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Migration of Former Siemens Distributed Control Systems to SPPA-T3000 within a Market-Oriented Innovation Management
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1 Summary

Siemens E F IE offers its customers state-of-the-art products, systems, and solutions. As a solution provider, Siemens E F IE has close ties to its customers and needs to build a customer friendship with trust to be able to continue to find the customer coming back to ask for new solutions. As a strategic move to assure customer satisfaction, Siemens E F IE has promised that the customers’ I&C investments will be protected.

The key advantage for the customer in the competitive deregulated power markets is to provide him with a quick, modular, scalable, and stepwise migration concept so Siemens E F IE and their customers can continue to operate profitable businesses. Full-scale modernizations with long-term shut downs are out-of-the-question in many competitive markets.

The heart of this business idea is the plug-in concept enabled by the SPPA-T3000 system architecture. As detailed in the Master Thesis, the customer will be able to move into the 4th Generation of DCS systems, but also retain major parts of his initial investments. As indicated by sales, this alone will generate immediate additional business and, hopefully, a few years later, the customer will again come back to Siemens E F IE to update their system. This represents Siemens E F IE strategic customer lock-in strategy.

For the marketing difference strategy, the marketing mix model shows that with the HMI Replacement the customers will achieve a position where they will have the basis for their full SPPA-T3000 DCS by small modernization steps. With the decision matrix, the place & promotion mix proved that the printed documents with their basic slides for management, flyers and success stories is an investment that must be done to publish the product and to show that the HMI Replacement will run with success. The most powerful and important events where the HMI Replacement needs to be shown are the I&C forums, like the VGB KELI and the ISA POWID Symposium. These are the focus exhebitions where the new conception, which the customer can use to receive the new innovated DCS platform in the 4th generation, needs to be presented.
2 Introduction

The project is based on the Energy sector of Siemens AG of which the former Power Generation (PG) forms part.

<table>
<thead>
<tr>
<th>Sector</th>
<th>Division</th>
<th>Former Divisions</th>
</tr>
</thead>
<tbody>
<tr>
<td>Industry</td>
<td>Industry Automation, Drive Technologies, Building Technologies</td>
<td>Osram, Industry Solutions, Mobility</td>
</tr>
<tr>
<td>Healthcare</td>
<td>Imaging &amp; IT, Workflow &amp; Solutions, Diagnostics</td>
<td>Med</td>
</tr>
<tr>
<td></td>
<td></td>
<td>A&amp;D, I&amp;S, SBT, Osram, TS, PG, PTD, I&amp;S OGM</td>
</tr>
</tbody>
</table>

Chart 1: The divisions in the sector Energy.¹

The Energy sector is divided into business units. One of the business units is the Energy Fossil Instrumentation, Controls & Electrical (E F IE). The Siemens E F IE offers plant solutions for power plants and one of the main businesses is the sale of Distributed Control Systems (DCS) for the automation of power plants. This is the sector where the project is located.

2.1 Vision of Siemens E F IE

The Master Thesis gives an overview of the general conditions and describes the strategy plan of the HMI Replacement and how the growth of the business with HMI Replacement by the DCS SPPA-T3000 will be managed. It gives information about relevant markets, strategic objectives, competitor marketing positioning as well as of the marketing actions. Additional to that, it gives an idea of how cooperation between the Siemens foreign region and partners can be done for the HMI Replacement.

2.2 Vision of Siemens E F IE for the HMI Replacement

With the HMI Replacement, it is not possible to increase the market share as well as to win a new customer group. The reason is that these customers are those

who already have a Siemens DCS. The business case is intended to focus on those customers that already have former Siemens DCS. Therefore, the HMI Replacement is focused on customer lock-in.

The vision of Siemens E F IE is also that there will be a win-win-situation under economic aspects. To achieve such a win-win-situation, the following questions should be discussed.

- Economics of Siemens E F IE view
- Economics of customer view

For new customers, the Siemens E F IE offers small and new SPPA-T3000 solutions.

There is a two-step concept to, first, provide an HMI Replacement with a plug-in concept as customer lock-in, and to exchange, in a second step, obsolete automation hardware with engineering data conversion to save as much as possible of the investments that have already been made. The plug-in concept is in progress for development, but the second step needs to be further evaluated.

### 2.3 Description of the HMI Replacement

Siemens E F IE is a global solution provider and a market leader in the world market for power plant control. Only by offering competitive solutions on a world-wide scale while locking in customers who are market leaders, Siemens E F IE can continue to thrive as years to come. Former migration concepts have proved to be effective over the last 40 years. Siemens E F IE provides lifelong support and can continue to strengthen its position mainly by continuing to deliver strategies that lock-in customer loyalty and block-out competition.

As detailed below, the customer will be able to move into the 4th generation of DCS systems by a migration concept and also to retain major parts of his existing investments. As indicated later in the Master Thesis, the HMI Replacement will generate immediate additional business and, hopefully, a few years later, the customer will come back again to Siemens E F IE to update the remaining part of the system as well.

SPPA-T3000 has an innovated software architecture where subsystems are not necessary anymore. The web-based architecture allows the use of standard IT devices for user terminals. The engineering, the diagnosis as well as the operation and the control became very user-friendly with the new DCS system. With the HMI Replacement, this new benefit will allow to use these aspects also with the former Siemens DCS systems.
3 Current Conditions

3.1 To lock the customer in

The ambition of the HMI Replacement is to lock the customer in. As mentioned before, the plan consists of a step-by-step modernization of the customer’s DCS. The benefit of the step-by-step modernization for the customer is that the customer does not need to make such a big investment at once. Siemens E F IE offers the customer to update the DCS continuously so that, under these circumstances, the big investment every approximately 15 years will not exist anymore. With this offer, the Siemens E F IE gives the customer satisfaction because the step-by-step modernization meets the customer’s expectations according to their needs of scalable investments.\(^2\)

This satisfaction will be used to increase the degree of brand awareness by mouth-to-mouth propaganda and for customers to show that Siemens offers a solution around the whole DCS and not only the solution for a complete modernization. By the specific solution, the Siemens E F IE appears on the market as differentiator.

Additionally, the goal is to keep the engineered data. This will be done by offering data conversion to save as much as possible of the engineering investments that have already been made. Thanks to this, the customer will be able to move into the 4th generation of the DCS, but also to retain some of his existing investments. By saving the customers invest, the Siemens E F IE will win the customer over.

3.2 Status Quo at project start

The current status is that it is not possible to migrate all generations of Siemens DCS systems to the SPPA-T3000. Some of the DCS systems are able to connect via the SPPA-T3000 communication module to SPPA-T3000. These DCS systems are TELEPERM ME, SPPA-T2000 and SIMATIC PCS7 PS.

In the past, Siemens E F IE has developed control systems to cover all specified requirements for power plant process control.

TELEPERM ME time began in the early 80’s and was one of the first computer based DCS systems. TELEPERM ME was revolutionized by SPPA-T2000 (TELEPERM XP). First, it was known under the name TELEPERM XP. Recently, Siemens changed the name for marketing reasons to SPPA-T2000. In the beginning, SPPA-T2000 automation system was based on the SIMATIC S5 controllers, later Siemens integrated the new SIMATIC S7 controllers, which are still sold.

The new high end Siemens DCS for Power Plants is called SPPA-T3000. Beyond the pure plant controlling task, Siemens E F IE provides comprehensive solutions

\(^2\) Backhaus, Voeth, 2007, p. 18.
designed to perform value-added power plant automation tasks:

- Turbine Control SPPA-R3000
- Process Optimization SPPA-P3000
- Diagnostic Suite SPPA-D3000
- Energy Management Suite SPPA-M3000
- Electrical Solution SPPA-E3000
- Simulator SPPA-S3000

Chart 2: Siemens E F IE platform software concept based on ECSTM.

SIMATIC PCS7 PS is an extension of the basic system SIMATIC PCS7 which is used for industrial process control. The „Power Solution“ library is tailored to meet power plant requirements. Since October 2007, SIMATIC PCS7 PS is not offered anymore for Siemens E F IE projects. The 2nd sales enquiry mentioned later proved that SIMATIC PCS7 has not enough market volume in the power plant business for the HMI Replacement.

3.3 The Market Definition Business Cases

The following business cases describe the concept of the migration steps that will be offered to the customers. The goal of the concept is to migrate the customers DCS system step by step. If this concept is followed, Siemens E F IE will achieve a high customer loyalty and the customer’s benefit is to get a modernization step by step, to increase the plant operation profitability as well as the plant availability.
There are three steps for the modernization. Depending on the investment, each modernization step is possible at any time for the customer.

- **Business case 1: HMI Replacement**
  HMI Replacement based on the new HMI concept in connection with the existing automation hardware component and original engineering.
  (PC obsolescence every 5-10 years or system discontinuation, e.g. TELEPERM ME abandoned from 2018).

- **Business case 2: partial modernizations**
  Exchange of some of SIMATIC S5-based automation systems and HMI Replacement in connection with existing automation systems.
  DCS migration including automation system upgrade with engineering data conversion.
  (With connection to plant parts which are controlled by TELEPERM ME / TELEPERM XP. Step-by-step migration)

- **Business case 3: 100% modernization**
  Exchange of the entire hardware for HMI and automation system in once
  (Due to system obsolescence, e.g. TELEPERM ME with LTE till 2018 – but expensive)

Chart 3: Siemens E F IE three business cases.
The scope of the business plan is considered for variant 1 & 2. Variant 3 is so far the standard solution that is available. As already mentioned, the goal will be to increase our solutions for the customer as well as to win the customer over.

### 3.4 Survey of the market

The evaluation of the market potential is based on the 2nd sales enquiry that was realized in the first quarter of 2008. This sales enquiry proved that the Siemens E F IE will focus on two business cases, which are the TELEPERM ME and the SPPA-T2000 (SIMATIC S5 and S7) installed base. As mentioned before, the 2nd sales enquiry proved that, economically, SIMATIC PCS7 has not sufficient market volume for the HMI Replacement.

For the region of the “Gulf States, Near & Middle East, Africa, Italy” and the “USA and Canada” the 2nd sales enquiry could not be used because of the poor quality of the feedback data.

#### 3.4.1 Market segmentation

The HMI Replacement is developed for customers with installed TELEPERM ME or SPPA-T2000 (SIMATIC S5 and S7). As mentioned, the idea is to bring the customer step by step to SPPA-T3000 and to keep the customer with this strategy without further competition.

#### 3.4.2 TELEPERM ME business case

It is identifiable that the major market for the HMI Replacement with TELEPERM ME is “Northern Europe and CIS” together with the region of “Latin America, Spain and Portugal”.

The two markets with the biggest potential of those regions are Mexico and Russia, where a lot of TELEPERM ME systems have been installed. In Mexico, especially the state-owned oil company PEMEX holds the biggest potential capacity for the HMI Replacement.

#### 3.4.3 SPPA-T2000 (SIMATIC S5 and S7) business case

The major markets are the region of “Latin America, Spain and Portugal” together with the region of “Germany”. A big potential for the HMI Replacement is Germany. Germany has high requirements on power generation. In the last decades, investments have been postponed and only a few plants went for a modernization. Now, several modernization projects are on stock and it is expected that makes the German market important.
4 Analysis

This chapter shows analyses in various environmental scopes. Porter’s 5 forces describe the microenvironment followed by the SWOT analysis for auditing the project organization and the respective environment. Finally, the competitor analysis focuses on the two major competitors of the DCS market, which are Emerson and ABB.

4.1 Porter’s 5 forces

Porter’s 5-forces analysis is a framework for industry analysis and business strategy development developed by Michael E. Porter. The framework is for diagnosing industry structure, built around five competitive forces that erode long-term industry average profitability. The industry structure framework can be applied at the level of the industry, the strategic group or even the individual firm. Its ultimate function is to explain the sustainability of profits against bargaining and against direct and indirect competition.

The following figure briefly describes the subtitles of the Porter’s 5-forces models for the HMI Replacement.

![5-forces model](Chart 4: 5-forces model.)


4.2 SWOT

SWOT analysis is a tool for auditing an organization and its environment. It is the first stage of planning and helps marketers to focus on key issues. SWOT stands for strengths, weaknesses, opportunities, and threats. Strengths and weaknesses are internal factors. Opportunities and threats are external factors. SWOT can be used in conjunction with other tools for audit and analysis purposes, such as Porter's 5-forces analysis.

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<thead>
<tr>
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<th>Weaknesses</th>
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<td></td>
<td>Strengths</td>
<td>W-O-Strategies:</td>
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<tr>
<td>Extern Opportunities</td>
<td>S-O-Strategies:</td>
<td>⇒ Future platform</td>
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<tr>
<td>⇒ Never goes obsolete</td>
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<tr>
<td>⇒ Scalable migration</td>
<td>⇒ Retain already installed field cables, I/Os and cabinets</td>
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<tr>
<td></td>
<td>W-T-Strategies:</td>
<td>⇒ Concepts to be able to enter SPPA-T3000 with a low budget (HMI Replacement)</td>
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<tr>
<td>Extern Analysis</td>
<td>S-T-Strategies:</td>
<td>⇒ Retain existing application data for SPPA-T3000 (engineering data)</td>
</tr>
<tr>
<td>⇒ Continuity of existing DCS</td>
<td></td>
<td></td>
</tr>
<tr>
<td>⇒ In-house know-how for modernization projects</td>
<td></td>
<td></td>
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<tr>
<td>⇒ Stepwise migration concept to avoid competition</td>
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Chart 5: SWOT – Analysis.

5 Market difference Strategy for the HMI Replacement

As mentioned before, Siemens E F IE is a global solution provider and a market leader in the world market for power plant control. Siemens E F IE promises the customer that their investments will be safe. However, Siemens E F IE always offers the possibility for customers to modernize the system to stay on track with the latest technological trends. Although it is not a requirement, a partial modernization via migration while leaving a big part of original investment in place is
welcomed by the customer. Whether it is Siemens E F IE or another solution provider, the customer will be persuaded to update and the best fit is Siemens E F IE. Additionally, this strategy avoids the open bid as a customer will choose Siemens E F IE to migrate its old system to the new system.

5.1 Continuity of existing DCS

SPPA-T3000 differs from the other DCS by the innovation level that distinguishes the system from the competitors. With SPPA-T3000 Siemens E F IE enters the 4th generation of the DCSs.

5.2 Marketing strategy

The marketing mix model, also known as the 4 P’s, can be used by marketers as a tool to assist in defining the marketing strategy. The method is used to attempt to generate the optimal response in the target market by blending 4 variables in an optimal way.3

Chart 6: 4'P according to McCarthy.4

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5.2.1 Product
The HMI Replacement is an “add on” to the basic software product SPPA-T3000. The HMI Replacement gives the customers the chance to get added values to his already existing former Siemens DCS. With the HMI Replacement, the customers will archive a position where they will have the basis for there full SPPA-T3000 DCS by small modernization steps.

5.2.2 Place & Promotion
This chapter describes the number of distribution channels that the Siemens E F IE is able to use to promote the HMI Replacement.

The different channels to be used for the place & promotion will be discussed in a basic workshop. The following figure describes the communication to the customers.

![Customer Place & Promotion Diagram]

Chart 7: Customer Distribution & Communication.

Market and customer communication is categorized into print media, online media, articles and events. These four channels will be used to distribute the HMI Replacement.
6 Summary

The heart of this business idea is the migration concept enabled by the SPPA-T3000 system architecture. As detailed above, the customer will be able to move into the 4th generation of DCS systems, but also to retain some of his existing investments. As explained in this Master Thesis and mentioned in chapter 2.3 Description of the HMI Replacement, this migration of former Siemens DCS to SPPA-T3000 within the shown market-oriented innovation management will generate immediate additional business and profit where, a few years later, the customer will come back again to Siemens E F IE to update the remaining part of the system.

This represents Siemens E F IE strategic customer lock-in concept and means that, with that strategy, Siemens E F IE will win over the customer. The customers’ benefit of this strategy is that they will be able to migrate their existing DCS system step by step, so the customers’ invest will be staggered. As a result, the partnership between Siemens E F IE and the customer will become a win-win situation. With this business case, the Siemens E F IE is able to strengthen their market positioning and to achieve the increasing business goals.

6.1 Achieved projects goals

As seen in the Master Thesis, the customers will have access to what they need to perform better on the market at a lower cost. A major cost advantage is less engineering and this enables Siemens E F IE to increase sales to maintain the high growth and profitability. This is considered as an expansion of the strategic offering beyond just meeting customer’s basic needs as explained.

Within this Master Thesis, the requirement to develop a market-oriented sales and marketing plan for the HMI Replacement has been met. The product management has benefitted from the consolidated findings of the SWOT analysis and Porter’s 5-forces analysis and from the marketing strategy.

The marketing strategy that has been explained in detail by the marketing mix model formed the decision matrix where the timing strategy has been developed by the detailed roadmap.

All principle results of the Master Thesis can be applied for the development project HMI Replacement due to the performed summaries and analysis. Especially the contribution for marketing roadmap and strategy can be used for the development project. The ideas of market area strategy are vital ideas to improve common business models to increase the business volume and profit.
6.2 Future prospects

For the further development works, it is important that the pilot projects will be successful so that the following HMI Replacement projects will be realized according to the best practice method. Technical expertise should push the development works in the next month. The technical expertise and to push the development of the HMI Replacement will be the major key, so that the Siemens E F I E will be able to go on the market in time.

It is important that the first plants with HMI Replacement can start as scheduled to avoid a further time delay in the business plan. Otherwise, the consequences would be that the breakeven point would not be as scheduled. In this case, the whole project might be jeopardized.
Appendix

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<th>Abbreviation</th>
<th>Full Name</th>
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<tbody>
<tr>
<td>A&amp;D</td>
<td>Automation and Drives</td>
</tr>
<tr>
<td>ABB</td>
<td>Asea Brown Boveri</td>
</tr>
<tr>
<td>CIS</td>
<td>Commonwealth of Independent States is a regional organization whose participating countries are former Soviet Republics.</td>
</tr>
<tr>
<td>DCS</td>
<td>Distributed control system</td>
</tr>
<tr>
<td>DCS SIMATIC PCS7 PS</td>
<td>Branch specific solution for power plants</td>
</tr>
<tr>
<td>E F IE</td>
<td>Energy Fossil Instrumentation, Controls &amp; Electrical</td>
</tr>
<tr>
<td>e.g.</td>
<td>from Latin: exempli gratia, “for example”</td>
</tr>
<tr>
<td>ECSTM</td>
<td>Embedded Component ServicesTM</td>
</tr>
<tr>
<td>ff</td>
<td>et seq. - and the following</td>
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<tr>
<td>HMI</td>
<td>Human Machine Interface</td>
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<tr>
<td>I A</td>
<td>Industry Automation</td>
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<tr>
<td>I&amp;C</td>
<td>Instrumentation &amp; Controls</td>
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<tr>
<td>I&amp;S</td>
<td>Industrial Solutions and Services</td>
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<tr>
<td>I&amp;S OGM</td>
<td>Industrial Solutions and Services Oil, Gas, Marin</td>
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</table>
I/O Input / Output

ISA POWID Instrumentation, Systems, and Automation Society Power Industries Division

IT Internet Technology

KELI Konferenz – Conference
Elektrotechnik, – Electrical Engineering
Leittechnik, – Instrumentation and Control
Informationsverarbeitung – Information

LTE life time extension (program to extend TME life cycle till 2018)

Med Medical

PC Personal Computer

PG Power Generation

PTD Power Transmission and Distribution

SBT Siemens Building Technologies

SIMATIC PCS7 Siemens DCS

SIMATIC PCS7 PS Siemens Power Plant DCS, Process Optimization Solutions

SIMATIC S5 (S5) Siemens PLC

SIMATIC S7 (S7) Siemens PLC

S-O-Strategies Strengths Opportunities Strategies

SPPA Siemens Power Plant Application

SPPA-D3000 Siemens Power Plant Diagnostic Suite

SPPA-E3000 Siemens Power Plant Electrical Solution

SPPA-M3000 Siemens Power Plant Energy Management Suite

SPPA-P3000 Siemens Power Plant DCS, Process Optimization Solutions

SPPA-R3000 Siemens Power Plant Turbine Control

SPPA-S3000 Siemens Power Plant Simulator

SPPA-T2000 Siemens Power Plant DCS

SPPA-T3000 Siemens Power Plant DCS
S-T- Strategies  
SWOT  
TC  
TELEPERM ME  
TELEPERM XP  
VGB  
W-O- Strategies  
W-T- Strategies  

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