth applications covered by the survey (e.g. ePrescribing, BPR, BI) are currently not used to a large extent. For this reason, response rates on questions dealing with such applications tend to be very low and results are not very reliable.

The existence of precursor survey(s) allows for an analysis over time of applications and selected indicators in order to throw some light at eHospital developments in the past. However, due to changes in underlying concepts and a more diversified understanding of eHospital applications, some comparisons are difficult and must be treated with caution. For example, the comparison of data from 2004 and 2006 for Knowledge Support Systems shows a clear decrease, which is not actually the case, but attributable to a clearer understanding of what a "dedicated Knowledge Support System" actually is.

Facilitators

Extensive project preparation and continuous close Project Management supported by a dedicated Project Team Leader ensures seamless workflows and availability of essential support (such as universe and sample development).

The cooperation with experts from HINE, Silicon Bridge, and leading companies in the ICT industry ensured market reality oriented operationalisation from the start.

The proper translation of the questionnaire into national languages is of key concern, in particular to ensure that technical terms were translated correctly.

The stringent application of internal quality control standards and conducting the vast majority of interviews centrally in-house ensures highest data quality.

Constraints

In some countries, the respondent target group seems to be "over-researched", i.e. covered by a large number of different surveys, or is even prohibited to participate (e.g. this was the case in the UK and in Czech Republic).

To a certain degree, interviews about ICT rely on the organisational knowledge (e.g. departmental structure, investment plans, budgets) of the respondent and a common understanding of technical terms. The necessary definition of terms used was a sometimes difficult and time-consuming task.

Learning points

The ability to perform the complete research process in-house and thus under direct control of one Project manager and one Quality Control team using one set of standards has a major impact on ensuring a homogenous quality level across countries. Experiences with the few external agencies involved in primary research varied greatly and so did the resulting data quality. In future, native speaking interviewers will rather be recruited and trained specifically for such projects (if not already available).

The active involvement of external experts from the early stages of the survey design on proofed to be a valuable help. Support from this side will also be searched in future activities.

In some countries, where ICT deployment is centrally governed, endorsement from official side helped motivating respondents to participate (e.g. in the UK). This may also help to reduce drop-out among "over-researched" respondents in other countries. A similar approach can be taken with regard to group structures.

The eHealth domain comprises a large number of different actors that often interact electronically (e.g. through patient data exchange). To get a better overview of the state-of-play in the domain, future activities should aim to directly cover as large a number of interacting actors as possible.

Insights into healthcare IT deployment and future plan for investments

Competitive positioning and market shares

Benchmarking across countries in Europe

The eHealth Benchmarking Study

The "eHealth Benchmarking" study is carried out by empirica on behalf of the European Commission, Information Society and Media Directorate-General. The study aims to collate and analyse existing eHealth monitoring and benchmarking sources in order to identify best practice in data gathering and to develop a framework for an EU-wide eHealth benchmarking activity. The intention is not only to help better understand eHealth progress but also to identify the main gaps, obstacles and barriers in relation to eHealth monitoring / benchmarking to be overcome in the next few years. In doing so, the study covers the Member States of the European Union, Norway, Iceland, Canada and the United States.

The benchmarking sources were identified by means of a combination of different research methods, including a survey among the experts of the EEA Working Group on Information Society statistics, desk research on sources of eHealth data and measurements on a supranational and European level, and research on the national level carried out by a network of national correspondents.

More information on the study is available online at <http://www.ehealth-benchmarking.eu/> or from the project coordinator:



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Authorship

This case was written by the case owner organisation.

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