Construction 2

Document 1: Vision

HexaTech

INFO3003A

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Version Control

Updates to documentation from elaboration 1 to elaboration 2.

Update	Details
Scope change	• Removal of the loan unit entity and process in the scope.

Updates to documentation from elaboration 2 to construction 1.

Update	Details
Scope change	• Removal of the customer side of the system – decision to make Repair Hub completely internal.

Executive Summary

We have been tasked to develop an information system for the repairs department at SolarWay Suppliers. The current system they have been using for repairs is inefficient and causes delays and customer dissatisfaction – leading to reputation damage and lost revenue caused by lost customers.

In this project, we aim to analyse the problem further and come up with a solution to the problem by delving into what SolarWay Suppliers needs from a computerised, web-based application. This solution brings many benefits to SolarWay Suppliers, which we delve into further, but in summary, it improves efficiency and productivity as well as customer satisfaction.

All in all, the work we are doing for SolarWay Suppliers will improve the business internal processes as well as the reputation of the business.

High Level Goals

The high-level goals of this project are to:

- Undertake an analysis of the requirements of SolarWay Suppliers for an information system in the repairs department.
- Document the potential system including models explaining how the system will work and the underlying data.
- Develop architectural models of the software and hardware of the system.
- Develop a fully functional and up to standard web-based application that fulfils the requirements of the company.

Client Overview

HexaTech is developing an information system for SolarWay Suppliers. SolarWay Suppliers is a supplier of solar equipment situated in the Greenside suburb of Johannesburg, South Africa. They specialise in the wholesale of batteries, inverters, and solar panels to installers of these systems or to retail suppliers, they do however sell to private individuals as well, although on a much smaller scale, revenue wise.

In combination with the sale of solar equipment to individuals, SolarWay Suppliers maintains a small team with a small truck that does installations for these individual, private individuals where requested.

SolarWay Suppliers also offers a repair service to customers with faulty solar units. For certain brands of inverter, SolarWay Suppliers has an in-house team of qualified and experienced technicians who repair faulty units. If the brand of inverter is not one that SolarWay's technicians are certified to repair, the unit is sent to a third party who does the repair on SolarWay's behalf. The business only offers repairs to units that are still under warranty, as this is a company policy, units that are no longer under warranty, or were not purchased from Solarway Suppliers, will be turned away.

Project Stakeholders

There are several stakeholders for this project:

- Management: They oversee the company from the top and need to ensure that the systems in use across the company are operating as efficiently as possible.
- Technicians: They are responsible for repairing the inverters and they directly use the system for repairs.
- Customers: They have a vested interest in the status of their repair.
- HexaTech: As the development team involved, we have a vested interest in the system and can be considered as a stakeholder.
- Lecturers: As the academic guidance and oversight, they have an interest in how the project is going and have quite a large influence on the direction of the project.

Business Opportunity & Problem Statement

Business Opportunity

As SolarWay Suppliers grows as a business due to the ever-increasing demand for solar electricity solutions in South Africa, a need arises for a consistent and efficient system to keep track of the repairs that SolarWay is obligated to oversee, whether that is to repair in-house or send to a third party.

Problem Statement

The current manual process of tracking repairs on scattered systems such as paper and separate Microsoft Excel spreadsheets is inefficient and leads to delays in repairs completion, a lack of clear communication to customers regarding repair status and an all-round difficulty to track. This leads to decreased customer satisfaction, inefficiency issues and lost revenue opportunities.

Our objective is to develop a streamlined computerised system with a database that optimises the repairs process. This allows for improved communication with customers and technicians and will improve the overall efficiency and service delivery of the repairs department of SolarWay Suppliers.

Summary of Proposed System and Benefits

The proposed system aims to transform the way repairs are managed at SolarWay Suppliers, the summary of the system and its proposed benefits are:

Summary of Proposed System

The system will be computerised allowing staff to track the status of repair more easily throughout its life cycle.

Customers bring their units in, and a member of staff will enter the unit into the system, this includes whether it will be repaired in-house or externally. If repaired in-house, a technician will be assigned to the repair and through a technician's menu, they can track their repairs as well as update the status.

The system will also have an analytics and reporting section, dedicated to producing timely and informative reports that will allow management at SolarWay Suppliers to make better informed decisions using these reports.

Benefits

Some of the benefits of the proposed system include:

- Improved efficiency: The automation of the repairs system allows for an improved efficiency compared to the previous methods the repairs department of SolarWay Suppliers used where manual errors and time wastage occurred due to physical paper input and uncoordinated worksheets.
- Data-driven insights: The proposed system will provide insightful reports generated from the data captured by the repairs department into the system. This will allow management to make decisions to better improve the repairs process within the business as well as the entire business.
- Enhanced customer experience: The proposed system will ensure customers are kept up to date about repairs all the time without failure. The current system requires the repair administration team to manually check documentation to know when to phone customers about their repairs, or customers have to phone in themselves to check the status of their repairs.
- Streamlined process: The proposed system offers a streamlined approach to how the repairs process within the business should operate. With the proposed system in place, and the business process that results from the system existing, a streamlined process for repairs will spawn, which will help staff in the business be more efficient at their jobs.
- Competitive advantage: With the new system in place, SolarWay Suppliers have an innovative approach to customer repairs that other businesses in the competitive solar industry may not have, and this offers the business a competitive advantage.
- Improved workforce productivity: With the repairs system and the automation that follows, staff, specifically technicians, are more in-tune with their responsibilities and this knowledge allows them to perform better and be more productive.

Overview of System Functionality and Features

The system for tracking repairs at SolarWay Suppliers incorporates several key functionalities and features and includes:

- Repair tracking: The system will allow staff to enter repairs, keeping it in a database, which allows for easy tracking of repair and their respective statuses.
- Technician tracking: The system will allow technicians to track what repairs must be done as well as information about the repairs and their respective statuses.

- Reports and analytics: The system will have a dedicated reports section that will allow management to view informative reports about repairs which will allow them to make better informed decisions.

Overview of Feasibility

1. Technical feasibility: The proposed repairs system is technically feasible as it leverages technology that is compatible with the existing infrastructure at SolarWay Suppliers. The system is also scalable as it will be a web-based application.
2. Financial feasibility: The proposed repairs system is financially feasible as SolarWay Suppliers is not paying a fee for the development of the system. Due to the academic nature of this undertaking, SolarWay Suppliers are receiving this system for free. There may be additional costs involved during the lifespan of the system, such as updates after the handing over of the system and hosting costs. These costs should not affect the financial feasibility of the system as the benefits outweigh these potential, relatively smaller, costs.
3. Operational feasibility: The proposed system will work in the context of SolarWay Suppliers as it aims to fill an opportunity to make the processes of the business more efficient. There are clear benefits to the business in the form of efficiency improvements, enhanced customer experience, and resource optimisation.
4. Schedule feasibility: The project can be completed within the set timeframe, with final delivery expected towards the end of the current year, 2024. Due to the academic nature of this undertaking, SolarWay Suppliers are aware and have agreed to the proposed timeline.
5. Legal feasibility: The proposed system will comply with legal requirements by having users sign an agreement that they agree to their data being saved on our system – this data will only be used within the system and will be protected. SolarWay Suppliers have also been made aware that at the end of the development period, they will have to sign a document with the University of the Witwatersrand to gain access to the finalised system, this is done to sign over the ownership of said system.

Overview of Non-Functional Requirements and Constraints

Non-Functional Requirements

In this section, we delve into the broad overview of the non-functional requirements, document 3 contains a description of these non-functional requirements.

The URPS framework has been used to gather non-functional requirements, this being the Usability, Reliability, Performance, and Supportability framework.

Usability:

- The system should an aesthetically pleasing user-friendly interface that is easy to navigate.
- It should have help options in the user interface to assist users.

Reliability

- The system should be available throughout the workday.

- The system's database should be backed on a regular schedule at the end of every workday.

Performance

- The system should respond to any requests within 5 seconds, considering loading times due to the internet nature of the system.
- The system should be able to run on all current computers at SolarWay Suppliers.

Supportability

- The system should have a testing period.
- The system should have a document provided with instructions.

Constraints

There are 4 types of constraints that we have considered, being: implementation, hardware, software, and legal constraints.

- Implementation: these constraints include time constraints, resource availability, training requirements for the system, and the fact that the new system must integrate with the business's current systems.
- Hardware: these constraints include the fact that the system must be compatible with the current hardware being used.
- Software: these constraints include the fact that the system must be compatible with the IT environment at SolarWay Suppliers. The system must also be browser compatible.
- Legal: these constraints include the need for customers to agree to their data being saved as well as the fact that the university needs to sign over the system if SolarWay Suppliers wishes to use it.

Overview of Risks

This section will be a brief overview of these risks.

Security Risks

- Data breach risks, which can be mitigated with strong authentication protections and firewalls, as well as physical security of the server.
- Authentication risks, which strong password policies and requirements can defend against.

Technical Risks

- There are risks associated with the system being down for whatever reason, and the way to mitigate this risk is with regular updates and patches as well as backups.
- Performance issues are another risk. These risks come about because of the web-based nature of the system. Optimization of the code, database and internet structure of the business are ways to mitigate this potential risk.
- Data loss is a major potential risk. Ensuring proper and regular backups is the mitigation plan for this as well as extra steps such as backup redundancy.

Operational Risks

- Lack of support, this is a risk as without support and regular upkeep, the system risks being unusable. Through a regular support plan as well as proper documentation, this risk can be mitigated.
- The abandonment of the system is a risk. An extensive training program as well as preserving legacy data is a way of mitigating this potential risk.

Reputation Risks

- Customer dissatisfaction due to incorrect use of the system by staff is a risk to the system and business. Ensuring good UX design through feedback by way of surveys and engagement is a way to mitigate this potential risk.

Overview of User Environment

The current system that SolarWay Suppliers uses for the repairs process is as follows:

1. A customer walks in with the unit they wish to repair.
2. The administrator at the front desk takes the unit, manually checks the date of sale and unit type to see if it is under warranty – if it is not, they are informed that the unit cannot be repaired at SolarWay Suppliers.
3. If it is under warranty, the administrator asks the customer to fill in some information on a piece of paper.
4. The customer fills in the information and returns it.
5. The administrator staples this filled out piece of paper, and a typed and printed note adding the repair number and additional information. They then add a sticker to the unit with the repair number on it and take it to a storage room where it is stacked, with no specific order.
6. Eventually the unit is taken for repair, and a report is filled out about the repair and what was required, if parts are available for it (if parts are not available, they are ordered, and the unit is put back in storage to be looked at again sometime after parts arrive).
   If the unit cannot be repaired in-house, the administrator contacts the manufacturer for delivery of the unit to them for repairs. The administrator also keeps track of the repairs with the manufacturer and checks in with them about the status of repairs.
7. Once the unit is repaired, the administrator phones the customer informing them of the completion of the repair.
8. The customer collects the unit, and fills out another form and signs it, this form is stapled to the original form and filed in a completed repairs file. The repair is also added to an Excel spreadsheet which details when it was collected.

The user tasks in the current system are as follows:

Administrator

- File the information when the repair is received.
- Check warranty status of unit.
- Take the unit to storage.
- Organise repairs with manufacturer where applicable.
- Communicate with manufacturer.

- Call the customer when the unit is repaired.
- File the information received when the customer picks up the unit.
- Fill in Excel spreadsheet of collections.
- Order parts for repairs.
- Assigns technicians jobs

Technician

- Repair units.
- Fill out information about what was needed in the repair (manpower and parts).
- Order parts for repairs.
- Inform administrator when repairs are completed.

Customer

- Fill out personal information and information about the unit being received.

Architecture Decisions

The software architecture will follow the Model-View-Controller (MVC) approach. This decision was taken as the application will be a web-based application, and the MVC architecture is supportive of this environment.

The hardware architecture will follow the 2-tier architecture, with the interface on one tier and the data structure and logic on the other tier, the server. This architecture was chosen to suit SolarWay Supplier's requirements as they have their own in-house server and want to keep costs down.

Further details on the architecture can be found in document 3 – Elaboration 1.

Changes in Elaboration 2

A minor change has been made in elaboration 2:

- The decision to offer loan units to customers who are having their current units being repaired has been removed – this decision has been taken as SolarWay Suppliers has a very small pool of demo units used as loan units, and it is not a sustainable service to offer everyone due to the limited offering, logistical challenges, and risks of customers damaging the demo units.

Changes in Construction 1

A change has been made to the scope of the system.

- Originally, the system was going to allow for customers to check the status of their repairs using the system as well, however, this has been scaled back and the system will only be used internally within Solarway Suppliers. This decision has been made as the repairs department is a separate entity to the sales department, who already have their own website, and as the system will run on an internal server, it is to ensure security from outside cyber-attacks, and reduced as there is no need to have the website hosted on a paid service.