

TO MAKE OR TO BUY?

SOURCING DECISIONS AT THE ZURICH CANTONAL BANK

Completed Research Paper

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Abstract

The case study describes the IT situation at Zurich Cantonal Bank around the turn of the millennium. Incapable to fulfill the company's strategic goals, it is shown how the legacy systems force the company into the decision to modify or to replace the old systems with standard software packages: to make or to buy? The case study introduces the bank's strategic goals and their importance for the three make or buy alternatives. All solutions are described in detail; however, the bank's decision is left open for students to decide. For a thorough analysis of the situation, the student is required to put himself in the position of the key decision maker at Zurich Cantonal Bank, calculating risks and balancing advantages and disadvantages of each solution. Six video interviews reveal further technical and interpersonal aspects of the decision-making process at the bank, as well as of the situation today.

Keywords: Make-or-Buy, Sourcing, IT strategy, Organizations, Banks

French Abstract

L'étude de cas décrit la situation à la banque cantonale de Zurich dans la fin de millénaire. Les systèmes patrimoniaux ont été incapable de remplir la stratégie d'entreprise en ayant astreint l'entreprise de modifier ou substituer les systèmes avec les produits standards: to make or to buy? L'étude de cas détaille tous les solutions et la stratégie d'entreprise pour l'étudiant de se mettre à la place de le preneur de decision.

Introduction

At the beginning of 2002, Mr. Buri, head of the security operations department at the Zurich Cantonal Bank (ZKB), was reading through the latest audit report when a sentence about the securities clearing system caught his attention: “Regarding the technological maintenance, unforeseen occurrences with financial and operational impacts of different degrees have to be assumed.”

Parts of the technologies used by the bank had already reached the capacity and complexity limits of the prevailing and future market. Mr. Buri knew that the only way to ensure technological stability and at the same time reduce costs was to modernize the 23 applications surrounding the securities clearing system. It was the only way to effectively pursue the company’s strategy and business model. After a meeting with the Logistics Head Office he was commissioned to evaluate possible solutions.

Zurich Cantonal Bank

During the age of industrialization in the 19th century, most banks had turned towards profitable investment projects in industry and in retail. In contrast, mortgages and assets for workers and trades people, as well as for small- and medium-sized agricultural and industrial businesses, had been ignored. This is where the “bank for the people of Zurich” filled a gap for the greater Zurich region. Founded in 1870, the Zurich Cantonal Bank has a statutory mandate to address economic and social duties in the canton¹ of Zurich, but has to make an appropriate profit at the same time. Today, this model has proven to be quite successful: With a balance sheet total of CHF 85.9 billion, it has become the largest of the cantonal banks and Switzerland’s third-largest bank overall. Altogether, 4100 employees in 110 branch offices deal with mortgages, investment banking, asset management, business investment and a daily transaction volume of over one billion. The bank has achieved a leading market position in the canton of Zurich with a market penetration of more than 50 % for personal customers, managing customer assets amounting to CHF 115 billion. For the future, the company is aiming to become a select address for Swiss private banking and to gain international influence.

Being subject to statutory restrictions, the bank traditionally limited its exposure to risky deals. Nevertheless, over the years, the company needed to adapt its operating activities to the changing economic and corporate needs. In order to keep up with changing trends, the bank drastically increased its business volume and has constantly changed its services to suit a variety of needs. In 1994, for instance, it was the first Swiss bank to offer online banking. For these reasons, changes in the second half of the 20th century successfully transformed Zurich Cantonal Bank from a local credit union into a full service bank with international influence. A new ZKB law² in 1997, defining the state’s liability if the bank’s funds are not sufficient, helped expand the scope for maneuvering: From now on, Zurich Cantonal Bank was able to independently make decisions, which strengthened the bank’s position as an entrepreneur. New directions, for example, were taken in 2002, when the bank opted for an effective strategy to become the number one financial service provider in the Zurich market:

“The decisions we took - to focus on our core businesses, strive for unspectacular yet consistent growth and seek broad diversification of income streams - are proving correct. We have been successful in achieving moderate internal growth. The heavy dependency on our interest operations has been reduced, while trading activities are generating significantly higher revenues. Over 40% of our income now comes from commission and fees, alongside trading activities.” - CEO Dr. Hans F. Vögeli

In June 2002, the production logistics department outlined five strategic goals:

1. Profitability: The bank is the leading logistics and production centre for financial services in the areas of customer orientation, quality awareness and profitability.

¹ A canton is a state within the Swiss confederation, comparable to a US state. All cantons are sovereign although federal law can limit this sovereignty. For the Zurich Cantonal Bank, the cantonal affiliation affects its mandate to contribute to economic and social duties in the canton of Zurich until today.

² ZKB law, LS 951.1, § 6

2. Time to Market / Products / Innovations: The company offers innovative solutions with a better price/performance ratio than its competitors.
3. Process control: The core elements for realization of the strategy are achievement- and customer-oriented logistics, that is, the standardization, documentation, weighing risks, certification and optimization of all production processes.
4. Growth and co-operation: It is of utmost importance to obtain the ability to insource in order to strategically integrate other financial service providers.
5. Technology: The department of logistics continues to systematically increase the profitability and the service level while reducing complexity.

The Logistics Department: Pressure for Modernization

A modern bank consists mainly of employees and IT, the latter making up 30-40 percent of total expenses. The heart of a bank can therefore be seen as its core banking tasks, which include account management, the granting of loans, and the administration of securities, amongst others. Thus, it is not surprising that Zurich Cantonal Bank annually invested CHF 350 million in information technology, and employed 600 IT experts working in the company's logistics department.

Historically, Swiss banks have had a competitive advantage over foreign banks due to the stable political system in Switzerland and strict banking secrecy laws. However, with increasing globalization, other factors became equally important, and thus, reduced this advantage. Zurich Cantonal Bank was forced to try and meet a challenging market with a more cost-effective strategy. With software applications dating back to the 80s, the legacy systems were easily identified as one of the most cost-intensive factors. Ongoing additions over the years and growing requirements had led to a soaring number of lines of code. After years of adaptations, the outcomes were numerous barely maintainable applications and poor interfaces. Computer-supported functions became increasingly error-prone and unstable, also because applications were insufficiently updated to new standards. Consequently, it was impossible to rapidly implement shifts in the market. Even the implementation of new functions was only possible with a comparatively big investment. A major reason for the situation was the high employee turnover resulting from the retirement of a number of IT personal. The source code, mostly written in the outdated programming languages Cobol or PL/I, was barely understandable to a new generation of programmers. In addition, the turnover of employees resulted in a loss of knowledge with regards to the range of financial processes, such as the setup of the securities clearing systems, or the financial management with information technology.

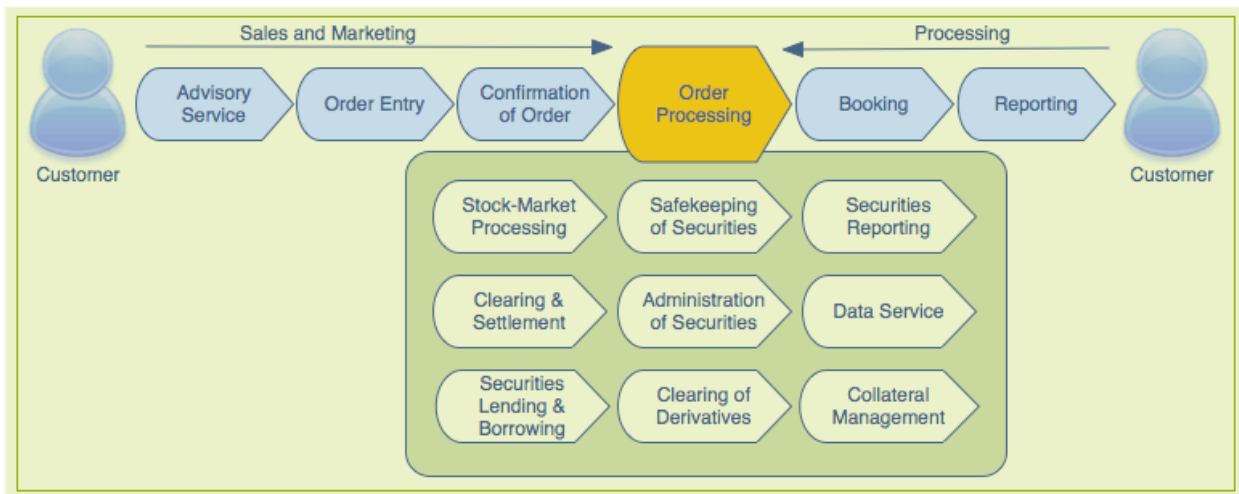


Figure 1: The Process of Securities Clearing

Various managers within the bank found the consequences of these developments highly contradictory to the bank's strategic goals:

- The inflexibility of the legacy systems made enhancements extremely complex
- The legacy systems were unable to scale to business requirements
- The functional boundary between system components became blurred as some parts of the legacy systems wrongly provided functionalities which other parts should have been responsible for.
- While production costs increased, there was no added value.
- It was impossible to cut the costs per transaction.
- The IT infrastructure was not able to handle new requirements, such as new stock-market systems, new regulatory requirements or other external influences.
- The monolithic applications were difficult to maintain.
- The systems led to data duplication and inconsistency, to processing inefficiencies and a lack of reconciliation and tracing features.
- It was increasingly difficult to fulfill growing customer requirements and demands on quality, e.g. user interfaces were non-uniform.
- The demand for user training increased.
- A soaring complexity of the products sold by the bank and increasing transaction volumes led to an accumulation of operative risks.

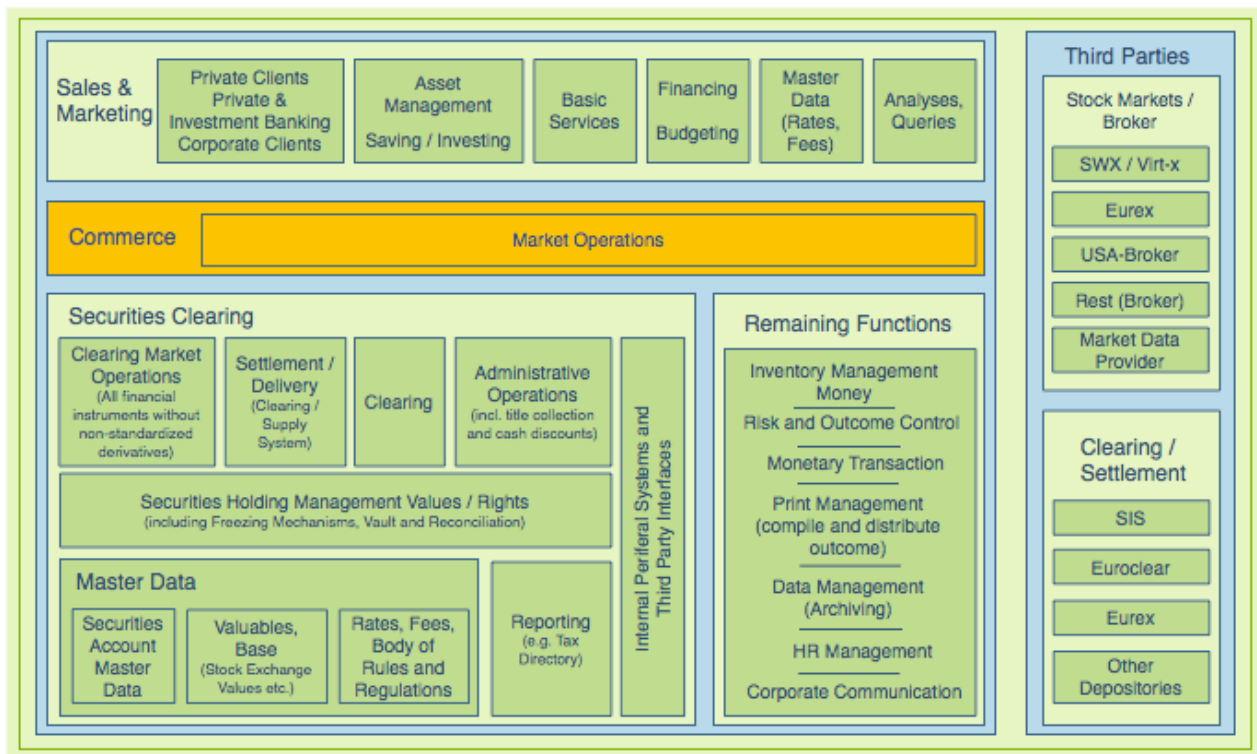


Figure 2: Functionality map of the securities clearing system

The systems involved in the securities clearing processes were highly affected – and with that, one of the bank's core competencies was at risk. Figure 1 shows how sales and marketing operations are linked with the actual processing; a break down of these systems would have impacted more than the securities clearing. Mr. Buri realized that continuing with these applications in their current form was an unacceptable business risk. It was obvious that a

cost reduction could only be achieved by an extensive modernizing of applications. A thorough revision of the status quo was, therefore, to update the technologies to the latest requirements and to streamline the IT department.

The bank's situation at the outset encompassed 23 securities clearing systems, embedded into 45 peripheral systems. The securities clearing operations were used in a multitude of business processes, such as in the field of online banking, private banking, asset management, or in global custody. Each of these areas consisted of dedicated stand-alone applications, all of which interacted with the securities clearing system. As a result, business processes and functionalities were not covered in a coherent and logical way by the securities clearing system. Functionalities for the direct interaction of bank customers, for example, had to be transferred to the distribution system that is actually in charge of these operations.

An overview of functionalities and of the different systems that were to be replaced is shown in Figure 2 and 3.

The Project “Migration of Securities”

In June 2002, Mr. Buri received the commission from the logistics unit to evaluate possible solutions to replace the 23 legacy systems by one integrated securities clearing system; the project “Migration of Securities” was brought into being. The overall aim of the project was to renew the securities clearing system and its functionalities in order to meet the demands of a competitive company. With 250 core staff members during the peak period, it comprised four participating business units and involved 3000 future users who were involved with retail banking and corporate customers, with investment, private banking, and product management.

The company's strategic goals provided the main basis for the evaluation of different possibilities. Refined to specific conditions of the new system, they provided an accurate requirement definition. As a consequence, the project's objectives were defined as follows:

- Enhance functionalities.
- Ensure an increased maintainability and possible enhancements for the next ten years minimum.
- Retain the functionality of the 45 peripheral systems.
- Remove data redundancy.
- Ensure regulatory requirements.
- Guarantee an isolated executability of the securities module.
- Reduce the costs per transaction by 10 - 15 % within three years after the system installation.
- New products and innovations have to work within 20 days of installation.
- Realize adaptations to the market and new laws on schedule.
- Demands of a particular business unit can be individually mapped.
- Data quality is the basis for a qualitatively high-ranking customer reporting in support of the bank's vigilance.
- Active management of process risks.
- Straight Through Processing Rate must be greater than 98 % of all transactions and able to handle high volumes.
- Processing times have to be state-of-the-art. Financial transactions involving the stock market should be processed within 12 seconds.
- Sustainably improve service level agreements.
- Ensure multi-tenancy in order to support the growth of co-operation, in- and outsourcing.
- Reduce the complexity of the old legacy systems by at least three applications.
- Scalability has to be ensured to 5-times the highest volume (250,000 securities accounts with 3 million assets and 10.2 million transactions.).
- Ensure real time-compliance and 24/7 operations.
- Ensure an individual price mapping (customer / transaction).
- Processes are standardized and accredited.

- Minimize downtime to the value of the operating data processing centre.
- Offer a unified and self-explanatory user interface compliant with international standards.
- Allow for scalability.

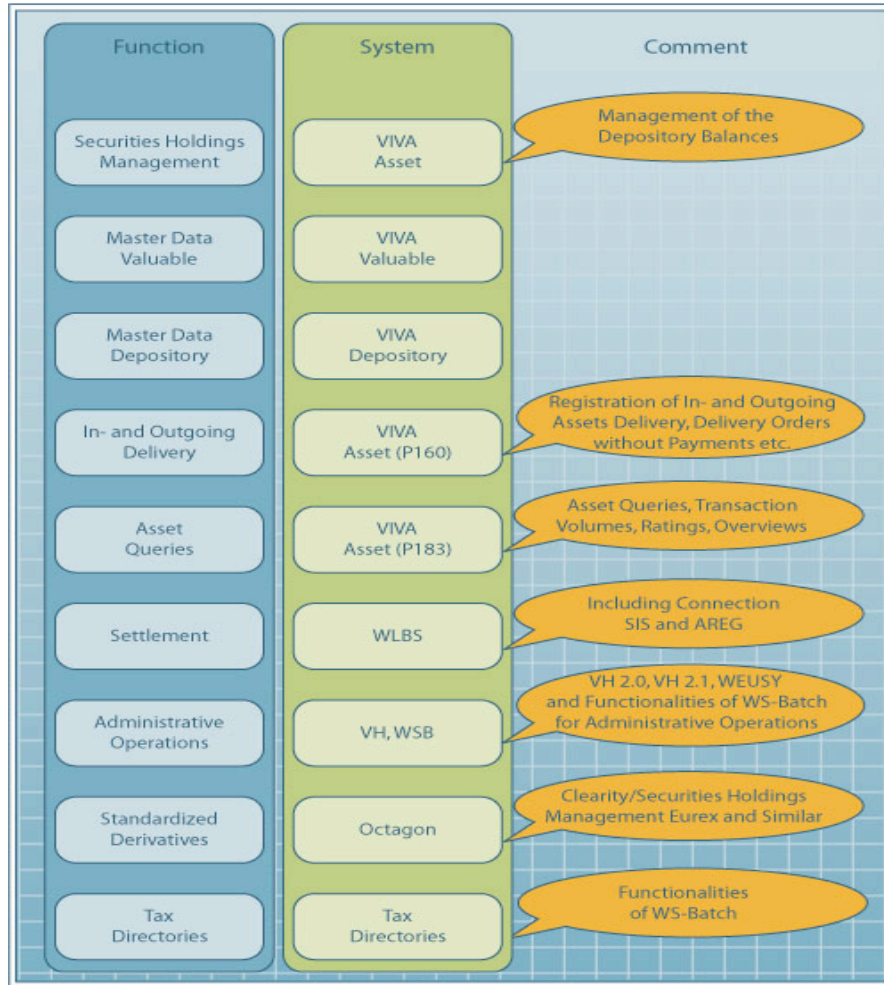


Figure 3: System landscape that was to be replaced

The Decision of Make vs. Buy

Under supervision of the Head of Operations Mr. Weishaupt and the Head of Securities Operations Mr. Buri, the team for the project “Migration of Securities” reviewed 15 different software solutions. Given a detailed report of cost and functionality requirements for the make or buy variants, Mr. Weishaupt and Mr. Buri took the decision to cut the choice down to three for further analysis: The two standard software packages Gendo³ and Aturi⁴ as well as the alternative of modifying the available system. When dealing with the make vs. buy decision, the bank built on an extended selection procedure: The solutions had to fulfill the bank’s strategic goals, comply with functional and non-functional requirements and ensure legal conformance. Furthermore, all three options were analyzed for

^{3,4} Both names changed by the editor

capability gaps, including the feasibility of closing them. The product life cycle and possible risks, such as the product strategy, the company's standing and financial situation, were further aspects that were investigated.

Alternative 1: Modifying the Securities Clearing System

While the project team was investigating the option of replacing all applications by a single unified product solution, they also explored the option of modifying the existing system. Therefore, it requested the external engineering service provider ESS⁵ to undertake a system study. Within three weeks, ESS had conducted a feasibility study and reached the following conclusions:

- Modification by and large is a feasible and desirable option for the systems in scope.
- The approach will be multi-pronged - modularization or adaptation of programs, replacement or redesign of certain applications, conversion of IMS databases to DB2 etc.
- The modification will be executed in multiple phases with deliverables at the end of each phase in order to reduce the overall risk and to have early visibility of benefits.
- The approach can serve both the objective of catering to business requirements and elongating the product's life cycle to ten years.
- The proposed system would be completely documented and sustain good maintainability.

Specifically, ESS specified the complexity of the proposed system with four to five coupled systems. It was suggested to completely integrate small application functionalities into the main applications.

In addition to the compliance with the bank's requirements, ESS highlighted the proposed new double entry functionality aiding the reconciliation process and providing better risk control.

Alternative 2: Aturi

The software producer Aturi submitted an offer for a modular banking system that was adaptable to the bank's requirements. With 90 employees and estimated annual sales of 20 million in 2002, Zurich Cantonal Bank determined Aturi to be in good financial condition, most likely keeping up comparatively high liquidity and profitability. Their innovative product had helped them to obtain a good reputation in the European banking world, leading to a corresponding order situation. However, as an industry expert pointed out, Aturi had had little experience with so-called release changes: "It is easy to market a version 1.0 application because you start off without any inherited burden. Problems involved in software development, however, usually arise when you work on a second version and strive for a smooth update - this is, where it bears a risk."

Nevertheless, the young and modern architecture also provided a competitive edge: As a new product on the market, the risk of redesign and the possible need for a product replacement within the next ten years was considerably reduced. Additionally, the system could be easily customized to new products, market conditions or legal adjustments, hence complying with the requirements of the bank's "time-to-market" trading strategy. Furthermore, the system provided the possibility to be expanded by connecting to front business units such as the valuables custody system, customer output or the stock market.

Aturi's proposal also claimed full multi-tenancy in order to support collaborative activities. Thus, it also guaranteed the major strategic criterion for integrating other financial service providers: the bank's insourcing ability. Despite Aturi's impact on the banking world, however, the system could not report comparable implementations concerning the bank's transaction volume and capacity. For Zurich Cantonal Bank, this contradicted the previously concerted IT strategy. Thus, in order to reduce the risk of system failure under maximum load, the bank carried out a performance test, which simulated the following tasks in parallel:

- One hour of interactive operations (e.g. user queries),

⁵ Name changed by the editor

- processing of stock market orders and other requests,
- operating background processes.

System action was tested with regard to response time, processor load, and operational capacity with a volume that corresponded to the one-, two- and five-fold present and actual state of the bank. The test successfully showed that these volumes could be processed. As the processor and disk load did not exceed the machine's limits, the system could also be assumed to be scalable. The results of the test, however, were only partially meaningful as an evaluation of the system's overall capability. In particular, the test did not provide any evidence that Aturi could be successfully integrated and run with the attached peripheral systems. This condition could be only verified with a prototype fully integrated into the system landscape. Aturi therefore required know-how for product parameters, which would almost certainly result in a longer development time, higher costs, and higher risks.

Alternative 3: Gendo

Unlike Aturi, Gendo solely concerned the securities clearing system, covering all processes in the securities business from ordering securities, securities clearing and settlement, to processing of corporate actions such as the payment of dividends. The system's main features lie in the straight-through processing and in the support of diverse in- and outsourcing scenarios with the help of client capability. Moreover, in its product flyer the company promoted the software package with the following key characteristics:

- Platform independency
- Multiple languages
- Real-time-capability
- 24/7
- Multiple currencies
- Multi-channel-support
- Flexible parameters
- Highly developed client capability
- Interaction with other systems through standardized interfaces
- Scalability and highest performance expectations

Gendo had been in use in other banks since 1998. During the following years, the company had taken orders from various banks and had proven to be reliable banking software in various European countries. Therefore, the bank was able to build upon well-tested implementations, ensuring planning reliability in regards to project costs and run-time. Additionally, the scalability and system performance did not have to be clarified.

Evaluation of Functionality Gaps, Finances, Suppliers and Regulations

Comparing the functionalities of the two standardized software packages Aturi and Gendo with the bank's required functionalities that were already present in the current system, the project team found numerous functionality gaps. They assumed that all gaps could be closed but were aware of the necessary know-how transfer and of the additional time required for adaptation. In an internal evaluation report, they concluded:

"Aturi has less gaps that are, furthermore, of a lower degree of difficulty. Provided that the bank can build up the necessary know-how, Aturi will be able to implement bank-specific processes using workflow, parameterization, and scripting with the help of the department of informatics at Zurich Cantonal Bank. It will be possible to flexibly react to market changes and requirements with a small number of change requests."

Apart from functionalities and the evaluation of added value of the new system, the project team went ahead with calculating the actual costs of each alternative. On the one hand, this comprised project development costs including license costs, cash flows, transaction volumes, and disbursements for parameterization and data migration. On the

other hand, the project team also factored the operating expenses for IT, the external maintenance, and the production. An overview of the project development costs is shown in Table 1.

The costs per transaction were approximated to be 8.33 CHF for the modification option, 7.7 CHF for Aturi (reduction 13.74 %), and 7.48 for Gendo (reduction 16.42 %). The costs per transaction for Aturi were reduced to 13.74 % from a possible 15.02 % because of a required pre-investment of CHF 1.5 million for 2 million (client-) transactions. In addition to Aturi's project costs, the bank's project team pre-estimated the theoretical costs for the generation of a prototype.

Table 1: Project Development Costs (in CHF 1000)

		Project Costs			Primary Costs			Investments			Secondary Costs		
		Modifi- cation	Aturi	Gendo	Modifi- cation	Aturi	Gendo	Modifi- cation	Aturi	Gendo	Modifi- cation	Aturi	Gendo
Supplier	Product costs	12'694	11'029	12'320				12'694	11'029	12'320			
	Interfaces with ZKB systems	2'175	8'000	8'000	1'100	4'000	4'000				1'075	4'000	4'000
	Migration / data reconciliation	1'500	3'000	3'000	1'100	2'000	2'000				500	1'000	1'000
	Test & implementation	2'871	3'988	3'988	800	988	988				2'071	3'000	3'000
	Infrastructure and technique	2'175	2'400	2'400				2'175	2'400	2'400			
	Disposal of legacy systems including archiving	750	1'500	1'500	375	750	750				375	750	750
	Maintenance former systems, specification	676	536	536							676	536	536
	Product maintenance project runtime	1'104	4'960	4'960	700	3'000	3'000				404	1'960	1'960
Business Units	Specifications	600	300	400							600	300	400
	Parameterization	1'000	2'000	2'000							1'000	2'000	2'000
	Test & implementation	2'000	3'000	2'000							2'000	3'000	2'000
	User training	453	600	600							354	600	600
Total project costs		27'899	41'313	41'704	3'975	10'738	10'738	14'869	13'429	14'720	9'055	17'146	16'246
Licensing of additional transactions for comparison purposes, 10 million transactions				2'000						2'000			
Comparison of costs with the same processing transactions		27'899	41'313	43'704	3'975	10'738	10'738	14'869	13'429	16'720	9'055	17'146	16'246

Zurich Cantonal Bank started contract negotiations for both Aturi and Gendo at the beginning of 2003 in order to be able to make a definitive product decision. The key conditions of both contracts are listed in Table 2.

As a last step, the analysis of possible risks also involved a thorough examination of the suppliers. The project team looked at each company's potential know-how, their references and reliability.

Conclusion

In April 2003, Mr. Buri and his project team reviewed the different alternatives. The final decision and the letting of the contract were imminent. Just one month later, they made an application to the bank's Head Office for the execution of one of the product alternatives.

Table 2: Tender and Scope of Services

Tender	Aturi	Gendo
Scope of service	Banking product	Securities clearing system
License price		
License price	CHF 9 million + VAT	CHF 8 million + VAT
Number of eligible transaction volumes per year	10'000'000 transactions	6'000'000 transactions
Additional license price for extra 4'000'000		CHF 1'875'000
License price to close functionality gaps	ca. CHF 0.5 million	No exact information available, max 5'000 man-days are included
Today's processed transaction volume of the ZKB	5'200'000	5'200'000
Rescission of a contract or exit of ZKB during project possible	Yes	Yes
Exit of supplier during project possible	No	No
Cash flows for license prices	Good to very good	Good
Maintenance		
Support and maintenance rate	16 %	Depending on volume 12 – 16 %
Fees for support and maintenance during project duration	-	ca. CHF 500'000
Duration	10 years from contract conclusion	15 years from contract conclusion
Cancellation period on supplier-side	48 months	48 months
Cancellation period on side of the ZKB	24 months	24 months
Performance bond	Withholding possibility of CHF 700'000	CHF 500'000
ZKB's duty to inform about Swiss usances and laws	No	Yes
Client prices		
Client set-up fee	CHF 200'000	CHF 150'000
Inclusion of the set-up fee into the maintenance	No	Yes

Glossary

Asset Management: The professional management of various securities (shares, bonds etc) and other assets (e.g. real estate), to meet specified investment goals for the benefit of the investors. Investors may be institutions (insurance companies, pension funds, corporations etc.) or private investors. (http://en.wikipedia.org/wiki/Asset_management)

Clearing: In banking and finance, clearing denotes all activities from the time a commitment is made to undertake a transaction until it is settled. Clearing is necessary because the speed of trades is much faster than the cycle time for completing the underlying transaction. Processes included in clearing are reporting/monitoring, risk margining, netting of trades to single positions, tax handling, and failure handling. ([http://en.wikipedia.org/wiki/Clearing_\(finance\)](http://en.wikipedia.org/wiki/Clearing_(finance)))

Cobol: Cobol is a third-generation programming language, and one of the oldest programming languages still in active use. Its name is an acronym for Common Business-Oriented Language, defining its primary domain in

business, finance, and administrative systems for companies and governments. (<http://en.wikipedia.org/wiki/Cobol>)

Data Migration: Data migration is the transferring of data between storage types, formats, or computer systems. Data migration is usually performed by pre-programmed routines to achieve an automated migration, freeing up human resources from tedious tasks. It is required when organizations or individuals change computer systems or upgrade to new systems. (http://en.wikipedia.org/wiki/Data_migration)

DB2: DB2 is a commercial relational database developed by IBM. (http://en.wikipedia.org/wiki/IBM_DB2)

Global Custody: Global custody is the centralized safekeeping and administration of large, globally diversified securities portfolios. (<http://ch.csam.com/chinst/gir/en/qa.asp?TopicID=874>)

IMS Database: IMS is a hierarchical database and Information Management System developed by IBM. (http://en.wikipedia.org/wiki/Information_Management_System)

Multi-tenancy: Multi-tenancy refers to the architectural principle, where a single instance of the software runs on a vendor's server, serving multiple client organizations (tenants). (<http://en.wikipedia.org/wiki/Multitenancy>)

Operative Risks: Risk of an unexpected loss resulting from specific events which may be caused by faulty information systems, inappropriate organizational structures or inadequate control mechanisms (also known as event risk) as well as the risk of cost increases or profit cuts as a result of unfavorable macroeconomic or sectoral trends (known as business risk). (<http://www.sigmacapital.net/scgstaff/gloss-o.htm>)

Parameterization: The representation, in a dynamic model, of physical effects in terms of admittedly oversimplified parameters, rather than realistically requiring such effects to be consequences of the dynamics of the system. (<http://amsglossary.allenpress.com/glossary/search?id=parameterization1>)

PL/I: PL/I ("Programming Language One"), is an imperative computer programming language developed by IBM. It has been used by various academic, commercial and industrial users since it was introduced in the early 1960s, and is still actively used today. (<http://en.wikipedia.org/wiki/PL/I>)

Private Banking: Private banking is undertaken by major institutional banks known as private banks, which offer financial services to private individuals. (http://en.wikipedia.org/wiki/Private_banking)

Securities: Documents embodying a private right in such a way that, in order to validate the right, the minimum requirement is possession of the document. Securities can be in the form of banknotes, cheques, bills of exchange, shares, bond issues, mortgage certificates, etc. (<http://www.sigmacapital.net/scgstaff/gloss-s.htm>)

Securities Clearing System: A system used to settle accounts between securities traders (banks, brokers, etc.). All claims are set off against one another in a clearing centre and only the differences settled, with no physical delivery between participants. (http://www.ubs.com/1/e/about/bterms/content_s.html)

Statutory Mandate: The statutory mandate of Zurich Cantonal Bank is to meet investment and financial needs in the canton of Zurich and to work towards socially and environmentally sound development. At the same time, the bank has a duty to make an appropriate profit. (<http://www.zkb.ch/privatebank/aaa/pdf/>)

Statutory Restrictions: Zurich Cantonal Bank has to ensure that its business actions comply with the demands of social and environmental responsibility (sustainability mandate). The bank is therefore measured not only by its profitability, but also by its contribution to the development of the region as required by its statutory mandate. In this way, the bank forms a significant counterweight to exclusively profit-oriented private banks. (<http://www.zkb.ch/privatebank/aaa/pdf/>)

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