The Story of DSI-TEKST: The First Software Package Which Integrated Word Processing, Database and Report Generator - in Denmark and Maybe in the Whole World

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The first Software Package which Integrated Word Processing, Database and Report Generator
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Abstract. DSI-TEKST was the first totally integrated program with word processing, a database and a report generator in Denmark - and perhaps the world. It was intuitive, very easy to operate and fast. New users could with minimal instruction figure out how to use it and also to build solutions in it. It was a pioneering effort.
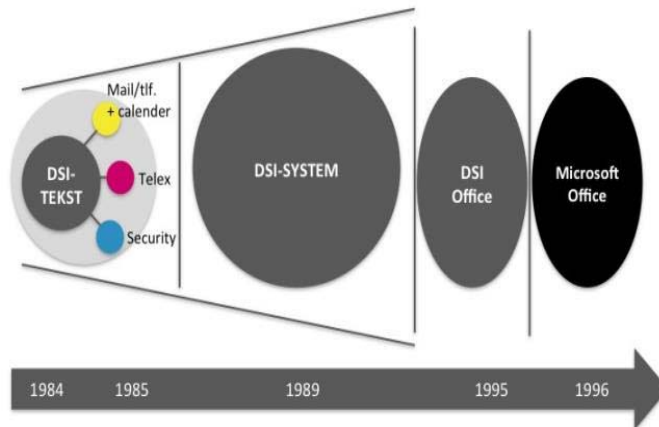
1   DSI-TEKST -- a Success Story

The DSI company, established by me in 1980, still exists, though it has changed its name a few times from Dansk System Industri (DSI) to DSI-DATA and now DSI-NEXT. It is located at the same address in Kokkedal North of Copenhagen and has 45 employees just as we had in 1994. A good business was created with a wide range of jobs.

DSI applications are still running at many places, and even today I often meet people who have been happy users of DSI-TEKST and praise it. DSI-TEKST and DSI-SYSTEM helped to make the users of public institutions IT competent early, and thereby helped to decentralize IT routines.

DSI-TEKST and DSI-SYSTEM were born with word processing, a database and a report generator. Very soon we integrated telex, a telephone directory, calendar, e-mail, and soon an identity and access control that was approved by the Danish Data Protection Office were added.

When DSI-TEKST was launched in October 1984, there were many other suppliers of word processing programs and databases in the Danish market, but there were none with the integration of features like DSI- TEKST.

Fig. 1. DSI-TEKST evolved from a small and light system to a large and easy system, DSI-SYSTEM, an extensive development of DSI-TEKST. DSI-SYSTEM had significantly more options and programming facilities. After Microsoft in 1998 captured the market, DSI went on to develop solutions in Microsoft Windows and Oracle.

1.1 My Background

I became MSc 1965 in chemistry from the Technical University of Denmark and had in 1984, when DSI-TEKST was born, already worked 19 years in the IT industry as:

─ 1965 Systems developer and consulting engineer in Christian Rovsing A/S. Developed, *e.g.*, an economy system for Medical Laboratory on an IBM 1130.
─ 1971 Systems developer and project manager at PBC A/S (Co-designer and project manager of Payment Service - today "Nets")
─ 1975 Head of the administrative IT-group at DTU, which did payroll and accounting for several Danish universities on a RC4000 computer.

1.2 What is DSI?

In 1980 my husband Torben Pind and I founded two DSI companies. One of them manufactured shop fittings for the oil industry in Europe. It had sales office in Copenhagen and manufacturing in Jutland and was run by my husband. Torben Pind MSC Mechanical Engineering. With his business experience from several companies he was an invaluable chairman of our board.

The other DSI was an IT consultancy company run by me. We shared office in the center of Copenhagen. I did jobs introducing IT into companies without previous IT experience. My customers were The Danish Society of Engineers and Technical Publishing.. I selected the required hardware and software applications and was project

manager for the implementation.

In my spare time I programmed an economy system for our own DSI shopfitting company. We had an au- pair girl taking care of our children. She noticed, how busy I was in evenings, and proposed that I got help of her boyfriend, who was a programmer. That was Thomas Hejlsberg. I immediately contacted him. Life consists of coincidences. The trick is to see them and have courage to use them!

1.3   The idea to DSI-TEKST

Thomas Hejlsberg, 20 years old, was employed as a programmer at Rank Xerox. 1981-84 he worked for me as freelance programmer. He started by developing a data transmission program because he thought the Visi-Term program, which I was using, was not good enough. The program he developed we named DSI-TERM, and I sold it to my contacts at the Danish Technical University.

In 1984 Thomas Hejlsberg asked me if I would finance him to develop a database program he had begun working on, and then sell it through my company. I was immediately interested, because I had seen what a brilliant programmer Thomas Hejlsberg was. He had the ability, just by seeing a program in operation, to make a similar program but in a better version. My condition for the project was, that the program in addition to database should include word processing because I was convinced that this would attract customers.

1.4   Decision for DSI-TEKST

My husbond and I decided to let our DSI shopfitting company fund the project, which we called DSI-TEKST. It should integrate word processing, a database, and a report generator.

Thomas Hejlsberg began to develop DSI-TEKST in Pascal under the operating system CP/M on a Compaq PC that was IBM compatible. IBM had just introduced their PC and, during the summer 1984, it became evident to us that DOS would be the next operating system. We therefore decided to reprogram DSI-TEKST for DOS. Thomas Hejlsberg developed the program at night working for Rank Xerox in the daytime and I wrote the user guide in the daytime - also on a Compaq.

2   First Presentation of DSI-TEKST October 1984

At the Office & Data exhibition in October 1984 in Bella Center, I presented DSI-TEKST for the first time and I sold the first program to a Time Share company in

Skagen. They soon made a complete booking system in DSI-TEKST for their time share apartments. That quite complex system was in operation already in December 1984. Thomas Hejlsberg made a couple of quick fixes - but there were NO serious errors.

2.1   DSI-TEKST - simple, easy and very fast

The user was guided through the program by an easy navigable menu on the bottom line of the screen. The menus were easily manageable, because they changed depending on the most relevant choices in the current situation in the program. The control key F1 displayed the menu bar and F5 showed relevant help - dependent on where the user was in the program.

Key combinations for auto functions were built-in, and the users could also define their own functions. Database items and standard data could be copied into the text. There was no limit to the length of documents. Processing of up to 10 documents simultaneously was possible as well as easy handling of blocks of text.

The database system had a freely definable directory structure with search keys and each item only used the minimum space.

Already in the first edition one could build solutions such as inventories, order confirmation, invoicing and sales letters and a booking systems. The system was very efficient for direct mail with selection of recipient addresses from the database.

2.2   The DSI-TEKST User Guide

After the successful presentation of DSI-TEKST it was important, that I used my time on marketing and sale. We were lucky to take on a friend of mine Andreas Hens, MA in history and English, to write the manual. Andreas Hens was one of the first Masters of Arts, who was employed in the IT sector. It was due to him that the DSI manual in various computer magazine tests was highly praised for its thoroughness and easy legibility. Andreas Hens was highly articulate and provided the manual with its relevant and amusing illustrations.

2.3   The first Major Customer

The first major customer was the Danish State Railways (DSB). On New Year's Eve 1984 I introduced DSI-TEKST to my friend, Nils Duval, who was employed in the Railway Department. He became immediately very enthusiastic about DSI-TEKST and could see many possibilities for its use in DSB.

DSB was thus the first customer to develop extensive solutions and paved the way for other state institutions. I sent many potential large government customers to Nils Duval so that he could demonstrate the possibilities of DSI-TEKST. Duval was em-

ployed by DSI in 1989 as a sales consultant and from 1991 as Sales Director.

2.4   Competition and Market Conditions

DSI was exposed to strong competition from both Danish and foreign word processing and database programs and was regularly subjected to detailed comparisons with other programs in the media, which made great demands on DSI to contain "all" features very quickly.

We competed with the Danish programs Dantekst, Aura Text, and IBM Text 3, and with the American WordStar, WordPerfect, DBase, Symphony, Lotus 1-2-3, Paradox, and later Open Access. All of those companies' products were single modules as opposed to DSI-TEKST, which was an integrated product. The competing programs were difficult to get acquainted with, because they started with a blank screen, and one had to learn a lot of key shortcuts.

Despite the fierce competition, only six months after DSI-TEKST came onto the market we achieved a market share of 16% of the Danish word processing market. The Danish financial daily paper Børsen tested the program in May 1985 and wrote "it is the best word processor we've tested."

3   DSI-TEKST Extensions

DSI-TEKST was especially under great pressure on the word processing side because the computer magazines constantly tested and drew up tables of comparisons showing details of all program features. DSI quickly issued versions with new features such as spell checking, a dictionary, and column totals in the report generator.

Texas Instruments A/S was the first computer supplier in Denmark to deliver their machines with DSI- TEKST as their only word processor, and we were on their stand at the Office & Data trade show in February 85 presenting DSI-TEKST version 2.

In April 1986 we added calculation and columns in the text, and in the database up to 90 fields per item shown on up to 10 display screens. In addition to all that a TELEX module and a MAIL module was created.

In those days a lot of communication was done through the telex system which in most countries was controlled and offered by the postal services. The telex machines were delivered and installed by the postal services, and contained control functions that allowed the sender to get feedback confirming the receipt of the message. A telex was thereby a fully legal documented sending and receiving. When one had sent a telex and received feedback on the receipt, that could be printed on the telex machine, one had proof that the document was delivered. It could be compared to a registered letter.

DSI 's telex module communicated through a box provided by the Postal Service.

This gave the advantage of advanced features to write letters and documents in DSI-TEKST instead of having to write directly on the keyboard of the telex machine where each character was sent as the key was pressed.

With DSI-TEKST documents could be prepared and corrected and then sent and stored, and the received documents could be stored and used in further communications. The module automatically handled sending and receiving with queuing and re-dial when necessary. Receiving and sending occurred in the background without interfering with other work. By merging with database components identical telexes could be sent to selected groups of customers.

Very early NETWORK facilities were included for communication within a company via local ethernet cables. It had record-locking, so that multiple users could simultaneously update in the same database.

A complete mail system for internal MAIL was developed. Right from the start it had functions allowing users to see and select recipients using the names of recipients from a recipients pool.

We developed interface to PolyDatas economy program Albatros, which made Albatros much more useful. Accounting data from Albatros could now be transferred to the user's DSI-TEKST database and processed in DSI-TEKST powerful report generator.

3.1 Departments of Program Development, Support, Sales and Education

The first 3 years we were in the premises of Shop System's office - four persons in the same room. In 1986 our Danish Shop Fitting company bought an additional apartment in the same block of flats, Kronprinsessegade 10 for our DSI-TEKST employees. In 1987 we were 6 persons and had to move to new leased premises in Kokkedal, North Zealand, because we needed to hire even more employees.

As DSI-TEKST became more widely used, demands grew both for training courses and hotline, and we set up large training rooms and a canteen for both staff and customers.

In addition to training courses and a free help desk support, agent- and business seminars were organized. On these occasions we presented new features and obtained feed-back in the form of both requests and constructive criticism.

Distribution of the package and program extensions and refinements was a laborious and very costly affair. There was a need for premises, equipment and staff to handle large volumes of manuals and floppy disks, and it was costly to convert any modification or renewal to the printed manual format.

When DSI-TEKST was launched programs were distributed on 5" floppy disks and with a comprehensive printed manual. The programs had from the start a built-in help, but the manuals were necessary to sell PC applications to a wider audience. Later the disk size changed to 3½" hard floppy disks.

The many printer drivers, which had to be developed and installed, was another very resource consuming task. More than 100 different printer drivers were developed and included in the DSI-SYSTEM.

DSI grew quickly after having moved to Kokkedal. Fortunately, as we grew, we were able to rent additional space in the premises we had chosen. In 1990 we were 45 staff, only 3 years after 6 people had moved there. This staff now covered the following functions: program development, sales, marketing, help desk support, printer drivers, consultancy, manual writing, customer training courses, production and distribution. In 1990 we extended with an office in Jutland.

3.2   Customer Concept

1.   DSI's customers were divided into two main types: agents and major customers. Agents were selling to private customers and were handled by the company PolyData A/S to which DSI had given distribution rights. Major customers were handled by DSI itself and we focused on: The Danish State Railways (DSB), the Military, the Ministry of Justice, including the courts and the police, the Danish State Information Service, The Ministery of Interior, the Refugee Agency, the Construction Mortgage Fund, BRF, the BST (The employees' health service) and other potentially large customers.

At an early stage customer seminars were arranged, and this collaboration evolved later to set up proper design groups to further develop the standard product. In addition to the large customers using the introduction of DSI-TEKST/SYSTEM to standardize all word processing, a need soon emerged for customers to organize the daily work in the systematic case handling routines.

On the database side a similar development was underway. From the start DSI-TEKST had included small filing systems that showed good examples for inventory control in various forms. Later, various large customers developed complex systems for journalizing, planning, comprehensive financial management, error statistics, inventory management, and staff & resource management.

PolyData stopped as distributor in 1990 and subsequently DSI sold through Esselte (150 stores), Damgaard Data (300 agents) and directly to its own distributors and large customers.

4   The DSI Philosophy

DSI-TEKST and DSI-SYSTEM were standard systems and therefore any development had to be directed to all kinds of users. Development in collaboration with major customers followed these guidelines: DSI received many requests, and after a rating, the various requests were given priority to the nearest small or to a later big update. An update was made approximately every six months. To cope with big customers'

relevant needs DSI-TEKST/SYSTEM was greatly expanded. Large customers were thrilled to use a standard program, the development of which they could influence, and so they ensured that everyone in the organization used the same program and that their solutions followed the latest updates of the program.

For example:

In cooperation with DSB it was organized such that the Rail Department handled the database and report generator development and the IT department was responsible for the development of facilities in the word processing system - but within the general standard model. The result was that the Rail Department over time developed a wide range of very powerful applications in DSI-SYSTEM which helped to prolong the life of the DSB's mainframe systems.

In cooperation with the DSB's renowned design director Jens Nielsen DSI participated in the preparation of a complete design manual on all written communication in DSB. Until then, they had a forest of "standards." When the DSI-SYSTEM made it possible to print on colour printers, DSB could totally eliminate preprinted letterheads.

If a customers request could not be included in the standard version, the customer was helped to build their own application program. The Police used DSI-TEKST to POLSYS, a complete planning system for all employees and for handling the management of resource allocation. The Courts of law used DSI-TEKST for an extensive journalizing system. The Danish military used DSI-TEKST in all internal procedures and planning tasks.

Børsens News Magazine March 1988 shows a statement from Expansion Marketing Bureau, that PC agents judged DSI to be the best software company in terms of product, service and training, and DSI-TEKST is rated as the second best word processing program - right after Word Perfect.

4.1 DSI-TEKST in decentralizing

Departments within DSB could, by using DSI-TEKST and DSI-SYSTEM, design requirement specifications for the reports they wanted to get from the database of the mainframe system. For a time the specifications were made this way. Later it was agreed where the dividing line should be drawn between the mainframe system and the PCs. In this way a significant prolongation of the mainframe system was obtained using DSI-TEKST/SYSTEM.

5   DSI-SYSTEM

DSI-SYSTEM, the successor to DSI-TEKST, was developed by reprogramming from scratch, which was very unusual for standard systems. It made the system very fast

and well organized. Normally new systems were developed by adding new features to its predecessor.

In DSI-TEKST one could from the start build quite big applications. But with DSI-SYSTEM, released in February 1989, it was possible to embed *real programming*, which allowed many additional opportunities and made it possible to build very complex applications.

DSI-SYSTEM included many more new facilities: The possibility of individual menus, generating content pages, indexing a document, head and foot notes as well as margin notes, variable number of lines per screen, date as a system field in the text, column blocks, a large Danish dictionary, print spooling from the system. It also included a real programmable relations database with free design of input screens. A very important new facility was that the user could *redefine the database* directory structure without losing data.

Prints could be formed completely free, printing of labels was standard. A master password was introduced preventing text from one installation to be read by others, and individual user passwords could be set for documents and files.

DSI-SYSTEM allowed recipients of electronic mails to be at another location using the DSI- SYSTEM. The messages were transmitted automatically via modem and telephone lines. The system examined whether the recipient was local or remote. The system was designed so that at the first contact with a remote location, the names of users at both locations were automatically exchanged, and at each location it could be controlled who could send and receive messages.

The computer magazine "Alt om Data" wrote in 1989 an article about DSI-SYSTEM, where they wrote "DSI-SYSTEM *is a Danish winner.* - It is sovereign on ease of use, data security and functionality".

Bent Mortensen in the Danish newspaper Politiken in a test in 1990 gave DSI-SYSTEM top marks, and declared that "DSI-SYSTEM is world-class software".

5.1 DSI-SYSTEM Extensions

DSI-SYSTEM continued to be based on DOS. In 1990 it was extended with a STATISTICS module, wide-ranging programming capabilities, integration with the spreadsheet program SuperCalc 51, import and export of Word Perfect documents, insertion of pictures and graphs in a document, and support for color printers. The statistics module could work on data from the database and optionally print them in

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[1] SuperCalc 5 was a spreadsheet program from Computer Associates A/S.

the XY matrix, bar graphs, etc. The magazine All about Data in the September issue 92 wrote "We are now seeing DSI-SYSTEM as a competitor to the database system Open Access."

Dictionaries in English and German could be purchased. A storage structure with Transaction Tracking (TTS2) ensured against data loss in case of power failure or deadlock

PC World wrote in July 1992 "DSI-SYSTEM is unique in the market, among other things including printing color graphics ".

5.2 Interface to Concorde

On strong requests from the agents of the economy management program Concorde from Damgaard Data A/S, DSI developed an interface to Concorde, which made Concorde much more useful. Accounting data from Concorde could now be transferred to the users DSI-SYSTEM database and processed in DSI-SYSTEMs report generator, which now included statistics. It thereby made the agents work much easier. DSI had earlier made interface to SuperCalc 5. With this strong cooperation of three software packages we had created the world´s strongest system concept for administrative data processing.

In September 1989 The Danish financial daily paper Børsen wrote "The combined software packages of DSI-SYSTEM, Concorde and SuperCalc5 will fulfill most companies IT requirements".

5.3 Security Module

As DSI-TEKST and DSI-SYSTEM were introduced in many public institutions where security was a major issue, DSI created a module DSI-VAGT that allowed full control of which persons should have permission to access the data on site. The function was fitted with a log facility showing by whom and when data was accessed, so one could keep a check on who had seen and used the information.
This was a functionality that only much later was introduced in the Windows operat-

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[2] TTS was used to secure data consistens in multiuser systems. One could lock the database, so no other could update at the same time.

ing system. DSI-VAGTs features already at this time fulfilled The Danish Data Protection Agency's requirements for data security!

6   Application Development

Over time a large number of well-functioning applications in both DSI-TEKST and DSI-SYSTEM were developed.

Examples of applications developed by agents :
Real Estate Agent System: Membership Administration, Tenders, Building Maintenance, Booking system, Sales Management, Construction Management , Electronic job placement.

Examples of applications developed by customers :
Journal System for in and outgoing mail in DSB (centrally and locally, in over 25 locations), Inventory of central and decentralized units, Error Statistics Resource Management Journal systems, Construction Management and Rental system including an invoicing system, Time Management system for train drivers inclusive a payroll.

Examples of applications developed by DSI (in close cooperation with the customer :
BST (Employees' Health Service), a system for tracking the lending of appliances for centers for handicapped people, Electronic Medical Record, inventory system for a large public institution dental management system, systems for the administration in Danish with an advanced journal System, a staff scheduling system, including a payroll system for the police.

6.1   Translations into other Languages

Soon both the need and desire to distribute the program in other languages arose. This led to the translation of DSI-TEKST into Swedish, Norwegian, German, Spanish and English for export because international companies demanded programs that could be used in all countries. DSI-SYSTEM too was translated into Swedish, Norwegian, German, Spanish, British English and American English.

   It cost DSI many resources to translate the programs into foreign languages and we showed great willingness to take risks. We had *, e.g.*, a man stationed in the United States for two years in an attempt to enter the U.S. market. Unfortunately, we obtained no substantial sales in foreign markets in spite of the large investments.

6.2   The Turnover

To develop DSI-TEKST and DSI-SYSTEM required continually many man-years. In 1988 26 man-years was used to develop DSI-SYSTEM.

Table 1. The company grew rapidly the first 6-7 years

	Revenue (DKK)	Profit (DKK)	Numbers sold	Employees
1984				1
1985			1200	3
1986			1500	4
1987	13 mio		4000	6
1988	13 mio	0,5 mio	7000	24
1989	26 mio	2,5 mio	8000	45

Windows Edition. When Microsoft launched Windows in competition with Apple, it was quite obvious that there was a fundamental shift away from DOS on the way. Therefore DSI decided to develop a version of the DSI-SYSTEM in an icon-based application, which was launched in two modules in 1994 under the module names of DSI-TEXT and DSI-BASE. In spring 1995 they were combined under the name DSI-OFFICE.

The reason for the icon based windows was that Microsoft Windows at that time was without any security. Safety and traceability (logging) were basic demands of the Ministry of Justice and all other public institutions, and this requirement was not fulfilled by Microsoft Windows.

6.3   The Phasing out of DSI-TEKST and DSI SYSTEM

The major competitor for DSI-SYSTEM turned out to be Microsoft Windows and the Microsoft Office package.

In the fall of 1994 the Justice Department asked four potential suppliers: Lotus, WordPerfect, Microsoft Word and DSI to tender for a new system to replace the existing successful journal system running in DSI- SYSTEM. The solution should consist of a journal database and various structured case management activities in word processing.

DSI was the only company that fulfilled the requirements with its early version of the later standard DSI OFFICE (Icon-based Windows edition). The reason for this choice of DSI as the supplier was that DSI-SYSTEM supported the required security, which Microsoft Windows did not have at all.

The other suppliers did not address the task, but demonstrated their programs through show presentations. Microsoft had so much influence, that they succeeded at ministerial level to persuade the government of Denmark to switch to Microsoft Windows.

As a result the Danish State in 1995 chose Microsoft as the future platform for all government agencies, and the Ministry of Justice notified DSI that any future cooperation would be based on the Microsoft platform.

By this time, DSI had the choice between losing the public institutions or moving to the new platform. As DSI over the years had had a very good position, with corresponding competence, in many public institutions, DSI chose the latter and has continued to develop systems in Oracle and Microsoft to public customers. DSI realized this quite inevitable trend, and continued to employ the company´s skills on the Windows and the Oracle basis.

The many later invitations to tender based on EU procurement rules - rules demanded by public authorities which DSI had to follow - cost subsequently DSI many resources (read: millions of DKK) and the state many more millions for costly systems!

7   DSI - a Business which created new Jobs

DSI-TEKST and DSI -SYSTEM belonged in the DOS operating system domain, and with Apple's icon-based system and Microsoft's Windows operating system, the DOS-based systems were gradually phased out. This was of course not without problems for us, but such are conditions of all development, for better or for worse.

 DSI was greatly successful by launching two powerful integrated packages DSI-TEKST and DSI-SYSTEM. We managed to develop a very user-friendly integrated software package, which introduced electronic data processing as very useful in the daily workload in private companies and public institutions. It challenged the users to develop both simple and more complex applications.

DSI especially got much praise for the report generator, which allowed users to print readable and understandable reports. Many users were accustomed to input "endless amounts of data" - but few users had previously gained something from these data volumes. With DSI-TEKST / DSI-SYSTEM, it was possible to focus on results.

DSI-SYSTEM was from 1989 until about 2000 the most used integrated information system with word processor, database, report generator, electronic mail, calendar and security system with logging.

In 1994 I sold the company DSI A/S to FRONT-DATA A/S. They renamed the company first to DSI-DATA, later to DSI-NEXT. DSI-NEXT are still delivering DSI-SYSTEM for applications.

The DSI company has just passed its 30th birthday as a software company, it is still an active player in the IT market, and many IT people have been trained in DSI. DSI still has 45 employees and has the same address as we had right from the start: Kokkedal Industrivej 2, 2980 Kokkedal.

References

The material in this paper is based on:
- DSI Usermanuals, Brochures and Newsletters
- Magazine articles