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Training as a Service:

Designing a Training Service for End Users

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PREFACE

I would like to thank Metropolia University of Applied Sciences and the whole Industrial Management Master's program faculty, the company that I work for and the customer that made this case possible. Thank you to all interviewees, both company and customer side. Cheers for my class mates for peer support, it was really needed. And last but not least a special thanks to my wife for her patience and support and our dogs for constantly reminding me in their own special way of what really matters in life.

It has been mind-opening.

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<p>This thesis explores the possibility of strengthening the service offering of a system supplier in the marine industry by designing a deliverable end-user training service. A service of this kind can also be used as a differentiating factor to gain competition advantage over other system suppliers.</p> <p>A single case study approach is selected as it fits the context of this thesis i.e. service designed to be delivered to a specific customer segment. The research design contains five steps where best practises of service design are combined with findings from the customer organization and the case company.</p> <p>The outcome of this thesis is a proposal built of two main elements; End-user training Service Concept and Service System. The Service System is shown as embedded in to a service blueprint, a process flowchart, including the steps to take in order to deliver the service and the resources needed to perform those steps.</p>	
Keywords	Service, Service Design, Training, End-user, System Supplier

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1 Introduction

This thesis is about designing a training service to be delivered by a case company. The case company is a fire protection system manufacturer based in Finland. The fire protection systems are used in many different applications but the focus of this case is on one key customer segment which is the marine industry, specifically large cruise ships.

While the fire protection systems are designed to be simple and easy to use, some of the finer operative aspects cannot be figured out intuitively by the end-users. Hence there is a need for end-user training. The fact that the system in question is a fire protection system, i.e. a safety system, further emphasizes the importance of proper end-user knowledge to operate the system correctly. Incorrect use of the fire protection system can have dire consequences in a fire situation possibly resulting in loss of property and even loss of life.

1.1 Case Company Background

The case company is a medium sized Finnish manufacturer and supplier of high pressure water mist fire protection systems. The Marine Business Unit of the company supplies these innovative fire protection systems to ships. The system supply scope usually consists of system design, component delivery and system commissioning. In new build projects of ships the direct customer of the case company is usually the shipyard that is building the ship. The shipyard then delivers the ship to the end customer i.e. the ship owner. In upgrade and extension projects, the direct customer of the case company is usually the ship owner directly.

1.2 Business Challenge, Objective and Expected Outcome

A modern cruise ship is filled with sophisticated technology required for the operation of the ship. Operating a modern cruise ship requires specific knowledge of different systems and equipment on board. Furthermore for safe operation it is required that the crew of the ship possess the skills needed to operate these systems and equipment properly. The need for these system operation skills are even more emphasized when safety systems are concerned. While system design and the clarity of the user interface play an important role on ease-of-use, these features do not eliminate the need for proper system operation training for the on-board crew.

The on-board crew's ability to operate the fire protection system correctly in an emergency, as well as normal day to day situations, is vital for a smooth handover, operation and safe sailing of the ship. The on-board crew's skills to use the fire protection system properly in all situations also effects the case company's brand. The system that the case company delivers has technical advantages compared to traditional fire protection systems, but it is technically more complex than many of them and the operation philosophy is also different. Against this background proper end-user training is vital from the safety and business aspects for both the end customer and the case company. Currently end-user training is handled on an ad-hoc case by case basis as opposed to a more systematic way that would ensure consistent training quality and would also be more resource efficient. The current way of handling end-user training as just a mandatory add-on to the system supply is partly a result of the case company's product oriented way of thinking and as such leaves room for improvement.

The objective of this thesis is:

To design a deliverable end-user training service in the context of the case company's core business which is the cruise industry.

The outcome of this thesis is:

A proposal of a deliverable end-user training service.

The reason for limiting the scope only to one ship type, a cruise ship, instead of dealing with all ship types is due to the fact that different types of ships have different crew structures and have slightly different rules applied to them. The rules that are applied to different ship types affect the fire protection system type and system scope needed and this, combined with a different crew structure, has an effect on the end-user training service that should be offered for best results. Because of time constraints the scope of this thesis has been limited to the ship type that the key customer that initiated this whole process operates.

The research is done as a qualitative case study involving one key end customer of the case company. The customer in question is a company in the cruise industry that is operating several cruise vessels around the world. The existing knowledge of service design is studied, along with best practises of emergency situation training, marine safety studies and the best practices of training as a service. Also the International Maritime Organisation (IMO) regulations on the Standards of Training, Certification and Watchkeeping (STCW Convention) and Safety Of Life At Sea (SOLAS) are reviewed regarding fire safety system training for the on-board crew ships. An analogical end-user training service of another system supplier in the marine industry is analysed and used for benchmarking of best practices of end-user training and training delivery.

This thesis is written in six sections. The first section deals with the research design, research methods and data collection utilized in this thesis. In the second section the current state analysis of end user training is presented. The third section reviews the existing knowledge and best practices of the key concepts involved in this thesis. These key concepts include service concept, service system, service design, experience centric services and service blueprinting. The fourth section deals with building the proposal of the end-user training service for the case company by combining existing knowledge with the findings of the current state analysis into a merge of ideas. In the fifth section this proposal is validated through collection and analysis of stakeholder feedback. Finally, in the sixth section, the conclusions of this thesis and its proposal, implications, validity and reliability are discussed.

2 Method and Material

This section deals with the research design, research methods and data collection used in this thesis. The basic concepts of the research approaches applied in this thesis are discussed. The research design is presented as a graphical illustration for clarity. Also the validity and reliability issues of the research are contemplated.

2.1 Research Approach

This thesis adopts a single case study approach using mainly qualitative data. This section explains briefly what is case study and what is meant a qualitative research strategy.

The definition of case study can be seen as twofold. Firstly case study is an empirical inquiry that studies a case, a contemporary phenomenon, deeply and in its actual real-world context. A case study approach is beneficial especially when the context of the phenomenon and the phenomenon itself do not have a clear separating boundary in between them (Yin 2014). In other words case study is the approach to take when the focus of study is a real life phenomenon, a case that requires also the understanding of contextual conditions for full comprehension of the case itself. The other part of the definition of case study explains its features; a case study inquiry copes with a technically distinctive situation in which there are many more variables of interest than data points. Case study relies on multiple sources of evidence where the data is gathered in a triangulating way, i.e. from different sources and from different perspectives to get the full picture. Case study also benefits from prior development of theoretical propositions, or known knowledge, to help guide the collection and analysis of data (Yin 2013). The focus of a case study can be a single case or multiple cases. Even though the wording “case study” might imply a single minded focus only to the case itself, the study still needs to be set into a wider context in order to fully appreciate the whole picture. (Blaxter et al. 2006).

Case study typically tries to answer questions like “how” and “why”. The data collection is typically done by direct observation of events, interviews of informants relating to the studied phenomena and using a wide array of documentation (Yin 2013). The setting of the events or phenomena is usually such that the researcher has very little or no control over said events or phenomena as opposed to a laboratory experiment where the researcher fully controls the environment and setting of the phenomena that is being experimented with. Also a key point is that in case study the focus is on contemporary phenomena or event as opposed to an entirely historical phenomena where interviews of people relating to the studied phenomena cannot be interviewed because they are already dead (Yin 2013).

As an approach case study has the capability to deal with simple as well as complex issues (Baxter and Jack 2008), and it is ideal also for a small scale researcher (Blaxter et al. 2006). Finally the goal of case study is not to extrapolate probabilities, but rather to generalize theories. Therefore case study is a generalizing, not a particularizing analysis (Yin 2013).

This study was about designing an end-user training service for a specific customer segment in the marine industry. More specifically the end-user training service was designed for a cruise ship operator and the target group of the actual training was the crew and officers of these cruise ships. With the above mentioned setting and a time limitation of four months to complete the thesis, a single case study approach was the obvious choice. To design an end-user service for a cruise ship operator the context of a maritime environment, the rules, specific customer needs, limitations and the natural physical environment connected to that context had to be studied and understood in order to build a proposal for the service design. The type of information that could and had to be gathered was mostly very clearly qualitative, i.e. not numeric or statistical.

The data used in a case study is usually mainly, but not exclusively, qualitative as opposed to quantitative. The strategy of qualitative research is to gather empirical data that is not in numeric form. Qualitative research explores issues in a detailed and non-numeric way. As a research strategy it aims for depth rather than breadth, i.e. it focuses thoroughly in to a small number of issues rather than just on a general level on a large number of issues. Qualitative research data is usually mainly primary data that is collected through straight observation and interviews. Therefore qualitative research the data collection is usually done mainly as field research (Blaxter et al. 2006). This however does not mean that secondary data gathered through desk research is in any way out of the scope of qualitative research. In fact when doing a case study the definition of case study usually requires secondary data to be collected via desk research in the form of existing documentation of the studied phenomena.

2.2 Research Design

This section shows the research design utilized in this thesis. The visual presentation of the research design is shown as a flow chart, figure 1. The chart starts from the top by defining the objective, then flowing down through the current state analysis to the study of existing knowledge and benchmarking. From there the research design moves on to building the prototype training service design and ends at the fine tuning and validation of the prototype through stakeholder feedback.

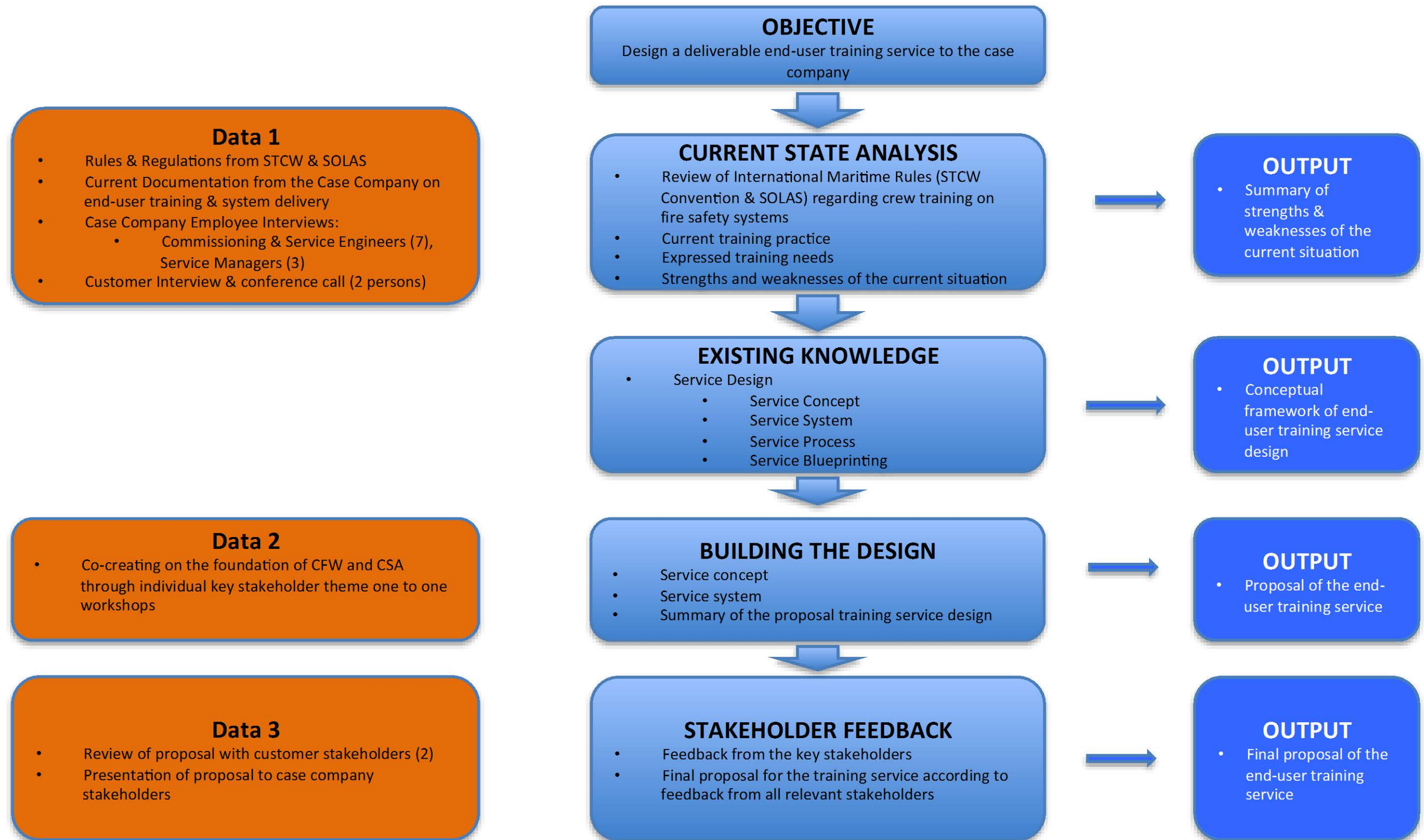


Figure 1. Research design

The starting point is the business challenge, to design a training service for end-users. The need for a systematic approach to end-user training was initiated by a customer. The customer approached the case company and requested that the crew of their whole fleet would be trained by the case company.

The first part of the research is the current state analysis that explored how end user training was done at the moment. By identifying the strengths and weaknesses of the current design the potential strengths could possibly be included in the build of the prototype while weaknesses could be discarded or learnt from. Also the needs and wants of the customer were studied. This was important for the reason that the context of the customer's business and operations, i.e. the maritime setting, had specific limitations and needs that needed to be taken in to account in the training service design. Also international maritime rules were reviewed for the same reasons as the customer wants and needs. The output of the current state analysis was the current state of end user training design, delivery and requirements.

The second part has two different entities parallel to each other, the study of existing knowledge through a literature review and the benchmarking of an analogical end-user training service of another system supplier in the marine industry. In both of them the aim was to explore the best practises and know-how of the design and delivery of end-user training services. The outcome of this step was a conceptual framework for a training service design. This is the part of case study where a review of theory is used to help guide the analysis of data.

From current state analysis through the study of existing knowledge and best practices the research went on to building the prototype training design. Here the conceptual framework that emerged from the literature review and benchmarking were combined with the information gathered in the current state analysis to build a prototype design of the end-user training service. This prototype design was the outcome of the -building the design- phase.

The final phase is stakeholder feedback. Here is where the validity of the prototype training service design was tested. The prototype design was presented to the stakeholders and put through a test run. The stakeholders consisted of the case company and the customer. The feedback from the stakeholders and the observations of the test run were then used to fine-tune the prototype training design. The outcome of this phase, and indeed the whole thesis was the final end-user training service proposal.

2.3 Data Collection and Analysis

This section presents the data collection for this thesis. The data was collected in three phases - different kinds of data mark each phase, see Table 1. This thesis uses three kinds of data collection methods- interviews, documentation and observation. The kind of data collected in each data phase is detailed in the following tables. Table 1 shows an overview of all data sources.

Data	Data source	Purpose	Data type	Analysis
Data 1	Case company stakeholders, interviews	Identifying current strengths and weaknesses	Description of current ways of working	3. Current state analysis
	Case company documentation	Identifying current strengths and weaknesses	Processes of training design and delivery Training agendas	3. Current state analysis
	Customer stakeholders, interviews	Identifying customer's requirements	Customer feedback and suggestions	3. Current state analysis
	International Maritime Organisation / STCW&SOLAS	Identifying regulations related to the case	Maritime rules & regulations related to crew training	3. Current state analysis
Data 2	Case company stakeholders, workshops	Combining the conceptual framework with data from CSA	Merge of best practises and case requirements	5 Building the design
	Customer stakeholders, workshops	Combining the conceptual framework with data from CSA	Merge of best practises and case requirements	5 Building the design
Data 3	Stakeholders	Feedback of proposal training service design	Stakeholder feedback	6 Stakeholder feedback

Table 1. Data source overview

The following subsections deal with the data collection of each of the data phases separately.

2.3.1 Data 1 Collection and Analysis

The function of data 1 is to gain understanding of the current state regarding end-user training conducted by the case company along with the customer's needs and wants and the international regulations that need to be taken into account in the context of the case. Data 1 was collected through three main sources; the case company, the customer and IMO documentation.

The current state of end-user training was explored through interviews of case company employees. The participants of these interviews were seven field operatives who were performing the actual end-user training and three managers from the service department. The second main source of data was the customer. Information from the customer was collected through interview and telephone conference with two key persons, both of them were ship managers in charge of on board safety issues.

The case company interviews focused on the current state of end-user training, how it is being conducted, at which stage and by whom, are the results satisfactory etc. A detailed list of the questions of case company interviews is attached as appendix 1. The questions were formulated with an aim to learn what the interviewee's connection with end-user training is, what the case company's approach towards customers and system delivery is in general and end-user training specifically. After this the questions aimed for a more focused exploration of how is end-user training done currently and what are the good and bad aspects of the current approach. Finally the reasons behind the current ways of operating were explored along with the interviewee's thoughts on how end-user training should be approached and performed.

The customer interview was along the same lines, but more focused on what was wanted and needed by the customer, should the training be hands-on or classroom based, at which stage the training should be conducted in regards to new build projects, what is the target group of the end-user training and what is the desired outcome. A detailed list of the questions of the customer interview is attached as appendix 2. In addition to the customer interview a telephone conference was conducted with two customer representatives. The results of this telephone conference were recorded as minutes of meeting.

All of the interviews were recorded as audio recordings and field notes were written from those recordings except for Riot1 telephone interview which was not recorded but field notes were written during the interview. All interviewees were interested in the topic of end-user training and most were keen on developing it further. The interviewees were very much straight to the point with pre thought out opinions and answers, which can be seen from the relative short duration of the interviews. This was not because people had little to say, but rather that they had a very clear idea of what they wanted to say and how. Table 2 shows the details of data 1 collection interviews for the current state analysis.

Data type	Participants position	Topic, description	Date	Length	Documents
Interview (Droplet 1)	Field Operative	Current approach to end-user training	JAN 2016	17 min	Recording, field notes
Interview (Droplet 2)	Field Operative	Current approach to end-user training	JAN 2016	26 min	Recording, field notes
Interview (Droplet 3)	Field Operative	Current approach to end-user training	JAN 2016	20 min	Recording, field notes
Interview (Droplet 4)	Field Operative	Current approach to end-user training	JAN 2016	11 min	Recording, field notes
Interview (Droplet 5)	Field Operative	Current approach to end-user training	JAN 2016	14 min	Recording, field notes
Interview (Droplet 6)	Field Operative	Current approach to end-user training	JAN 2016	13 min	Recording, field notes
Interview (Droplet 7)	Field Operative	Current approach to end-user training	JAN 2016	15 min	Recording, field notes
Interview (Mist 1)	Manager, Service	Current approach to end-user training	JAN 2016	13 min	Recording, field notes
Interview (Mist 2)	Manager, Service	Current approach to end-user training	JAN 2016	35 min	Recording, field notes
Interview (Mist 3)	Manager, Service	Current approach to end-user training	JAN 2016	21 min	Recording, field notes
Conference call (Riot 1 & 2)	Asset Managers	Customer requirements	JAN 2016	45 min	Field notes, Minutes of meeting
Interview call (Riot 1)	Asset Manager	Customer requirements	FEB 2016	34 min	Field notes

Table 2. Details of data 1 collection interviews

In addition to interviews, existing documentation was also used as a data source for data 1. The existing case company documentation related to end-user training was studied. The third main source of data were the International Maritime Organisation (IMO) Standards of Training, Certification and Watchkeeping (STCW Convention) and the Safety Of Life At Sea (SOLAS) rules and regulations. The case company documents that were inspected included existing end-user training description and existing end-user training agendas along with marketing material, the general scope of system delivery documents and a tool for making quotations. The STCW Convention and SOLAS regulations were studied to find out what is regulated, if anything, regarding the ships crew's training involving fire safety equipment on board. Table 3 shows the details of data 1 collection through existing case company and STCW Convention & SOLAS documentation.

Name of the document	Size	Description
End-user training description	1 page	A general description of end-user training
End-user training agenda	2 pages	Agenda for the current end-user training
End-user training quotation template/tool	4 sheets	Excel template for creating end-user quotations
Quotation template	21 pages	Scope of what is included in the quotation of a fire protection system
Marketing brochure	4 pages	Marketing material of the fire protection system
System commissioning instructions	91 pages	Step by step instructions for system commissioning
System commissioning report	15 pages	Report template that is filled during system commissioning
SOLAS 2014	474 pages	IMO, SOLAS Consolidated Text of the International Convention for the Safety of Life at Sea
STCW Convention 2011	356 pages	International Convention on Standards of Training, Certification and Watchkeeping for seafarers

Table 3. Details of data 1 collection; case company and IMO documentation

The collected data was analysed with a thematic approach, where a series of themes is extracted from the data collected. First the data is looked at as a whole, then interesting features are picked up and coded. All data of these features is collated under each code. Then the codes are collated in to potential emerging themes. A cross check is made with the themes and the code extracts and the entire data set to generate a thematic map of the analysis. An on-going analysis is applied to refine the specifics of the themes and the overall story of the analysis. This way clear definitions and names for each theme is generated. Finally a report of the analysis is produced. (Braun and Clarke 2006. Cited in: Blaxter et al. 2006).

The results of data 1 are used in the formation of data 2 in building of the training service proposal.

2.3.2 Data 2 Collection and Analysis

Data 2 is the merger of the conceptual framework that emerged from existing knowledge with data 1 collected in the current state analysis. This merger which is data 2 is then used to design a proposal training service. Data 2 for this study was derived through workshops with the stakeholders. Table 4 shows the details of data 2 collection.

Data type	Person ID	Participant position	Date	Duration	Document
Workshop one-to-one	Droplet 1	Field Operative	MAR 2016	45 min	Post-its/Field notes
Workshop one-to-one	Droplet 7	Field Operative	MAR 2016	45 min	Post-its/Field notes
Workshop one-to-one	Mist 2	Manager, Service	APR 2016	55 min	Post-its/Field notes
Workshop one-to-one	Mist 3	Manager, Service	APR 2016	45 min	Post-its/Field notes
Workshop one-to-one	Mist 4	Coordinator, Service	APR 2016	45 min	Post-its/Field notes
Workshop one-to-one	Mist 5	Manager, Sales	APR 2016	45 min	Post-its/Field notes
Workshop one-to-one	Mist 6	Senior Manager	APR 2016	55 min	Post-its/Field notes
Workshop one-to-one	Mist 7	Coordinator, Service	APR 2016	45 min	Post-its/Field notes
Workshop one-to-one	Mist 8	Coordinator, Service	APR 2016	45 min	Post-its/Field notes
Workshop one-to-one	Mist 9	Manager, Service	APR 2016	45 min	Post-its/Field notes
Workshop one-to-one	Mist 10	Manager, Sales	APR 2016	45 min	Post-its/Field notes
Workshop one-to-one	Riot 2	Asset Manager	APR 2016	90 min	Post-its/Field notes
Workshop	Riot 1	Asset Manager	APR 2016	70 min	Post-its/Field Notes
	Riot 3	Asset Manager	APR 2016		

Table 4. Details of data 2 collection for building the training service design

The validation of the proposal training service is done using data 3.

2.3.3 Data 3 Collection and Analysis

Data 3 is feedback from stakeholders regarding the end-user training service. Data 3 serves as the validation of the end-user training service proposal and is used for fine tuning of the proposal. The feedback was collected as stakeholder feedback in the case company and in the customer's organisation. The stakeholder feedback was then used for the building of the final end-user training service design proposal. Table 5 shows the details of data 3 collection for the stakeholder feedback.

Data type	Person ID	Participant position	Date	Document
Stakeholder feedback	Riot 1	Asset Manager	APR 2016	Field Notes
	Riot 2	Asset Manager		
Stakeholder feedback		Case company executives (4)	APR 2016	Field notes

Table 5. Details of data 3 collection, stakeholder feedback

When the data collection sources were chosen, the aim was to get data from different perspectives and in a triangulating fashion. This was to help to get an overall picture of issues relating to the case and the context surrounding it. Multiple perspective triangulating data collection also contributes to the validity and reliability of the research.

2.4 Validity and Reliability Plan

This section deals with the validity and reliability of the research conducted in this thesis. A brief summary of concepts is presented and the intended steps to be taken to ensure the validity and reliability of this thesis are listed. The actual assessment of the validity and reliability of this thesis is discussed in the Discussions and Conclusions section.

The validity and reliability are concepts used to assess the quality of research. Depending on which research approach and methods have been chosen the approach towards validity and reliability will follow accordingly (Quinton and Smallbone 2010). The quality of empirical social research, which is the body of research that case study is part of, can be assessed through four tests. Construct validity, internal validity, external validity and reliability (Yin 2013).

Construct validity is a measure of the validity of the mechanics of the research. “It aims to identify the correct operational measures for the concepts being studied” (Yin 2013). This research is identified as a case study utilizing qualitative research data in section 2.1 Research Approach, and the research design and methods are derived from this starting point to create a valid research construct.

Internal validity is a test that asks did the research actually measure what it intended to measure, did the research design study the right things. Internal validity is an issue that can be seen as a strength of qualitative research in general because of the nature of the research method itself. The argument is that it does not matter if the question answered turns out to be slightly different than the original question, because as it is qualitative research so much data is collected that it will tell you something of the subject of study regardless (Quinton and Smallbone 2006). Internal validity seeks to establish a causal relationship where certain conditions lead to other conditions. As such it is not easily applicable to exploratory or descriptive studies (Yin 2013). In this research data collection is done in big part through interviews. The formulation of the interview questions was done with internal validity in mind. Many of the questions are in many ways focused to get answers relevant to the topic of end-user training while at the same time some of them contributed in painting the bigger contextual picture. Also the documentation review focuses only on relevant documents regarding end-user training of fire protection systems.

External validity is an assessment of can the results of the research be applied to other context and if so, to what extent (Quinton and Smallbone 2006). Yin defines external validity as “defining the domain to which a study’s findings can be generalized” (Yin 2013). In a single case study this can be achieved through the study of relevant theory within the context of the case. In this research the relevant theory within the context of the case is studied in the existing knowledge section through a literacy review of key concepts identified in the current state analysis.

Reliability of research assesses can the same results be derived by repeating the same research by another researcher. In a case study this would mean repeating the same case study, not by doing the same research to another case (Yin 2013). This is sometimes seen as problematic in social context research as people are not always consistent sources of data (Quinton and Smallbone 2006). Reliability can be improved by following the following methods (adapted from Quinton and Smallbone 2006): Data should be collected from multiple different sources and using different collection tools. Using multiple research methods to answer the same question is called triangulation. Established theory should be applied from one area to another, as in case study when building the conceptual framework using existing knowledge. In this thesis many steps are taken to ensure a high level of reliability of the research. Data is collected from different sources, not just one. Data 1 for the current state analysis is gathered from three different sources; the case company, a customer and IMO. Data 2 for the building of the design will include two more sources; existing knowledge in relevant literacy and a benchmarking company. The data will also be gathered in different forms; recordings and field notes through interviews and workshops, documentation from the case company, IMO and literacy and also through direct observation during the validation process. Reliability will also be ensured by taking a methodical approach to the whole research. All of the interview questions are added as appendixes along with the field notes of the recordings of the interviews. The field notes are sent for review to the informants before filing. Also notes from workshops and minutes of meetings are filed as appendixes. All sources of data, different types of data, collection methods, interview durations and dates are recorded, listed and explained in section 2.3 Data Collection and Analysis.

One issue worth mentioning is the possible presence of researcher bias. In this case the researcher has been heavily involved in end-user training in the case company already before this research. This might have an effect for example on the case company informants' answers to interview questions. As a precaution against researcher bias the author worked on being neutral throughout the conduct of the research. This was noticeable in particular in formulating of questions for the interviews, the analysis of data and theme deduction and the approach and attitude taken with the customer early on. It needs to be mentioned that qualitative research always induces an element of bias, thus full neutrality and objectivity remains an illusion. The resulting reliability and validity of this thesis shall be assessed in the Discussions and Conclusions section.

With the research approach and design, data collection and analysis methods and validity and reliability issues of this study settled, the actual research start with current state analysis discussed in the next section.

3 Current State Analysis

This section focuses on identifying the strengths and weaknesses of training provided by the case company as well as end-user training expectations through a Current State Analysis. This is done by first mapping out possible regulatory aspects regarding fire protection system training in the context of the case, i.e. rules regarding passenger ships. Secondly the current delivery and features of end-user training provided by the case company are studied. Thirdly the requirements of the customer regarding end-user training and its features are examined. The section ends with a summary where the key findings are presented.

3.1 Overview of the Collection and Content of Data 1

Data 1 was collected by the study of documents and interviews and one conference call. The data was then looked at and analyzed in with a thematic approach. From data derived from the case company four main categories emerged. The same could be seen with the data derived from the customer, but the four categories that emerged were slightly different than those with the case company. The difference is due to different viewpoints. The case company informants reported on what they saw as the strengths and weaknesses of the current end-user training and the different stages of its process, whereas the customer informants did not really consider any end-user training to exist at all in their current customer relationship context. Accordingly the customer informants considered the end-user training to be a new service in development and reported solely on their requirements and wishes regarding the features of this new service.

The data in each category was then analyzed to identify strengths and weaknesses in the current case company end-user training delivery and its features. These strengths and weaknesses were then studied to pick up the key findings, and these combined with the key findings of customer requirements are presented and used to form an overall picture of the current state of end-user training. This is done by presenting the current features of end-user training, comparing them to the desired features that emerged from the customer and case company data and cross checking both angles against the features required by regulations.

3.2 IMO STCW Convention and SOLAS Regulation Requirements

As the case is set in a marine setting, possible regulations regarding the training of the crew of a passenger ship are mapped out by reviewing the STCW Convention and SOLAS documents on fire protection systems and crew competence. The STCW Convention is the standard of training, certification and watchkeeping of seafarers and deals with the competence of seafarers whereas SOLAS Consolidated Text of the International Convention for the Safety of Life at Sea deals more with technical specifications of ships and the emergency equipment and appliances of ships.

The STCW Convention specifies firefighting training requirements regarding seafarers, but there is very little said about fire protection system specific training. The STCW Convention deals more with the general basic emergency training of seafarers. All seafarers need to have basic firefighting training. Seafarers who are designated to control firefighting operations need to have advanced firefighting training. (STCW Convention 2011: A-VI/1, A-VI/3). Table A-VI/1-2 specifies the minimum standard of competence in fire prevention and firefighting but the only mention of firefighting systems reads as *“knowledge, understanding and proficiency to the location of firefighting appliances and equipment”* (STCW Convention 2011: Table A-VI/1-2). The minimum standard of competence in advanced firefighting mentions *“knowledge, understanding and proficiency to fixed fire extinguishing systems including appliances, pumps etc.”* (STCW Convention 2011: Table A-VI/3). Regulation A-1/14 deals with the responsibilities of companies. *“Companies are required to ensure that seafarers assigned to any of its ships have received refresher and updating training as required by the convention”* and *“Companies are required to ensure that seafarers on being assigned to any of its ships, are familiarized with their specific duties and with all ship arrangements, installations, equipment, procedures and ship characteristics that are relevant to their routines or emergency duties”* (STCW Convention 2011: A-1/14). In other words on board ship specific fire protection system operation training can be seen to be required for relevant crew members, but the specifics and level of detail of this training is not mentioned in the STCW Convention.

The SOLAS text is on the same general level as the STCW Convention regarding fire protection system training. The part Construction - fire protection, fire detection and fire extinction mentions that fire patrol members need to be trained and familiarized with the arrangements of the ship including the location and operation of any equipment they may need to use (SOLAS 2014: II-2/7 ,8.1). In another section it is mentioned that the crew members need to be trained and familiar with the ship arrangements, location and operation of firefighting systems. The firefighting skills need to be maintained to ensure the operational readiness of the firefighting organization. (SOLAS 2014: II-2/15).

In summary the maritime rules and regulations do not give any specific demands regarding on board system specific fire protection equipment training other than that the crew needs to be familiar with the system to perform their duties.

3.3 Current End-user Training by the Case Company

The current delivery and features of end-user training by the case company was studied by interviews of personnel and through the study of documentation related to end-user training. The findings based on this analysis are presented next, first by providing an overview of the stages of end-user training, followed by a stage-by-stage analysis of the training process.

3.3.1 Overview of Current End-user Training

Currently end-user training is mainly provided as a system hand over training during commissioning or sometimes during maintenance visits. As a hand over training it is included in the system delivery scope and usually in the system delivery price as well. Commissioning reporting and -instruction documents support the hand over training approach as they both mention “system training” as the final step before finishing commissioning and handing the system over to the end-users. Time allocated for hand over training is usually a few hours, sometimes a day. The person that conducts the hand over training is the commissioning / service engineer performing the commissioning or maintenance at hand. When done as part of commissioning the timing of the end-user training is usually just before the complete hand over of the ship. This is a very busy time for all stakeholders as there are multiple system commissioning and training activities going on at the same time. A marketing brochure for services and service contracts made in 2014 mentions training as one of the purchasable services that the case company provides.

It is worth noting that some of the strengths and weaknesses that came up in the interviews come across as contradictory. One aspect that made the results somewhat bi-polar was that apparently in addition to the standard hand over training there is an existing specially designed end-user training service which has not been fully implemented nor communicated across the case company. This showed up in the interviews when some of the interviewees knew about the existing end-user training service and some were not fully aware of it.

From the data derived through the interviews a thematic framework was established. The emergent themes formed naturally under four main categories; sales & promotion, planning & content, customer awareness and training delivery. These categories represent the different stages of end-user training. The strengths and weaknesses found are illustrated in detail using the thematic framework in figure 2. Whilst most of the strengths and weaknesses related to a certain phase in the training process, some of them were visible throughout the end-user training process.

Summary of S&W of the current process

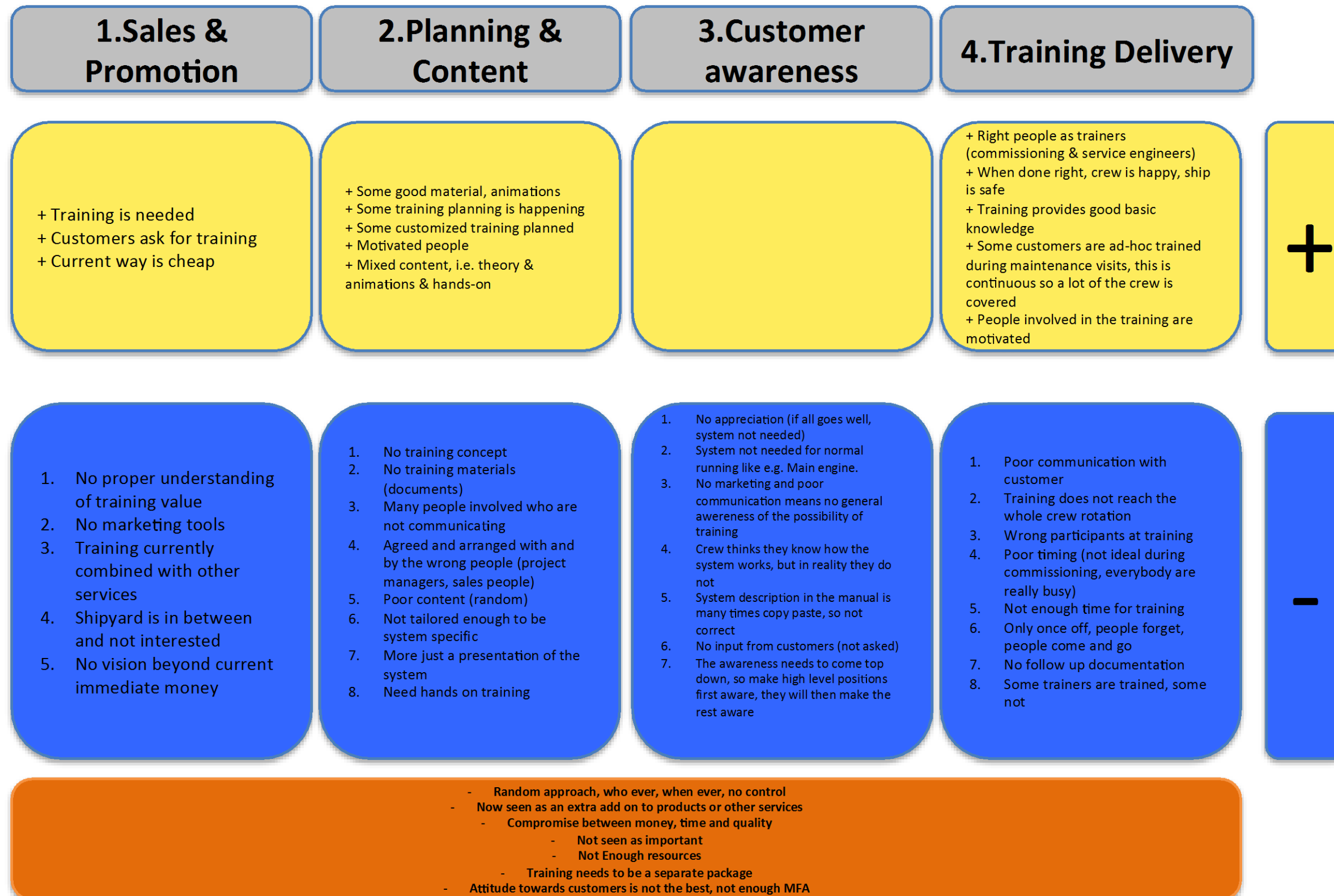


Figure 2. Strengths and weaknesses thematic framework of data derived from case company interviews

3.3.2 Stage 1: Training Sales and Promotion

The chronologically first category that any strengths and weaknesses are identified is the sales and promotion stage of end-user training.

The strengths relating to the sales theme of end-user training were partly case company internal and mostly external. As an internal strength of the current approach all of the interviewees mentioned that this way end-user training is cheap to provide. When the end-user training is combined with other services there are minimal additional expenses as there are no separate travel costs or arrangements needed. The effect of this is that training can be sold very cheaply or can even be included free of charge to the system delivery. As the price is cheap, the demands and expectations of the customers are also on a relatively low level which minimises the need for preparation work. On the other hand training is more and more desired and even expected by the customers and end-users. This is visible as requests for end-user training even though there has been minimal marketing. It is a service which is more and more in demand and can be sold to some extent simply by reacting to customer initiatives.

For the sales part the weaknesses found regarding end-user training started from a lack of proper appreciation of the value of end-user training. Most of the other weaknesses can be seen to derive from this starting point as the sales phase is mostly driven by the need for immediate monetary results instead of an appreciation of long term customer experience and service life after system delivery. Promotion wise marketing of end-user training is almost non-existent *“Well currently we are not marketing it in any way. So it is only by customer’s request”* (Mist 1). The lack of marketing could be because end-user training is not seen to have any real value, and thus marketing it would be a waste of resources. The lack of marketing for end-user training was seen as a major disadvantage overall by many of the interviewees. Already in the sales phase end-user training is considered as only an extra add-on to the sales of the physical products and systems and is usually combined with other services, most commonly with system commissioning and sometimes with maintenance visits. The negative effect of combining the end-user training with other services will be presented in more detail in the training delivery section.

In addition to the internal approach of the case company, the setting of the sales process has a negative effect on the sales motivation of end-user training. The sales setting is such that the immediate customer of the fire protection system is usually not the end customer and end-user of the ship. Instead the direct customer is the shipyard that builds the ship and then delivers it to the end customer and end-users. The shipyards usually only aim to deliver the ship and are not really interested in the life after hand over beyond the warranty period. For a system supplier like the case company this is gap in the sales bridge and a draw back when trying to establish customer relationships for after sales purposes for system life cycle support with the end customer.

3.3.3 Stage 2: Training Planning & Content

The second category that emerged from data 1 having strengths and weaknesses is the planning and content stage of the training.

In general the planning and content of the end-user trainings got mixed results. On one hand material was said to be poor or non-existent and on the other hand some interviewees commented that the material and content is good and versatile. The same contradictory nature is visible regarding planning. Some of the interviewees said the planning of trainings is poor and too general i.e. not system specific enough *“The only training that the end-user, the actual customer, gets from us at that point is the minimal training which the commissioning engineer can give during the class authority inspection”* (Droplet 1). At the same time some of the interviewees thought that it was good that some of the trainings were tailored to be system specific and were planned out well.

The overall conclusion regarding the planning and content of the current end-user training is that there is no general concept or guide lines of how it should be done, who should do it and what it should include. In different cases it is done and planned with different approaches by different people. Thus the outcome is not consistent.

A specific weakness that emerged from the interviews with the people who had been involved in the trainings as trainers was the approach to the planning and arrangements. In the informants' opinion the approach was in many ways somehow flawed. With further inquiry a connection with this undesirable approach and new build sales, planning and arrangements was made. In other words the training suffered because it was connected to new build sales and was part of project delivery. This weakness was present on both case company and customer sides. Project managers on both ends were mostly seen to be interested to get the system delivered as quickly as possible with minimal costs and delays. They were uninterested in any services outside commissioning. Sales persons were seen to be mostly focused on selling the system itself i.e. the products and components, whereas services in general were of very little interest to them. Possible reasons for the lack of interest of the sales personnel in end-user training are discussed in the previous subsection.

The overall feeling was that the motives and drivers of new build project sales and delivery were not in line when it came to services. Also the understanding and attitude towards end-user training and end-users in general of project managers and sales people was seen to be poor because people in these positions have no connection with the end-users.

3.3.4 Stage 3: Customer Awareness of Training

The third category to emerge is the customer awareness stage of end-user training. Here the term customer awareness has many dimensions and is considered as the case company informants perceive it.

One dimension is that as there is minimal promotion of end-user training most customers are not aware that the case company provides any. When they are not aware of the existence of end-user training they do not ask for it *“It depends on the customer. How much they are asking for. I think the company tries to just sell the product”* (Droplet 2). Another dimension of customer awareness relates to the nature of fire protection systems. In an ideal situation the system is never needed to fight fire because hopefully there will be no fires to fight. This means that the system is of little interest and attention in the everyday running of a ship. This is sometimes visible in the customer’s interest to end-user training especially if it is arranged in the form of hand over training. As stated before the timing of the hand over training sets it in the middle of all other system commissioning and training activities of the ship. And since the fire protection system is not part of the immediate interest of the end-users in a similar way as e.g. the main propulsion system is when considering the day to day running of the ship the end-users will sacrifice fire protection system training to attend to other more crucial activities going on at the same time. One more dimension is the awareness of the customer in the form of false confidence regarding the operation skills of the fire protection system. Sometimes the end-users think that they know how the system works and how to operate it but this might not be the case. Promotion and marketing of the fire protection system tends to highlight automatic functions and ease of use, but since it rarely mentions anything about the existence and need for end-user training the end-users can get a distorted view of their actual skills and knowledge required for proper operation.

3.3.5 Stage 4: Training Delivery

The fourth category to emerge from data 1 is the delivery stage of the end-user training. Here again the controversy of some people not being fully aware of the separately designed end-user training service is clearly visible. Some of the weaknesses regarding training delivery are valid only for the hand over approach, but the designed end-user training service is not completely weakness free either.

One key strength that was clearly visible in all of the interviews is that the right people are involved as trainers, i.e. the commissioning and service engineers. The reasoning for this is that they have the best technical and system specific knowledge already without the need for separate familiarising process *“Of course the commissioning engineer is probably the best man to know how the system is working”* (Droplet 6). Also the commissioning and service engineers are highly motivated to perform training in their own opinion. It is evident that when done right the end-user training will provide the end-users with good knowledge of the system and this contributes positively to customer satisfaction and the fire safety of the ships in question.

Weaknesses specific to the hand over approach include problems with scheduling, timing, time constraints, target group awareness and communication. As the hand over training is usually part of the commissioning which as previously already stated is a very busy time for the end-users the scheduling is sometimes nearly impossible to do so that a common time slot can be found. Also the time that can be used for training is very limited; the case company has usually scheduled the commissioning so tightly that there is very little time left to perform training. As mentioned by Droplet 4:

The biggest problem is the lack of time. Schedules are so tight that we do not have possibility to do the end-user training in the end of the commissioning. Often we just have to pack our things and leave to the airport straight away.

On the other hand the end-users on the customer's side are so busy with other things that they cannot spare too much time for fire protection system training. One big problem that was evident is that many times the people that attend the hand over training are not end-users at all. This is strongly connected also with communication with the customer. Many times the customer's side becomes aware of the training in such a late stage that they send whoever happens to be around and available, regardless if they have anything to do with operating the fire protection system. Also many times the crew members, the end-users that are present during system commissioning and ship hand over are different to the crew members that will actually man the ship later on after hand over.

Weaknesses that were common both to the hand over training approach and the designed end-user training approach were related to the way that a ship operates regarding crew and crew rotation. Both ways of end-user training are conducted as one instance only. This means that only those crew members present at that time will attend. As most ships have a crew structure and rotation of two persons per position where the other person works on board the ship while the other person is on leave at home, a so called 1-1 system, the provided one-instance-only training approach will leave half of the crew still untrained. Also normal movement of people in and out of the company or to another ship means that new people will be introduced to the crew of a ship continuously and these new people will not benefit from a training conducted before their time. One more issue that is related to the nature of fire protection systems that was also contemplated already in the previous sub-sections, is that as the system is not something that has to be actively used every day or even every month, knowledge gained in training will eventually fade from memory if no refreshment will happen.

3.4 Customer Requirements

The third source of data for data 1 was one key customer of the case company. Information was gathered by interviewing two key persons in the customer's organisation. First a conference call was arranged with both of the customer's representatives and later an individual interview was conducted with one representative. In this case the customer already had some pre-thought ideas regarding the whole end-user training process. These ideas were communicated in the conference call and then partially used as a base for formulating interview questions for the customer interview. Points that were raised by the customer included training content, delivery method & timing and learning outcome. The details of customer requirements are illustrated in figure 3.

Customer requirements (Riot Interview & tel. conf.)

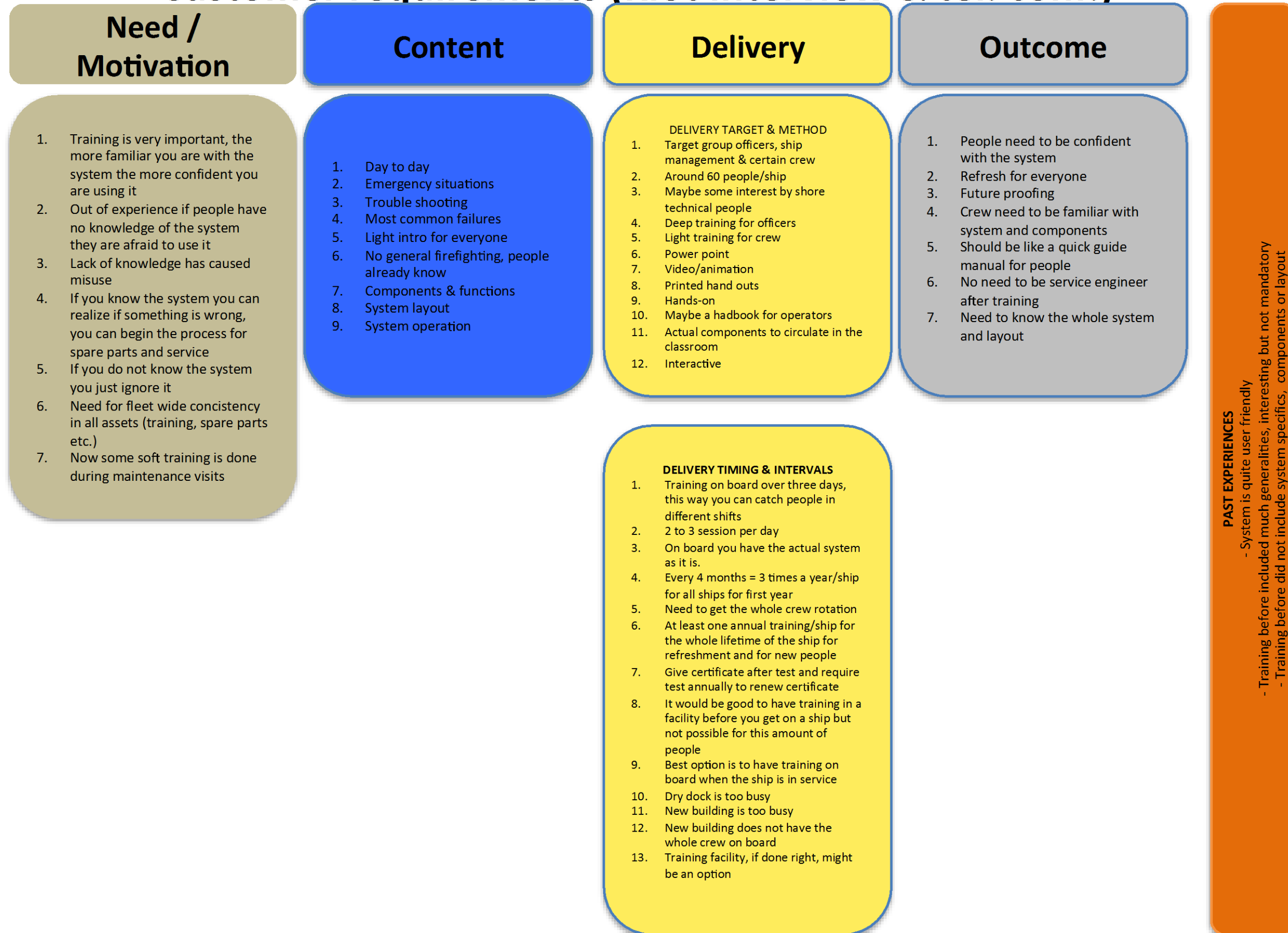


Figure 3. Customer Requirements.

As background knowledge both of the customer's informants did have past experience with case company provided fire protection systems and training. As a clarification the training that they had received in the past was given when they were working for a different company than that of this case. The fire protection system itself they described as being quite user friendly, while the previous training was said to include too much generalities and not enough specifics.

As stated in subsection 3.1 categories that are present here in customer requirements are not the same that came up in the current process of end-user training by the case company. The reason for this is the difference in viewpoints; the case company informants commented on the current features of end-user training whereas the customer informants did not consider to have received any end-user training at all in the current customer relationship context. Thus the customer informants only commented on their requirements and wishes regarding the features of a completely new training service.

3.4.1 Category 1: Need for End-user Training

The customer of this case had approached the case company and communicated their need for end-user training. Their viewpoint is that of a ship operator i.e. the safe uninterrupted smooth operation of their ships is the overall goal.

The customer sees end-user training as important from multiple angles. One of the angles is fire safety. The more familiar the end-users are with the fire protection system the more confident they are in using it in any given situation. If turned around, in the customer's experience if end-users do not have enough knowledge of the system they are afraid to use it in any way in fear of making things worse "*Because the experience says that most of the time people are afraid to do certain things or to take action on some system if they do not have the right knowledge*" (Riot 1). Or the end-users will simply ignore the system if they do not appreciate the features and uses. Apparently lack of knowledge has been proven to lead to misuse of the fire protection system with undesired results in the past.

Another angle for the need of end-user training is the awareness of the state and condition of the fire protection system. If the end-users do not know the system they will not realize if something is wrong with it. Or even if they recognise a fault situation they do not have a clear idea how serious the fault is. This also creates delays if spare parts are needed or possibly a service visit has to be arranged as the operators might not know what parts are needed and is a fault serious enough to trigger the need for a service visit.

One final angle has to do with the nature of manning a big fleet of ships. The customer expressed that they need fleet wide consistency in all assets, this includes fire protection system end-user training. This is due to the fact that crew members will work on different ships at different times and if all of the assets are as consistent as possible on every ship the transition from ship to ship will create minimal problems.

3.4.2 Category 2: End-user Training Content

When inquired about what type of content should the end-user training include the customer listed a number of points. One criteria when defining the scope of content was the target group of the end-user training. As the target group consists of sea personnel some generalities of firefighting can be discarded as these types of issues are already part of the basic training that all sea personnel have to have. As said by Riot 1:

I have had training before when I was shipboard and well the training was nice, it was ok. But it was mostly about general firefighting stuff, fire triangle, things like this. Ok they are good to know but most of the people know them already especially if they work in a ship.

The need for two separate trainings with different content was expressed. The idea is to give a lighter basic training for relevant members of the crew and a more in depth training for officers and ship management. The details of these two different training deliveries will be discussed in the next subsection that discusses training delivery targets and methods. This subsection presents the overall scope of content for the end-user training.

The scope of end-user training content starts off with basic system information. All of the major components and the layout of the system need to be included along with physical locations of these components on board. These components include operation panels, pump units, section valves and general spare part information. After the components and layout the basic system operation, how the system works and reacts in different situations, needs to be presented.

System operation in emergency situations was listed as high importance. But equal importance was given to day to day routines checks and tests along with knowledge of the most common failure situations and trouble shooting. The reasoning behind this equality approach is that the end-users capability to maintain the system in good operating condition and recognise minor and major faults and problems contribute to the actual emergency situation as much as the actions taken during the emergency situation.

3.4.3 Category 3: End-user Training Delivery

Many points came up regarding training delivery. Two sub categories can be seen emerging from the data. The first sub category is training delivery target and method which includes points regarding the target group, the types of training delivery and method of training. The other sub category is training delivery timing and intervals which includes issues regarding at what point should training be given, should it be repeated and how often. The training delivery target and method subcategory is presented first followed by the training delivery timing and interval subcategory.

Training delivery target and method

The customer specified the target group as the officers, management and crew of a cruise ship. The customer specifically wished that two levels of training would be provided; lighter and more generic training for a selected group of crew members and a more detailed in depth training for the engine officers, safety officer, part of the deck officers and ship management. All together this will be about 60 persons in one ship. As for delivery method a mixed approach was suggested. This means that the training would consist of class room theory in the form of power points and lecturing combined with hands on training utilizing the actual system on board *"It would be good to have some of the actual components that are talked about physically there to circulate them around so that people can handle them"* (Riot 1). Overall the training should be quite interactive as the target group consists of people who have been trained to be very operative and hands on.

The training delivery timing and interval

The training should be conducted on board over a period of three days to allow multiple training sessions so that all designated participants can attend. There needs to be multiple sessions as almost everyone on board work in some kind of shifts. This three day period needs to be repeated all together three times in the course of one year. This way the full crew rotation can be accommodated within a one year period. After the initial training year at least one annual training session needs to be arranged for the whole lifetime of the ship so that possible new crew members can attend and the ones already trained can renew their training certificate. This needs to be done on board the whole fleet. Training on board a ship in normal operation is suggested as the best option. Training during commissioning or dry dock are discarded as choices because of their busy nature and also for the reason that not all of the designated target group members will be on board and able to attend at dry dock or during commissioning. This was a very clear point for the customer (Riot 1):

Best option is to have the training when the ship is already sailing and in service. Because if you think about new buildings or ship in dry dock, it is too busy. The crew for sure will not have time for training.

3.4.4 Category 4: End-user Training Outcome

As a general end-user training outcome people need to be confident with the system. The end-users do not need to be trained as service engineers of the fire protection system, but they need to know the system layout and be familiar with all of its main components and operation. The training should be like an inner quick guide manual for end-users. As described in interview (Riot 1):

You know when you buy a new car you try to understand everything, how it works and what you can do to improve it and which accessories you have in your car. That is something we want to do with the system on board. We want to make sure that people feel safe and confident with what they have in their hands and they are free to use it.

The need for an end quiz or test was also expressed to verify the training outcome. All participants should be subjected to a final test and if the agreed limit of correct answers is not achieved the test has to be taken again or the training needs to be repeated.

3.5 Key Findings from the Current State Analysis

The STCW Convention and SOLAS rules and regulations are on a very general level and mostly only mention general firefighting training. The summary regarding on board fire protection system training is that the crew needs to be familiarized with the system to be able to perform their duties. Other than that there are no relevant specifics mentioned.

Key findings revealed through case company interviews and documentation can be found in all four categories that emerged from the data; sales & promotion, planning & content, customer awareness and training delivery. When looking at the features related to all themes an overall picture emerges that if the value of end-user training is not fully appreciated and communicated internally in the case company and externally to the customers it will be considered only as something extra that is sometimes maybe mandatory to deliver. In the sales and promotion phase it is important that the sales and marketing people realize the true potential value of end-user training. This is the only way they can effectively sell and promote this type of service successfully. Equally important is that the planning of the training, content wise and in general, is performed by people who know what are the end-users' needs and what is the customers end game. End-user training needs to be a separate service that supports the needs of the actual end-users, not just something to get the box ticked in the commissioning report.

End-user training needs to be planned and performed in a systematical manner according to agreed processes and using prepared material so that it will not be just ad-hoc and random by nature and content. The training itself needs to be delivered by competent people who know the system and understand the context of the end-user.

Key findings from the customer requirements seem to be quite similar of those derived from the case company. The current prevailing hand over training model apparently is not beneficial at all regarding desired overall outcomes of end-user training. Instead the training should be arranged after hand over when the ship is in normal operation. Also one training session is not sufficient as this does not catch the whole crew rotation. Instead multiple training sessions are required. Also in a cruise ship the designated participants consist of a large number of people and so two levels of training is preferred, light for crew and deep for officers, instead of a “one course fits all” approach. With all this in mind it is very clear that hand over training combined with commissioning does not suffice to satisfy the requirements of the customer and end-users. Also the content needs to be planned according to the target group of the end-user training. The content needs to be system specific and go in to enough detail. Content that is already included in the basic training of sea personnel, like generalities of firefighting, can be left out so that the focus can be more in the specifics of the fire protection system at hand.

To summarize, all of the key findings of the three viewpoints of regulation requirements, currently provided features and desired features need to be combined and cross checked. The idea is to see the following; are all of the regulatory aspects are met, which are the strengths to keep and weaknesses to tackle regarding the features of current approach to end-user training, and how do these strengths and weaknesses correlate with customer requirements. A cross check is made in table 6 regarding the condensed key features that correlate with each other and how they compare in their respective categories. It is worth noting that the “Desired Features” column in table 6 does not only include issues derived from the customer requirements but also insights from the case company informant interviews. Therefore the desired features listed here are the result of a merger of customer requirements and case company know how.

CATEGORY	PROVIDED FEATURES (From section 3.3)	DESIRED FEATURES (From sections 3.3 & 3.4)	REGULATION REQUIREMENTS (From section 3.2)	MATCH
General approach	General system presentation	General system description	System familiarization	YES
	Random	Consistent	-	NO
Content & Planning	General training	System tailored training	-	NO
	Ad hoc	Systematic	-	NO
	Single training for all	Two levels of training for officers and crew	-	NO
Delivery	Delivered at handover	Delivered when ship in service	-	NO
	Combined to other services	Training delivered separately during separate visit(s)	-	NO
	One instance training	Repeating training courses	-	NO
Outcome	Trainers are system experts	System specific information	-	YES

Table 6. Cross check of key issues between regulation requirements, currently provided features and customer and case company desired features by categories

There are also many issues that fall outside of this correlation cross check that nevertheless cannot be left unconsidered. But as the overall current delivery of end-user training and its features is in so many ways different compared to the desired features the overall conclusion is that end-user training as a service needs to be designed completely from scratch.

3.6 Summary of the Current State Analysis

This section explored the current state of end-user training through three view points; Regulation requirements, the current delivery and features of end-user training provided by the case company and the customer requirements regarding end-user training of fire protection systems on their cruise ships.

The overall finding is that the current approach is not ideal. The regulatory aspects are very generic and are currently fulfilled, but most of the features of the current end-user training delivery do not match with customer requirements or even with the case company consensus of the desired features of end-user training.

Looking at the overall picture of the current state of end-user training in the light of all of the information that was uncovered during this investigation the final conclusion is that if end-user training is a service that the case company intends to provide, then it needs to be re-designed completely from the ground up. This needs to be done using the insights gathered here combined with existing knowledge and best practices derived from service design literature. This way the inconsistencies with the current delivery versus external and internal requirements can be dealt with in a logical and grounded manner.

4 Existing Knowledge

The conclusion of the current state analysis was that end-user training as a service needs to be re-designed completely from start to finish. Accordingly the aim of this section is to study service design and the elements related to it.

The exploration of existing knowledge covers several different viewpoints. Most viewpoints are embedded in to a quality based perspective as quality is something that can be used as a lens to view the service design throughout. The viewpoints are chosen with an aim to form an overall picture of service design in the context of training services. From the identified key elements a conceptual framework will be built. The conceptual framework needs to be on a suitable level of detail and robustness regarding the requirements of the case of this thesis, i.e. when building a completely new specific service for a particular case.

4.1 Systems Thinking Perspective to Service Design

Service is human centric by nature. Therefore it includes ill-defined, wicked problems. This combined with the presence of multiple stakeholders makes services complex issues. Complexity requires a wider definition of design that does not produce solutions as such but can be seen to enable services rather than creating them outright. The design intervention needs to also be consistent with the large picture to be accepted as valid. (Darzentas and Darzentas 2014).

When looking at things in the way of systems thinking, working with the larger picture is required. Breaking the large picture down into smaller parts will mean losing the interrelationships between those parts. Systems thinking also strives to accommodate the human centric i.e. complex nature of problems. (Darzentas and Darzentas 2014).

Systems thinking compared to traditional design has the following features; it looks at relationships rather than individual objects. It looks at the connectedness of issues. It looks at processes instead of structures. It perceives the whole instead of the individual parts. It looks at patterns of a system instead specific contents. Systems thinking is about context. Systems present emergent features which cannot be deducted from the individual parts that they are compiled of. (Darzentas and Darzentas 2014).

The service designer's task is seen as to enable value co-creation between all parties (Darzentas and Darzentas 2014).

A systems thinking service designer looks actively for desirable emergence. Emergence is the appearance of non-predictable behaviour in response to an event. Systems thinking designers are observers that are involved in the system i.e. they are not outside observers. This means that they are co-designers along with the problem owners and other parties involved. (Darzentas and Darzentas 2014). As an added bonus the systems thinking oriented service designer is naturally open for input from other disciplines and therefore more inclined to solve complex situations. (Darzentas and Darzentas 2014).

As a summary if services are approached through the mindset of systems thinking they need to be considered and designed as complete entities being part of the overall system of the case company, i.e. business strategy, organisation structure, the people in that organization etc. If the entity of service is broken down to its individual components the interrelationships between those parts will be lost and the service will no longer work as originally intended.

4.2 Experience Centric Perspective to Service Design

The focus of this thesis is the design of a training service. Therefore the nature of training as a service needs to be considered. In addition to being about human interaction, training can also be seen as experience centric.

Experience centric services are here defined as services where the value of experience is more than the value of service attributes added to the price of the service. (Zomerdiijk and Voss 2010). In experience centric services the customer experience is at the core of the service offering. To design an experience centric service you need to design the experience. However as these experiences are perceived by the customer, they are partially out of control of the service provider. (Zomerdiijk and Voss 2010). The nature of experience centric services is such that they are designed to engage the customer and to enable them to connect with the service in a personal way. This specifically builds emotional connections and can lead to a positive word of mouth. (Zomerdiijk and Voss 2010).

The drama metaphor can be used to describe services. It includes the following elements: the stage – the physical environment, the actors – the service staff, the script – the service delivery process, the audience – the customers and the back-stage – the back office support. (Zomerdijk and Voss 2010).

Experience centric service design gives us six propositions:

1. Proposition one says that the designing experience centric services is done by designing a series of service encounters, or touch points, with the customer and cues that orient the customer.
2. Proposition two says that the design of experience centric services involves sensory design. Although service itself is often in-tangible the tangible elements, like the physical environment where the service is delivered, are none the less often considered key variables that influence the customers perception and behaviour. The five human senses are considered crucial to the design of tangible elements in experience centric services.
3. Proposition three says that front line staff are required to engage with customers. Interaction between staff and customers is believed to be a very important factor.
4. Proposition four says that attention needs to be paid to the dramatic structure of events.
5. Proposition five says that the presence of fellow customers has to be managed. Customers will perceive other customers and this will have an effect on the experience that they will have and remember.
6. Proposition six says that the backstage employees need to be closely coupled with the front stage experience.

As a summary experience centric services can be designed by considering five key concepts derived from the drama metaphor; the physical environment of the service delivery, the staff that are in contact with the customers, the delivery process also called as the service encounter (Cook et al. 2002), the customers that are involved in the delivery process, and the back office functions that support the service overall. Experience centric services should be designed from the customer journey point of view utilising customer touch points including sensory design. Front line employees are required to engage with customers. The dramatic structure of the service design needs to be paid attention to and backstage employees need to be closely coupled with front stage experiences. (Zomerdijk and Voss 2010). Another similar viewpoint for the customer journey design is customer scripting that refers to the fact that in service encounters the customers tend to interact according to pre-existing paradigms. These paradigms are referred here as scripts. When scripting service providers the script is a behaviour trained to the staff as the preferred means of conducting an encounter. Customer scripting is challenging as often there is no opportunity to train customers to any decent extent. In this case scripts need to be chosen from a pool of scripts that exist at-large. (Cook et al. 2002).

4.3 Quality Perspective to Service Design

The viewpoint of quality as the basis for service design and service development can be seen to resonate with the systems thinking mind-set as overall quality also tends to emphasise the need to consider things as entities rather than separate parts.

When designing a new service a good fundamental starting point to adopt is a quality based perspective as quality is seen by many people as a very important means of competition and a necessary prerequisite for satisfied customers and profitability. It is beneficial to design and build in the right quality from the start. (Edvardsson and Olsson 1996).

New service development requires formal processes and practices much like new product development, instead of the prevailing “it just happens” approach. NSD competence reflects expertise that organisations have to deploy routines and resources to achieve a new service end. (Menor and Roth 2007). New service development strategy requires that the overall business strategy of a company must be in line with the development strategy of new services. An effective NSD strategy also ensures that the service offerings features and delivery match the customer expectations and requirements. NSD development culture encompasses the values and beliefs in the service company towards service development. It plays a critical role in the success of service management. (Menor and Roth 2007).

In service development the customer is the starting point as the added value and quality of the service realised with the customer. Creating perquisites for services that have a customer perceived added value is the main task of service development. For this to happen the company needs to have good understanding of the customer's requirements. (Edvardsson and Olsson 1996).

Customers have needs, wishes and expectations. Needs are basic and different to each customer. Wishes are the ways of how a customer wants their needs to be met. Expectations are formed the overall picture that the customer has regarding a service. Expectations are to do with the interactions with the customer and the service and / or the service company. To understand the customer and their needs, wishes and expectations the customer needs to be involved in the process of service development. The customer needs to be heard and taken into account. The service development process needs to be interactive. (Edvardsson and Olsson 1996). While understanding of customer needs, wishes and expectations is important, this does not mean that they are to be followed blindly. A trusting and open relationship with the customer is important. (Edvardsson and Olsson 1996). The most important thing is for the service provider to understand the customer's end game (Heinonen et al. 2010).

Quality can be seen as satisfying the needs and expectations of three main groups: customers, company staff and company owners. Yet again the emphasis is on the customers as they are the ones who perceive the quality of the service. Quality is something that is not easily defined, but a common definition of service quality is that “the service should correspond to the customer's expectations and satisfy their needs and requirements”. (Edvardsson and Olsson 1996).

4.3.1 Service concept

The service concept covers the description of the customer's needs and how they are to be satisfied (Edvardsson and Olsson 1996). When new services are being developed it is good to keep in mind that individual services usually form a system together with other services (Edvardsson and Olsson 1996). Service is generated by a process where the customer outcome is created. As the customer is a co-creator of the service this participation role must be made clear. (Edvardsson and Olsson 1996). The service company is not providing the service itself, but rather the prerequisites for that service. Hence the goal of service development is to provide the prerequisites for functioning customer processes and outcomes. (Edvardsson and Olsson 1996).

A challenge for a service company is to ensure that the correct services are targeted to the correct customers. Customers tend to have an image of the service concept whether or not they have actually experienced the service themselves. For the service package, service encounter and customer expectations to match, service companies have to focus on the design of their service concept. The service concept should be the key driver for the service design. (Goldstein et al. 2002). Service concept can be further defined to be compiled of the following components: Service operation, which way the service is delivered; service experience, the customer's direct experience of the service; service outcome, the result and benefits of the service for the customer; value of service, the benefits the customer perceives as inherent in the service weighed against the cost of the service. (Goldstein et al. 2002). If there is no clear understanding of the service concept i.e. the nature of the service to be provided the designing of a successful service is not possible. Putting it in another way, the first step of service concept execution is service design planning. (Goldstein et al. 2002). Service concept provides the foundation for developing the what, the marketing content and the how, the operations content of a service. It serves as the base on which the service delivery system is built. (Goldstein et al. 2002).

4.3.2 Service System

The service system in short is the resources available to the process for making the service concept a reality. These are the service company's staff, the customers, the operating environment and organisation and control. (Edvardsson and Olsson 1996). As similar type of element can be found in experience centric service design where the term context is used, where context includes the physical and relational elements in the experience environment. (Zomerdijk and Voss 2010).

Staff is a very specific key resource. Customer's perception of the quality of the service is mainly dependent on how they see the staff in regards to their commitment and knowledge. "Individual staff are by and large synonymous with the service" (Edvardsson and Olsson 1996). As staff equals people, there is a need to understand people can be motivated to work in the best manner. (Edvardsson and Olsson 1996). The importance of staff is also recognised by other authors as employee expertise along with tangible evidence was listed as a key success factor of services (Posset and Förstl 2011).

When striving for good quality services the whole customer relationship chain must be dealt with. The service encounter can be seen as a triad that is composed of the service organisation, the contact staff and the customer. Here service encounter means interaction process between the server and the served. It is beneficial for all of these parties to work together towards a positive service encounter. Here the customer works with the contact staff within the frame of the service defined by the service organisation and expects service satisfaction. The contact staff expects to receive job satisfaction and to achieve customer satisfaction by serving the customer within the service frame. The service organisation must satisfy the customer and the contact staff in an economically viable way. (Cook et al. 2002).

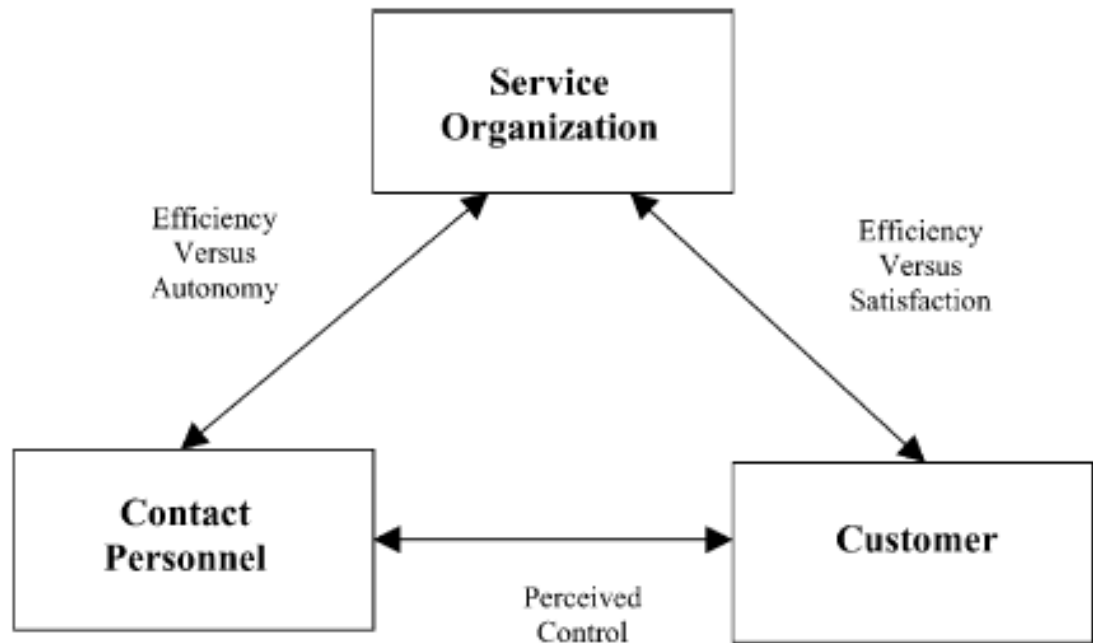


Figure 4. The service encounter triad (Cook et al. 2002).

Company internal relations should be seen in the same way as external relations i.e. the company internal customer relationships are as important as the external actual customer relationships. (Edvardsson and Olsson 1996). This viewpoint is backed up by the concept of Service-Profit-Chain where customer loyalty drives profitability, customer satisfaction drives customer loyalty, external service value drives customer satisfaction, employee productivity drives external service value, employee loyalty drives productivity, employee satisfaction drives loyalty and internal service quality drives employee satisfaction. (Heskett et al. 1994/2008) (Cook et al. 2002). In other words for a company to be able to provide high quality services and to achieve good customer satisfaction, the internal customer service needs to be of good quality as well.

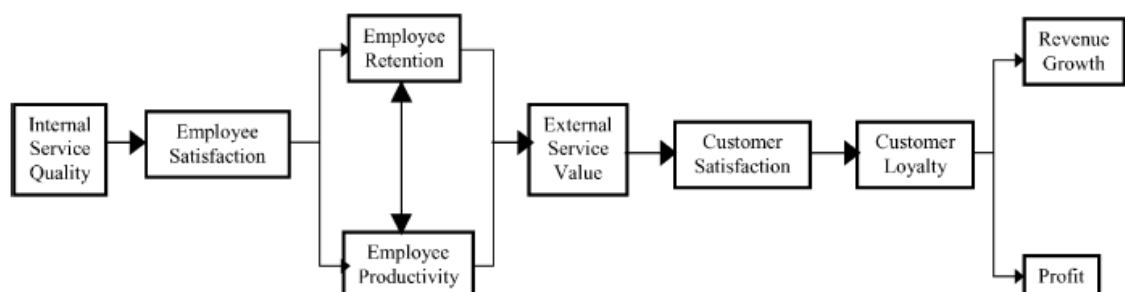


Figure 5. The service profit chain (Heskett et al. 1994, republished 2008).

The customer is also a key resource. To get customers you need marketing. Marketing needs to be an integral part of service development. Marketing here is defined as giving the right promises and fulfilling them (Edvardsson and Olsson 1996). To do this you need to be aware of the customers' needs, wishes and expectations. You should not make promises that you cannot deliver. (Edvardsson and Olsson 1996). This also includes teaching the customers how to act or behave in the role of co-producer (Edvardsson and Olsson 1996). Regarding the service system and its resonance with the customer, four points are raised: firstly, interaction wise a queue system needs to be in place for when the service is overloaded; secondly, the customers relationship with the company and its organisation regarding routines needs to be organised; thirdly, the customer-staff interaction needs to be organised; and fourthly, the customers interaction with the physical and technical environment needs to be organised. (Edvardsson and Olsson 1996).

Looking at some other specific resources the operational environment and organisational structure are considered key elements. The operational environment includes all of the technical equipment and the physical premises that are in any way involved in the service processes. (Edvardsson and Olsson 1996). The organisational structure needs to be clear on responsibility and authority. Also the administrative systems like planning and information, financial system etc. need to be supportive to the production of a workable service. (Edvardsson and Olsson 1996).

4.3.3 Service process

The chain of activities which must function for a service to be produced is the service process. This includes all of the activities of which some are conducted at the customers' premises. This means that some of the activities are out of the direct control of the company, but the company must nevertheless have overall control of the entire process. All parts of the process are important, but some can be identified as being more problematical than others. Some hard to control activities are for instance the interfaces between departments and between the company and the customer. To create a service that meets the service concept fully, all processes including micro-processes and individual activities need to be detailed completely. (Edvardsson and Olsson 1996).

Customer behaviour in service encounters includes three concepts, the flow of the service – what is happening, the flow of time – how long it seems to take, and the counterfactual reasoning in judging the encounter performance – what you thought about it later. (Cook et al. 2002). The service encounter design should include five principles. The first principle states that a service encounter should finish strong. This is so that the service encounter should have a continuous up-swing or improvement for positive effect. The second principle states that undesirable elements should be eliminated as early as possible, as people prefer bad news first before good news. The third principle states that pleasure should be segmented i.e. distributed over the service encounter and pain should be combined in to one instance. The fourth principle states that commitment should be built through choice by letting the customer control the process. The fifth principle states that attention should be paid to the norms and rituals of a service encounter. (Cook et al. 2002).

One key issue regarding the service process is the need to consider which parts of the service system are visible to the customer. This is called the line of visibility. Some parts need to be clearly visible and transparent while others are better to be left outside the visibility scope of the customer. (Edvardsson and Olsson 1996).

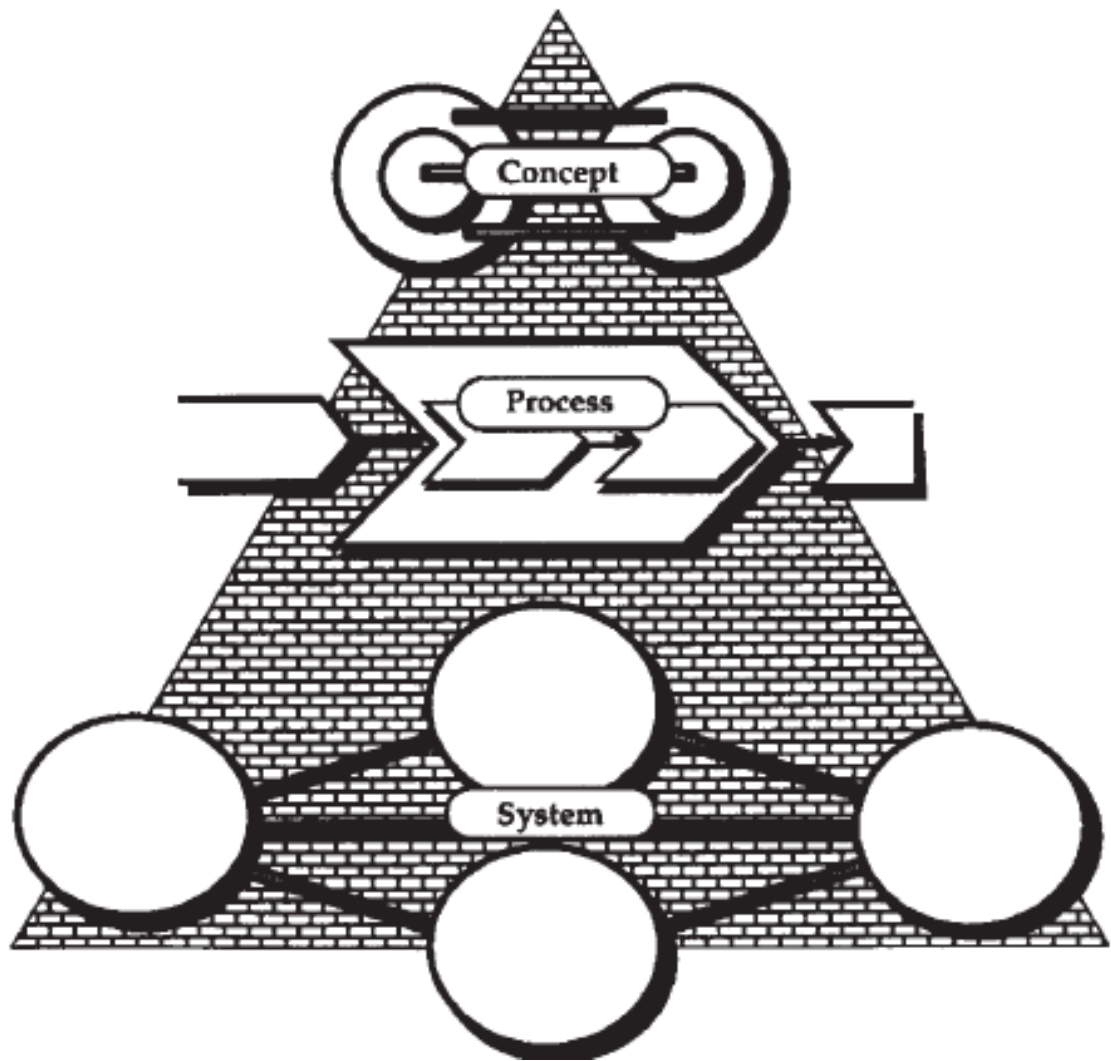


Figure 6. Model of the Prerequisites of the Service (Edvardsson and Olsson 1996).

The model of the prerequisites of a service by Edvardsson and Olsson is shown in figure 6. The figure shows a pyramid where the service system is on the bottom supporting the service process that supports the service concept.

4.4 Service Blueprinting

With the basic service frame established, service concept, -system and -process, a tool is needed to form the actual service design. Service blueprinting is a design tool or -concept that resonates with the overall quality perspective, customer centric approach and systems thinking mind set of service design.

Services are in essence based on interpersonal delivery systems i.e. they are very human and process natured. Therefore the focus of innovation needs to be on process and experience. Accordingly customer focus is a natural approach for service innovation and improvement. Service blueprinting is a technique and tool that allows companies to visualize the whole service process, the customer contact points and the physical evidence associated with the service. By nature service blueprinting is very customer focused. (Bitner et al. 2008).

Service blueprinting can be used to design services from a very high conceptual level right down to the refinement of a single step in the customer process. The effective designing and management of customer experiences requires the presentation of a series of clues that function holistically to meet customer expectations. Overall this requires a cross-functional perspective in the service company organisation. All parts of said organisation have to be driven by the common goal of creating an integrated and favourable customer experience. This is made possible by service blueprinting because it enables everybody in the organisation to visualize an entire service. It provides a common understanding through which the critical customer contact points, physical evidence and other key experience clues can be orchestrated. (Bitner et al. 2008).

Service blueprints have usually five main components; customer actions, onstage / visible actions of contact employees, backstage / invisible actions of contact employees, support processes and physical evidence. The customer actions are all of the steps in the service delivery process that the customer takes part in. Key here is that the customer actions are central to the blueprint and usually all other parts are derived based on these actions. Next separated by the line of interaction are the onstage/visible contact employee actions. These are the face-to-face actions that happen during the service encounter. Each time the line of interaction is crossed between the contact employee and the customer a “moment of truth” has happened. Next in line are the backstage / invisible contact employee actions. These are separated from the onstage actions by the line of visibility. Everything on the onstage side of the line of visibility is seen by the customer whereas everything on the backstage side of the line is invisible. The backstage actions are actions performed by the contact employees but that are not face-face actions, e.g. email communication and also other activities that have to do with preparation of the service or activities that are part of the contact employees role of responsibilities. Support processes are the fourth component. The line of interaction separates the contact employees from the support processes. All the activities

that need to happen for the service to be delivered that are carried out by the company but not by the contact employees are called the support processes. The support are in the blueprint can connect with all other parts via inter functional connections in order to support all actions that are essential to deliver the service to the final customer. The last component is the physical evidence. The top of the blueprint has the description of the physical evidence that the customer comes to contact with in each moment of truth and customer action. (Bitner et al. 2008). A template of the service blueprint components is shown in figure 7.

Physical Evidence	
Customer Actions	Line of Interaction
Onstage/ Visible Contact Employee Actions	Line of Visibility
Backstage/ Invisible Contact Employee Actions	Line of Internal Interaction
Support Processes	

Figure 7. Service Blueprint Components (Bitner et al. 2008)

To build a blueprint the service process and sub-processes to be blueprinted need to be clearly defined. First the customer segment that is the focus of the service being designed needs to be identified. Once this is done, the customer actions should be delineated first because the customer action component is the basis on which all of the other service blueprint components should be founded on. After customer actions the next components to be delineated are the contact employee actions, onstage and backstage, followed by the support processes. This is a good point to add the links between customer actions and onstage / backstage actions and support processes. The last component to be added is usually the physical evidence. It is worth noting that it is beneficial to involve cross-functional teams and also customers to the development of service blueprints. (Bitner et al. 2008).

With the design concept and basic frame established a full conceptual framework can be built with the insights of other beneficial viewpoints embedded to it.

4.5 Conceptual Framework on Service Design

Using the different perspectives on service design presented in the previous sections a conceptual framework was produced. The result is mainly based on the basic model by Edvardsson and Olsson presented in section 4.3. This is a seminal and well-cited article in the field. The article is cited 714 times (Google Scholar, April 2016) - which is an exceptionally high citation rate. The reason for basing the conceptual framework mainly on the Edvardsson and Olsson model is that this model encompasses all the needed building blocks for the case of this thesis on a correct level of detail and robustness. As it is built from an overall quality perspective it naturally supports and enhances all of the aspects of service development and design in a positive manner. The conceptual framework is shown in Figure 8.

The Conceptual Framework consists of two main elements. The first one is the service concept, which is a detailed description of what is to be done for the customer and how it is to be achieved. This, in other words, defines the service. The service concept element is derived from the basic frame provided by Edvardsson and Olsson with embedded features from Goldstein et al. The features embedded are: Service Experience, Service Outcome, Value of Service and Service Delivery.

The second main element is the service system that includes the resources to the process of realising the service concept. The service system is the infrastructure that is to be utilized for the service and includes all of the resources available, both company and customer resources. The service system also encompasses the service processes that are the chain of activities which function to produce the service. Again this includes all of the activities, parallel and in sequence, high level and micro level down to individual steps. The service system presented in this framework is a merger of the service process and service system elements from the Edvardsson and Olsson model.

The service concept is presented as an independent component, whereas the service system is embedded in to a service blueprint frame.

Service Design for End-User Training Service

CONCEPTUAL FRAMEWORK

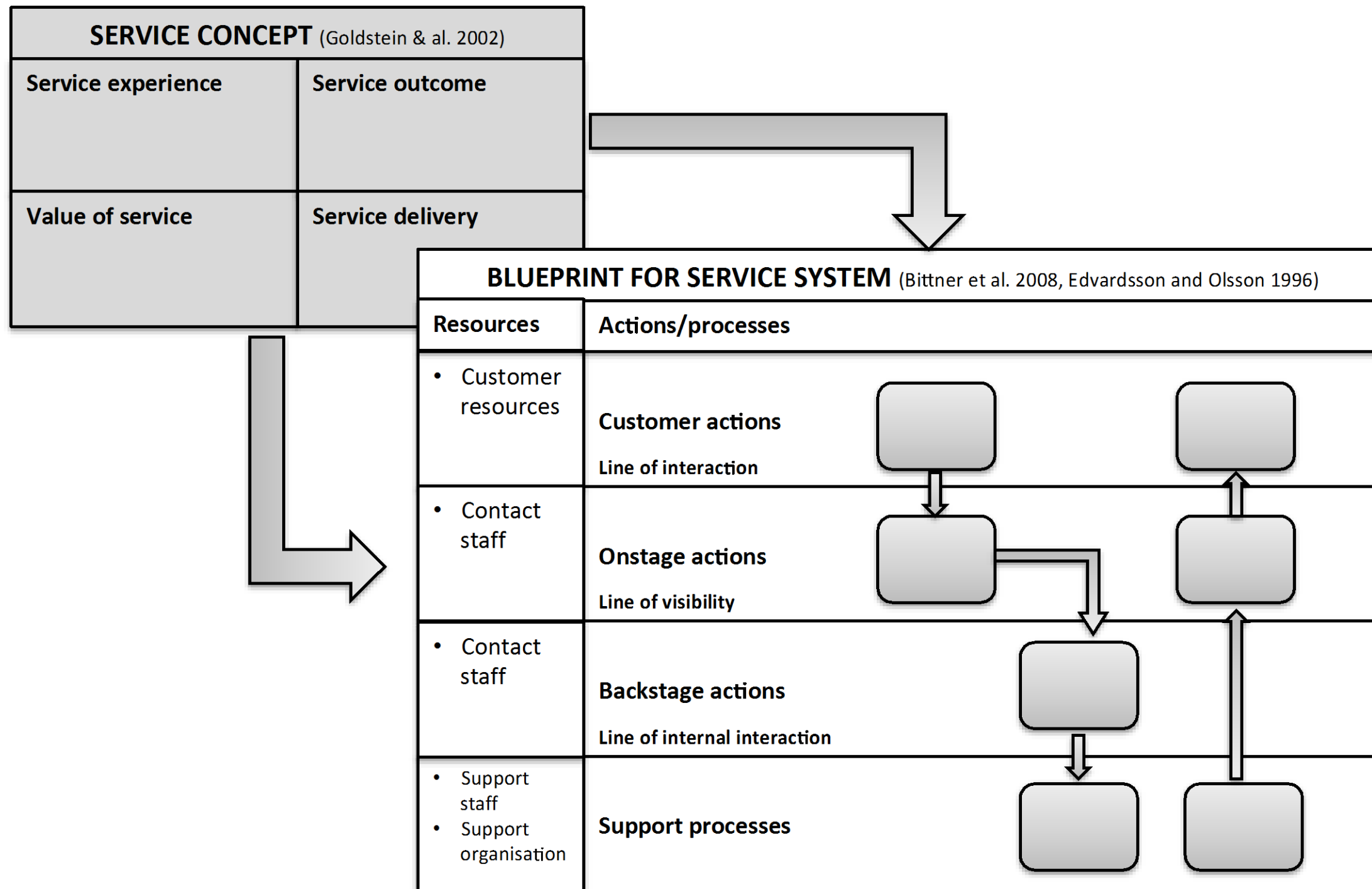


Figure 8. The Conceptual Framework on Service Design for End-user Training Service.

This conceptual framework will be used as the frame for building the proposal for end-user training service in the next section. It will serve as a tool and a template that combined with the findings of the current state analysis will be used as the base on which the end-user training service proposal will built.

5 Building the Proposal

With the findings of the current state analysis from section 3 and the conceptual framework produced in section 4 a proposal for end-user training service is produced in this section.

5.1 Overview of the Proposal Building Stage

The proposal for end-user training service design was built by using the conceptual framework from section 4 as a tool and a template to combine the insights of the current state analysis with new ideas that emerged in workshops that were conducted specifically for the proposal building. A visual representation of data utilization can be seen in figure 9.

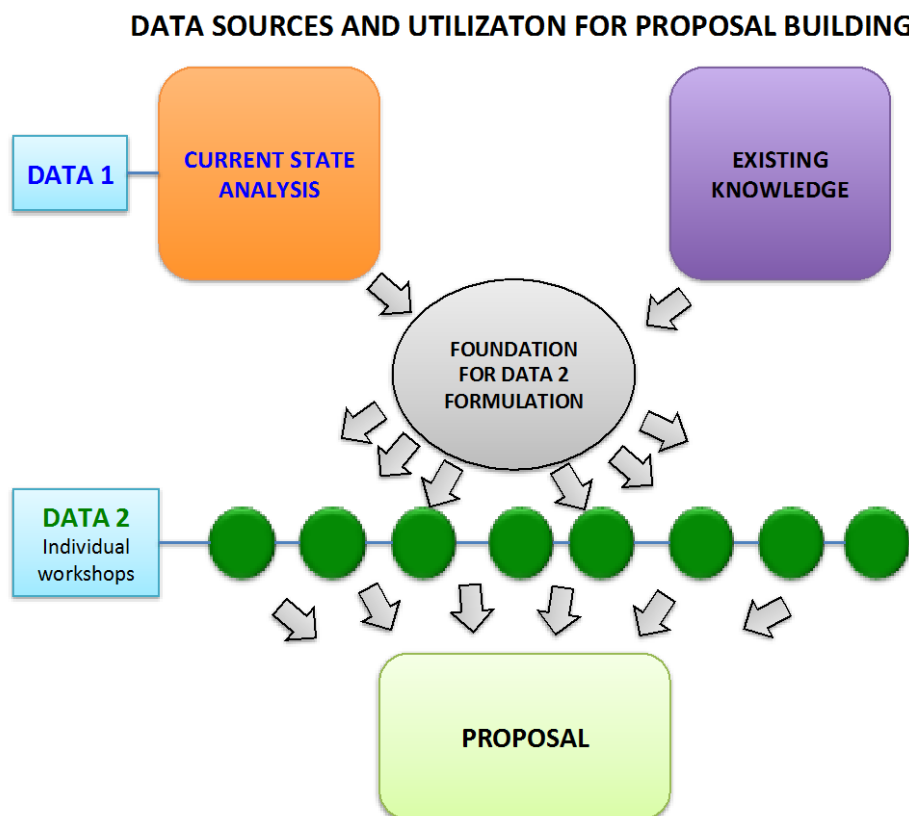


Figure 9. Data Sources and Utilization for Proposal Building

Based on the results of the current state analysis in section 3 the decision was made to design a completely new end-user training service. For this stakeholders from the case company and the customer were engaged in one-to-one workshops. In these workshops the results of the current state analysis were reviewed. Then using the conceptual framework as a guiding template and as a tool, new end-user training service proposal ideas were produced by considering the weaknesses, strengths and desired features reported in the current state analysis. All together eleven one-to-one workshops were conducted within the case company. The stakeholders selected were field operatives, coordinators, and relevant middle and senior managers. One one-to-one workshop and one group workshop were conducted with the customer stakeholders. The details of data 2 collection are shown in table 4 in section 2.3.2 Data 2 Collection.

The proposal building focused on the elements of the conceptual framework, Service Concept and Service System. The input for the Service Concept came mainly, but not solely, from the customer workshops. At a quick glance it might look like a direct repeat of the customer requirements and desired features from section 3. However the introduction of the conceptual framework helped to clear out and condense the sometimes vague or generic starting ideas in to concrete elements of the Service Concept. The Service System is a merge of case company and customer ideas and was approached as to support the Service Concept.

Not all of the workshop results were completely in line with each other. The Service Concept got the most unified results. Almost everyone agreed in the light of the results from the current state analysis what the Service Concept should be like. The Service System however got somewhat differentiating results. View points varied mainly between building something completely new versus keeping things the way they are. However one viewpoint dominated the other with most of the workshop results supporting it and thus these were used to build the Service System proposal.

After the workshops the resulting data was once more categorised and processed using the conceptual framework as a template and a tool to produce the draft proposal for end-user training service design. The Service Concept was formed in to the proposal form directly as the result of the workshops. The Service System that emerged from the workshops, was shaped to its final form by embedding it in to a service blueprint as the conceptual framework dictates.

5.2 Findings of Data 2 Collection

The findings of Data 2 collection are presented through the elements of the Conceptual Framework; the Service Concept and the Service System.

5.2.1 The Service Concept

The end-user training service concept was built by the consideration of four main sub-elements; Service Experience, Service Outcome, Service Value and Service Delivery. The input for the Service Concept came mainly from the customer, but case company insights were incorporated to it as well. The source of the data is relatively irrelevant as all workshops, with the case company and with the customer, yielded almost unified results. The shortcomings of the previous end-user training approaches revealed by the current state analysis were accepted as valid by all workshop participants. The end result correlates to the desired features listed in the summary of the key findings of the current state analysis.

The Service Delivery sub-element got very much attention. Everyone who contributed to this part had very similar ideas and thoughts. In the summary of the key findings of the current state analysis, the delivery was seen to be not meeting requirements as the training was mostly either arranged as part of system commissioning or combined with maintenance service. *“The training cannot be done together with maintenance, the result will be completely not what we want” Riot 1.* Also the training was mostly done only once and thus benefitted only a part of the complete crew rotation of the ship. This was seen as a key point to address in the end-user service design. The end result is very different to the original approach of the case company. To catch all of the right people the end-user training needs to be arranged on board when the ship has entered normal service and therefore is manned by the crew that stays on instead of a start-up crew that will move on to the next new build almost immediately.

The end-user training itself has to be tailored to each ship specifically and updated before every training visit. *“You need to make sure the training corresponds to the actual system on board, you need to check for upgrades and modifications”* Riot 2. The end-user training has to be conducted over three visits in one year to the same ship to catch the whole crew rotation. One end-user training visit has to include at least three training sessions to catch the whole watch rotation. Personal participation of all designated crew members is mandatory and they will be subjected to a test at the end of the training to ensure the needed level of understanding regarding the fire protection system and its operation. *“The Master as well, he/she needs to participate even if they don’t want to”* Riot 1. The evaluation used in the test is very simple, green if no faults, yellow if even one wrong answer, red if too many wrong answers. With a yellow result the areas that went wrong will be clarified immediately. If the result is red then the whole training needs to be repeated. *“If they don’t learn in one time then you might need to even extend your stay, the end result is what matters”* Riot 1. The exact limits and levels between yellow and red were not yet defined.

The Service Experience sub-element deals mostly with the content, planning and general approach part of the summary of key findings from the current state analysis. The end-user training will be compiled of two main types of experience: Classroom training and hands-on training. The training will be conducted using pre-made and pre-approved training material that is tailored to fit the system of the ship in question. The whole training session is designed to be very interactive and is scripted so that it has a good rhythm so that people will not get bored. *“These people, the crew, are trained to be very operative and straight forward. They will get bored if there is too much detail and text”* Riot 2. Utilizing a systematic approach by defining the agenda and content of the training with enough detail the weaknesses that were due to an un-systematic approach are mostly dealt with.

The Service Value sub-element responds to the customer requirements and desired features on a high level but nevertheless effective way. The value of the end-user training service to the customer includes an enhanced control to the risk of fire as with the proper utilisation of the fire protection system fires can actually be prevented. Also fire damage control is enhanced as the proper use of the fire protection system will suppress the fire more quickly. Both of these issues are seen as part of the end-user training concept as the training content has to correspond to these needs. Enhanced crew awareness to fire protection system maintenance needs and the reduction of extra interruptions to the operation of the ship are a response to customer requirements.

The Service Outcome sub-element is stated as *confident and capable crew in all situations regarding the fire protection system*. This also is a direct response to the customer requirements in section 3 and was stressed by many informants, both in the case company and on the customer side. *“This is what we want, they really need to be confident” Riot 1.*

5.2.2 The Service System

The Service System includes the resources, actions and processes needed to produce the service defined by the Service Concept. In this case these resources, actions and processes are embedded to the service blueprint.

The weaknesses regarding the case company's approach to end-user training identified in the current state analysis could be seen to somewhat stem from the fact that end-user training was connected mostly with new build sales and seen as part of project delivery. The overall conclusion from the findings of proposal building workshops was that end-user training would benefit if it was treated as part of after sales services instead of being part of new build project delivery.

This conclusion has implications to the Service System in the form of task allocation within the organisation and the organisation structure itself. Some of the informants saw that the end-user related tasks should be allocated in the same way and to the same people as already existing services, mainly the maintenance service. *“This is the only way, it will not work if it is not done like this” Mist 7.* Others, the majority, saw that due to the very different nature of training versus maintenance as a service, end-user training related tasks should be handled by people in specifically dedicated positions. *“It is its own thing, we don’t want to do this like maintenance if we can avoid it” Mist 8.* This dedicated positions view was also supported by the fact that people handling maintenance service tasks had already a heavy workload. Adding to that workload was seen as a problem. *“If we add all of this on top of existing work, then we need to choose what will be left undone. Already tasks are lagging behind” Mist 1.*

The role of the trainer was also seen as a dedicated resource. Although it was identified in the results of the current state analysis as one key strength that the field operatives were the ones performing the actual training due to their high level of knowledge of the fire protection systems, at the same time the lack of time to focus on training because of the urgency of other work tasks, maintenance and commissioning, was seen as one of the major drawbacks. The conclusion of most of the workshops was that the position of the trainer should be such that the trainer is an experienced field operative dedicated only to training. *“No other way, if they do everything then they don’t do anything properly, no maintenance, commissioning or warranty cases, just training” Mist 9.* The need to upkeep the professional field operative skills was recognised but no uniform understanding of how to accommodate this in to the position of the trainer without compromising the integrity of that position was reached.

Of no small part of these discussions was the presence of interdepartmental friction, the sometimes conflicting drivers and goals of these departments, and the resulting complications. Mist 10 gave an extreme example:

I’m supposed to just sell more and more without any consideration to the fact that for example we are unable to accommodate any more maintenance visits. They say that it is not our departments concern, but in real life I don’t think we should do that.

Complications had previously emerged mainly due to the differentiating views of managers on which task, training, maintenance or commissioning, should be prioritised in the case of a timetable confliction.

Task allocation in the customers organisation was also considered. The customer required that there should be only one point of contact on their side through which all communication should go. The customer would then need to internally inform all stakeholders of the required actions. This means that even if a ship contacts the case company directly e.g. regarding re-scheduling of a training visit, the case company has to direct the communication back to the designated one point of contact in the customer organisation. The reason is that although a single ship might know exactly their own schedule, they might not have the complete picture of what is happening regarding the rest of the fleet. This was emphasised by Riot 1:

Do not agree anything with the ships directly. If we at the office do not know about it, then it does not exist. Otherwise with this many ships there would be no control of anything and no one would be on top of anything.

Regarding scheduling a one year long perspective was considered appropriate on both sides to start with. Both case company and customer informants saw that end-user training is a fleet wide entity and should be handled as such. This means that scheduling should be done for the whole fleet for one year in advance. At the end of the year if some visits have been missed they will be re-scheduled or implemented in to the next years plan.

5.3 Proposal Draft

The proposal draft of end-user training service is presented in this section in the form of figures. The proposal consists two main elements; the Service Concept and the Service System. For the Service System the proposal also includes three different organisation model proposals to address the issue of interdepartmental friction.

5.3.1 End-User Training Service Concept Proposal

The end-user training service concept proposal is shown in figure 10. The concept is at the right level of detail to properly define the service being delivered yet still allowing the correct room for professional freedom to build the final training agenda and content.

END-USER TRAINING SERVICE CONCEPT

Training Service Experience <ul style="list-style-type: none"> • Classroom presentation • Hands-on operation of the system • Interactive • To the point (no generalities) • Scripted rhythm (20 min attention span) 	Training Service Outcome <ul style="list-style-type: none"> • Confident and capable crew in all situations regarding fire protection system
Training Service Value <ul style="list-style-type: none"> • Fire risk control • Fire damage control • No extra interruptions to the operation of the fleet related to fire protection system • Enhanced awareness of crew regarding need for maintenance etc. 	Training Service Delivery <ul style="list-style-type: none"> • Training On-board each ship • Tailored to each ships system • Repeating visits, 3-times a year, to catch whole crew rotation • Multiple sessions on each visit to catch the whole watch rotation • Personal Participation mandatory for all relevant crew members • Test/Quiz at the end of training (green/yellow/red for results)

SOURCE:

CFW
DATA 1
DATA 2

Figure 10. End-User Training Service Concept.

In the Service Concept the starting point can be seen to be the service outcome. This is the sub-element through which all of the other sub-elements can be derived through at least to some extent. For the end-user training service to be delivered properly the Service System needs to support the Service Concept in all aspects.

5.3.2 End-User Training Service System Proposal

The end-user training Service System is presented as embedded in to the service blueprint as dictated by the conceptual framework. The service system consists of two layers presented in two separate figures; the Service System one year overview of the whole fleet in figure 11 and a zoom in of the Service System in the perspective of one individual ship for one service visit in figure 12.

END-USER TRAINING SERVICE BLUEPRINT ONE YEAR OVERVIEW (WHOLE FLEET)

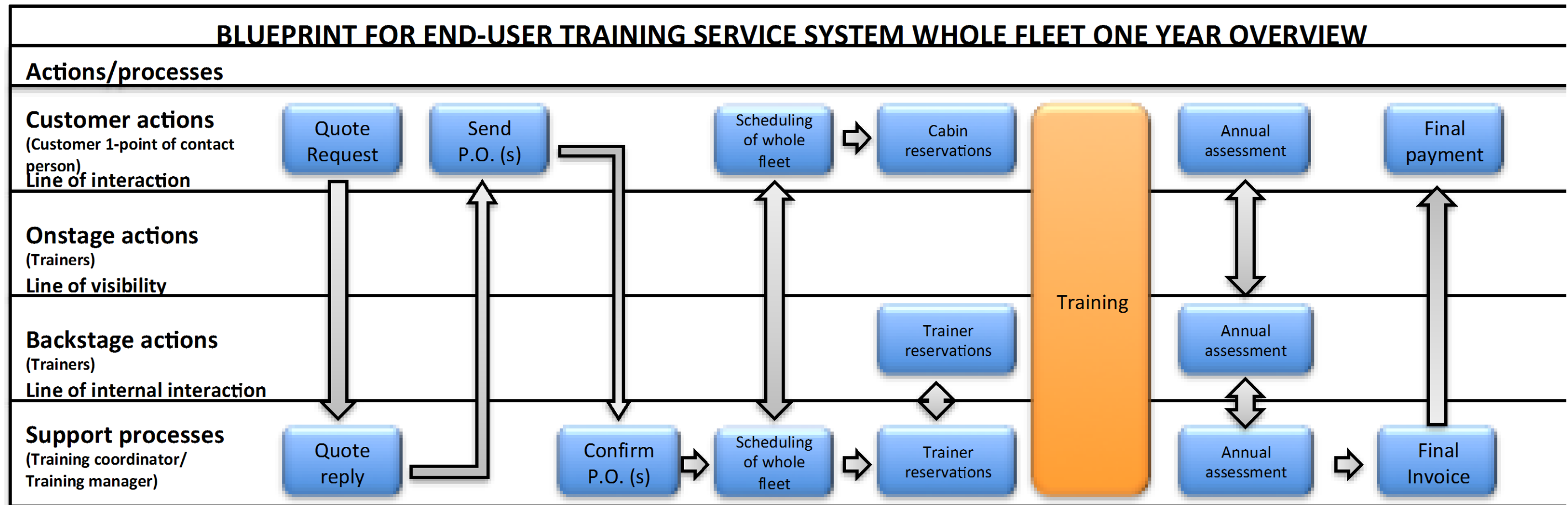


Figure 11. End-User Training Service Blueprint One Year Overview of the Whole Fleet

END-USER TRAINING SERVICE BLUEPRINT FOR AN INDIVIDUAL SHIP

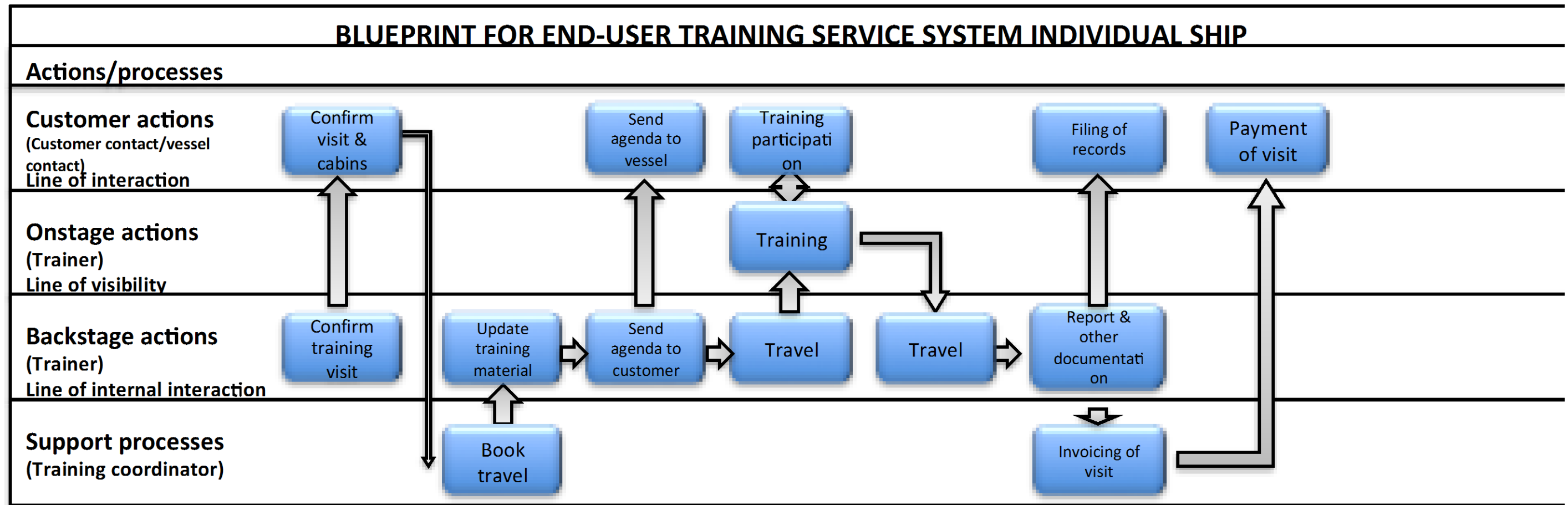


Figure 12. End-User Training Service Blueprint Individual Ship

The Service System proposal also includes three different organisation structure proposals. These organisation structure proposals address the issue of task allocation and the existence of interdepartmental friction regarding the delivery of the end-user training service. All three models have positive and negative features.

The current organisation layout regarding end-user training service delivery is shown first in figure 13. This is the currently prevailing model and here the task are divided across three departments and embedded to the same model and positions as used for the maintenance service.

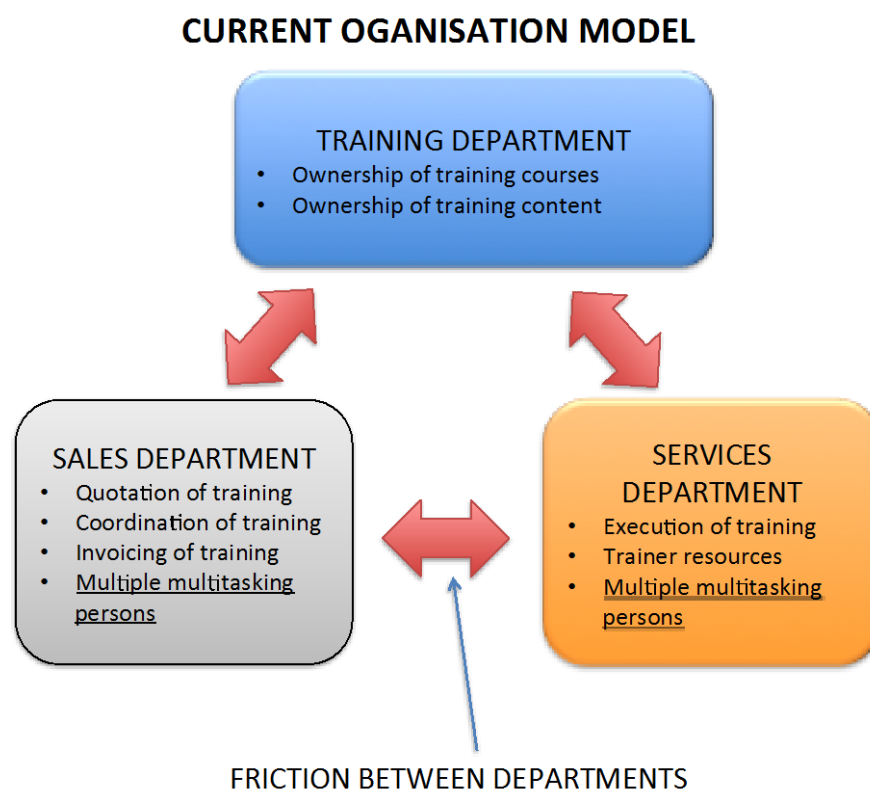


Figure 13. Organisation Model Proposal; Current Model.

The positive aspects of using the current organisation model is that no real changes need to be implemented regarding any positions or staffing in general. The downsides are already previously discussed in section 5.2.2. These included giving more work to positions with already a heavy workload and the possibility of interdepartmental arguments if there is a shortage of resources.

The second organisation model proposal is the Hybrid Model. In this model the participating departments are the same as in the current organisation model. The difference is that in the Hybrid Model the sales department has a position dedicated to training coordination and the service department has dedicated trainer positions.

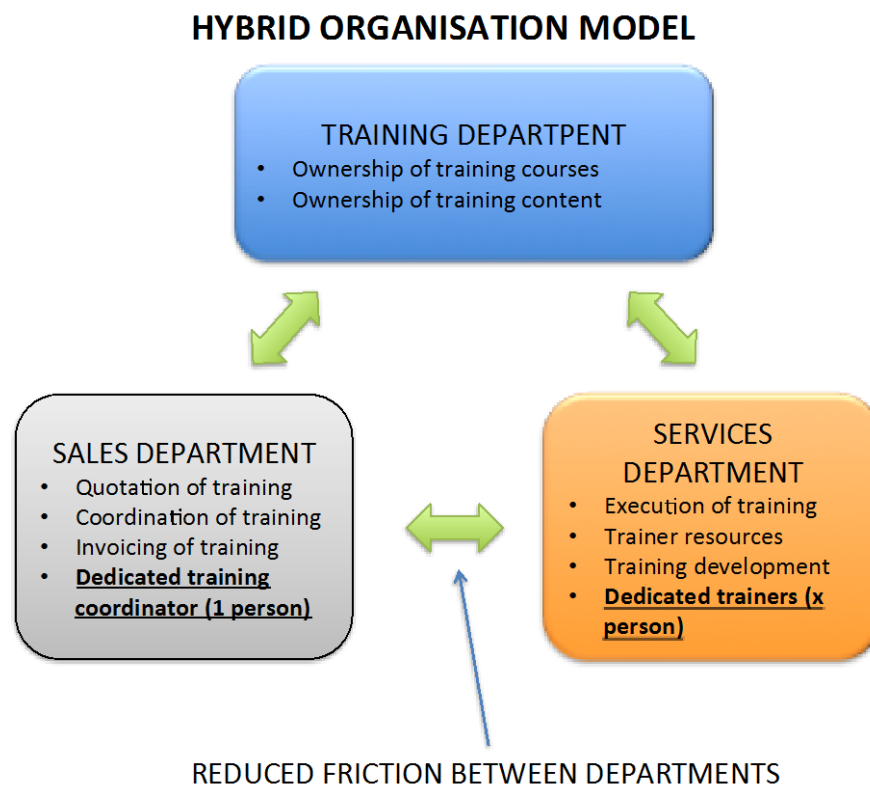


Figure 14. Organisation Model Proposal; Hybrid Model.

As the Hybrid Model has dedicated positions to be used as resources for the end-user training service the likelihood of miscommunication and mismatching resource allocation is greatly reduced. This results to a more reliable high quality delivery of the end-user training service. What could be seen as the downside for the Hybrid Model is that changes need to be made to the current positions and resource structure.

The third and final organisation model proposal is the Focused Model. In this model only the training department is involved in the end-user training service. All of the needed resources, trainers, coordination and course and content ownership are within the training department.

FOCUSED ORGANISATION MODEL



NO FRICTION BETWEEN DEPARTMENTS

Figure 15. Organisation Model Proposal; Focused Model.

The focused model eliminates any possible friction, miscommunication and arguments between departments as there is only the involvement of one department. The downside is that this type of department does not exist as such. Therefore the focused model would involve a lot of changes to the organisational structure, working culture and staffing of the case company. These type of changes can induce change resistance and the need for change management which is also time and resource consuming.

5.4 Summary of the Training Service Design Proposal

As a summary the proposal for end-user training service includes the Service Concept and the Service System which is embedded in to a service blueprint. The Service Concept defines the service that is to be delivered to the customer and the service blueprint shows the service system as a process flow chart including the steps to take and the resources needed to achieve those steps.

6 Validation of the End-user Training Service Proposal

The validation of the end-user training service proposal is discussed in this section. The data for validation, data 3, was collected as key stakeholder feedback.

6.1 Findings of Data Collection 3

Key stakeholder feedback was collected in two settings; from the customer key stakeholders and relevant case company managers and senior managers. These two settings are discussed separately.

6.1.1 Customer stakeholder feedback

The customer stakeholder feedback was collected immediately after the building of the proposal. This was done in an event where the proposal for end-user training service was presented to both customer stakeholders Riot 1 and Riot 2. As the proposal building had involved the customers quite actively the proposal was already what the customer was expecting. There were no comments other than agreeing ones and questions about when can the end-user training service be launched. *“Yes, this is what we talked about. This is good”* (Riot 1). *“You need to contact us with a price and a final plan”* (Riot 2).

6.1.2 Case Company Feedback

Case company feedback was collected after the customer feedback. Interestingly almost all of the case company comments revolved around the details of the training course content. This might be because the detailed training course content was not yet defined or produced and therefore everyone probably saw it as a gap. In regards to the actual service blueprint there were no comments what so ever. No consensus was reached regarding the organisation model proposals for the feedback deadline of this thesis.

6.2 Final Proposal

The final proposal for the end-user training service stands as it is presented in section five. As for the organization model proposals the Hybrid Model presented in figure 13 is proposed as the preferred choice as it has the best mix of positive features with minimal inconveniences and is easy to apply.

6.3 Recommended Future Steps to be Taken by the Case Company

To complete the project of designing an end-user training service and in order to satisfy the customer requirements fully there are still a few steps that the case company needs to take.



Figure 16. Future Steps to be Taken by the Case Company.

A summary of the recommended future steps of the case company is presented in figure 16.

6.3.1 Finalize the Offering

The offering of end-user training service needs to be finalized by the case company. The needed resources, the actual head count of trainers and support staff, needs to be figured out. Also the training course content and material needs to be completely finalized in order to see how long does an actual training session and training visit take. Only with the information of these two steps can the costs and price of the final offering be determined.

6.3.2 Launch the End-user Training Service

Once the offering of the end-user training service is finalized the service needs to be launched. This means that after appointing resources and the settlement of organization structure to the wanted model the case company needs to communicate to the designated customer contact person that the service is a go. Ideally the launch should start the service blueprint “one year overview” from the left with the case company sending a quotation to the customer. After should be all a matter of following the service blueprint(s).

6.3.3 Market End-user Training Service to Other Customers

If the end-user training service is found successful after one year the same concept can be marketed to other customers as well. The service concept should be directly applicable to other similar customers, i.e. big cruise ship operators. Also with appropriate modification the end-user training service can be adapted to fit any marine customer.

7 Discussion and Conclusions

In this section the overall result of this thesis and the steps taken to achieve that result are discussed. Also the managerial implications of the result and the reliability and validity of the whole thesis are contemplated.

7.1 Summary

This thesis is about designing a deliverable end-user training service to a fire protection system manufacturing company. The research was approached as a single case study with focus on one key customer segment; a cruise ship operator in the marine industry. The research is based on qualitative data collected in three stages, current state analysis, building of the proposal and stakeholder feedback on the proposal.

The current state analysis revealed that although end-user training is conducted by the case company and even required to some extent by international maritime regulations, the approach that has been taken by the case company is far from ideal. It does cover the regulation requirements, but the outcome of the training regarding the future operation of a ship is poor with only part of the future crew trained using ad-hoc material and an unsystematic approach in general. A comparison between the desired features to the actually provided features of end-user training, revealed that almost none of them matched in a desired way. Based on this, a decision was made to design a completely new end-user training service.

In order to design the new end-user training service properly a Conceptual Framework was produced. This was done by exploring existing knowledge in academic literature regarding service design, the elements related to it and the approach to take when designing services. The resulting end-user training service Conceptual Framework is built of two main elements; the Service Concept and the Service System with the Service System embedded in to a service blueprint.

The proposal of the end-user training service was built by utilizing one-to-one workshops with customer and case company informants. In the workshops the Conceptual Framework was used as a tool and a template to form new ideas with the insights of desired features to incorporate and weaknesses to avoid from the current state analysis. The actual proposal was built based on the information revealed in these one-to-one workshops.

The resulting proposal has two main elements as the conceptual framework dictates. The first one is the Service Concept that describes and defines the end-user training service that is to be delivered to the customer. Key points in the Service Concept are the outcome and the delivery sub-elements. The outcome is stated as a *confident and capable crew in all situations regarding the fire protection system*, which can be seen to more or less define most of the other sub-elements. The key points regarding the training delivery is the need for multiple training visits to catch the whole crew rotation of one ship, the need for multiple training sessions on one visit to catch the whole watch rotation of the relevant crew and the need for repeating the training at regular intervals to account for the relatively rare use of the fire protection system and the resulting fade of knowledge from memory.

The second main element, the Service System, is illustrated in a flow chart type service blueprint. It is designed to support the Service Concept in all of its elements. Even though the Service System blueprint seems quite simple in its finished form, a few key points are of special importance to make it work as intended. First of all the scheduling has to be done for the whole fleet for one year in advance. This means that three visits to each ship have to be scheduled and individual visits will be confirmed separately as they approach. The schedule will not be altered during the course of the year to avoid a domino effect of re-schedules. Also the preparation time of the trainer for each training visit shall not be compromised in any situation. Once the one year schedule has run its course an annual assessment will be conducted by all stakeholders to see if any visits were missed or if there is a need to alter anything for next year. Even though each training visit will be invoiced per ship, a final invoicing round will take place at the end of the year to accommodate for any missed visits or any extra costs that might have accumulated.

No changes were deemed necessary based on the collected feedback. The customer stakeholders were satisfied with the proposal as it was. The case company feedback was more to do with the next steps to be taken instead of the actual proposal.

Next steps in order to launch of the end-user training service are to do with finalizing the offering so that a price tag can be determined. The detailed content of the training course needs to be defined and produced. Also the headcount and workload of resources needed to deliver the service needs to be determined. Once these steps are done the costs can be calculated and the price determined.

The overall end-result is a concrete end-user training service design that can be launched after the above mentioned finalizing steps. The proposal can be used directly as a process flow chart to deliver the service, with a few tweaks to accommodate certain details.

7.2 Managerial Implications

The result of this thesis is a design for a deliverable service for a company that manufactures and delivers fire protection systems. It can be seen as a business opportunity in its own right or as a service that supports the actual product(s) being sold and delivered. Because of the nature of training services it can and should be delivered repeatedly, not just as a one-off instance. This type of service strengthens the after sales offering and portfolio of a systems supplier and can therefore be used as a differentiating factor for competition purposes. Also being a service of purely human interaction, the haunting dangers of material delivery failures and physical product defects are non-existent. Figure 17 highlights a few positive key features of the end-user training service.

BUSINESS OPPORTUNITY OF END-USER TRAINING SERVICE

- **Service comparable to annual maintenance service**
- **Once project is delivered ideally training will continue until scrapping of the vessel**
- **Enhances the after sales portfolio and offering**
- **Can be used as a differentiating element for competition advantage**
- **No dependence on material delivery, no physical product defects**

Figure 17. Business Opportunity of End-user Training Service

While the business opportunity can be seen to be there, there are also obstacles that need to be overcome before the benefits can be realised. For a fire protection system manufacturing company to take on a service delivery that involves no physical products whatsoever a big change in company and working culture needs to be made. By nature a manufacturing company of any kind tends to have a goods dominant view and logic of conducting business. This is also true for the case company of this thesis and it became clearly visible in the current state analysis. To deliver a high quality service the value and nature of that service needs to be properly appreciated at least by all managers and preferably by all employees of the company delivering it. Otherwise a risk of quality deterioration exists which then will have a negative effect on the whole business.

In the case of this thesis the customer is actually demanding for the service, but the case company is still in the early steps as a service provider in general. The case company needs to start the process of evolving from a goods dominant logic to service dominant logic of business. Only this way can the future of the company be secured in the competitive landscape where more and more businesses are changing towards services. A ship will sail on average about 30 years before scrapping and there are only so many system upgrades that can be justified to create revenue. But a service like repeating end-user training will potentially churn on for all of those 30 years after initial project delivery and continue to produce value for both the customer and the case company.

7.3 Evaluation of the Thesis

The evaluation of this thesis is discussed in the following paragraphs. First the objective setting, the outcome that resulted and the match between the two is evaluated. Then the achieved reliability and validity of the whole thesis is contemplated.

7.3.1 Outcome vs. Objective

The outcome of this thesis is a proposal for an end-user training service. When compared to the original objective stated in the introduction and research design as *To design a deliverable end-user training service* they can be seen to match well. As the outcome is an actual Service Concept and a Service System blueprint that can be used as a process plan to deliver the service, the overall conclusion regarding Outcome vs. Objective can be said to be a satisfactory.

However as the outcome is only a proposal the final acid test of validation through actual delivery and experiences accumulated from it is missing. The only way to truly see if the proposal can deliver what it promises is to test it in the field. This is something that is un-achievable within the time frame of this thesis and thus remains missing.

7.3.2 Reliability and Validity

The reliability and validity issues of this thesis are assessed here.

A case study approach was selected and in hind sight it suited very well for the purpose of this thesis. The way of service design and services in general promotes the use of qualitative data as services are by their very nature human centric. However the data collection needs to be planned and arranged properly so that the resulting data is relevant and valid.

Regarding data collection the target was to collect data in a triangulating fashion. The aim was to achieve this by looking at marine rules and regulations as one angle, customer requirements as the second angle and current practices of the case company as the third angle. However it turned out that the rules and regulations had very little to say regarding fire protection system end-user training for seafarers. This makes the data collection of data 1 and the data formulation of data 2 more two-dimensional instead of triangulating.

Also there was only one data collection round per data phase, while ideally at least two or three rounds should have been conducted to focus the interviews and workshops in the right direction and to accommodate for the emerging new issues from the first data collection round.

As for the informants used in this thesis, all of them were selected on the basis of their relevance and experience regarding end-user training and services in general. On the case company side informants were plentiful, but only two key- and in total of three informants contributed from the customer organization. This can be seen to make the customer point of view to be quite narrow. However the selected informants were highly regarded professionals and specialists of their field and their field was very relative to the topic of this thesis.

One issue regarding the possible deformation of data is the role and position of the author within the case company. The author is a training manager and has been involved in training related development projects in the case company. This was known to all informants and it might have had an effect on the answers that were given. Although nothing clearly points that this is the case, the presence of this type of researcher bias has to be acknowledged.

The research of this thesis is repeatable as research protocol has been followed by thorough documentation and maximum transparency. However due to business strategy related issues complete transparency cannot be achieved.

The validation of the resulting end-user training proposal can be seen to be quite thin. As stated before in section 7.3.1 Outcome vs. Objective, the true validation of the proposal can only be achieved through conducting the service in the field. However as this was not possible within the time constraints of this thesis the only level of validation is the feedback collected from key stakeholders regarding the proposal. The customer stakeholders have been involved in all of the data collection phases of this thesis. For data 1 the customer stakeholders were interviewed and the results are presented in section 3.4. For data 2 the customer stakeholders were involved in workshops as presented in section five. For data 3 customer feedback was collected in a presentation event. Case company stakeholders were also involved in all data collection phases and thus have contributed to the outcome throughout the research.

Regardless of the intense involvement of all key stakeholders the actual feedback for the validation of the proposal was very slim and relatively uninformative. It seemed that all participants, especially the customer, were already anxious to start the next steps and had no patience to dwell on the proposal any longer.

7.4 Overall Conclusions

As services in general, also service design in particular is tricky business. As it is, the things that make it difficult, hard to plan and complex in general are also the things that make it enjoyable, purposeful and important. The things referred to are people and the complex nature of human interaction, direct or conducted through an interface of any kind.

A pure service, i.e. a service that only involves un-tangible things like learning and experience is a delicate thing. There is no tangible “prize” that the receiver is left with, as in “boy was the staff rude, but at least I got my car back from the maintenance”. If it is done poorly or so that the outcome is something that the receiver does not appreciate the result is unsatisfactory to all parties involved and can have a negative effect on the image and brand of the service provider. However if planned and executed properly the resulting value creation for all parties involved is good, the image and brand of the provider is enhanced in a positive way and the customer relationship is made stronger. To achieve this all parties need to be sincere, transparent and aiming to assist each other.

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Case Company Interview Questions

Topic(s) of the interview	QUESTIONS
Starting point: the interviewee describes his/her experience in view of the topic/problem	What is your role in your organization regarding fire protection system delivery and end user training?
	Rate the overall customer satisfaction regarding the fire protection system, delivery and otherwise?
	How is the customer taken into account end user training wise?
	What is the current approach to end user training in your organization?
Identify strengths/problems	Is end user training currently performed in a satisfactory manner in your opinion? Whatever the state, why?
Key concerns	What are the biggest problems regarding current end user training?
Key concerns	What is good about current end user training?
	What do you think are the biggest contributing elements to the current problems and current good aspects of end user training?
Best practice	What would you change, if anything, regarding current end user training?
Development needs	Do you have any general development ideas for the end user training concept or any other parts of the system delivery?

Customer Interview Questions

Topic(s) of the interview	QUESTIONS
Starting point: the interviewee describes his/her experience in view of the topic/problem	What is your role in your organization regarding fire protection systems and end user training?
	How long have you been doing this what you are doing now in your organization?
	What is your experience of the fire protection system as a user?
	Why is training important, or is it important, in your experience?
	What are your expectations/hopes regarding the outcome of end-user training?
Identify strengths/problems	Who is the target group of the fire protection system end user training in your organisation?
Identify strengths/problems	How well does the current delivery of end user training respond to your organization's needs?
Identify strengths/problems	Please rate the current performance (1 to 5, 1 low/ 5 high)?
Identify strengths/problems	What are the key strengths and weaknesses of the current type of end user training?
Key concerns	What type of training content do you think would be beneficial for the end users? (emergency situations, day to day routines, fault situations) Why?
Key concerns	Which types of delivery forms of the end user training would be effective in your opinion? (training video, written document, e-learning, face to face lecture, hands on) Why?
Best practice	When would you like end user training to be provided for you? (In general / new builds /vessels in use)(before handover/during normal ship operation/separately i.e. in a training facility)
Best practice	When regarding all of the after sales activities, how big is the role of end-user training in your opinion

	(for your organization)?
Development needs	Beyond training what else would be beneficial? (regarding the fire protection system delivery and aftersales in general)
Topic(s) of the interview (these came up at previous telephone conference 21 st JAN 2016)	QUESTIONS
Training with 4 month interval (3 times a year / vessel)	How should the training program continue after the first year? (The same interval / not so often / not at all)
2 different types of training, deep for officers, soft for crew	Should the training be tailored even more, i.e. different for engine crew versus deck crew versus hotel crew?
Supplier to arrange a quiz, if fail the need to redo training	Should the quiz be repeated after a certain time? Should the whole training be repeated after a certain time?
Development needs	Anything else you would like add.

Pictures of Proposal Building Workshop Results

