

## **OTHER**

Role: Head of Digitalisation IGT

### **Project Name**

*Artificial Intelligence for Fault Report Analytics*

### **Introductions:**

As part of the digital transformation that we see happening around us every day, the importance of data and its analytics has risen to the top of most companies; In essence, we are becoming dataholics.

However, the need of all these data has also become a challenge. Specifically, on how companies can create value out of it, and its capacity to crunch such data. It is said that data doubles every 14 months (Perhaps in the future 12 hrs) and that the average employee spends 2.5 hrs a day searching for data.

These challenges not only manifest when it comes to “big data”, it can also manifest in other scenarios, like the one presented in this case.

A bit focus for Siemens it's the quality of our products, and as such we have systems and processes, that capture any faults in the process / products. These faults are categorized based on criticality and are systematically addressed accordingly.

However, what happens with the minor faults? We believe that there is a potential on significant improvement in our recurrent quality issues, if we were able to understand the trends that we see in such “minor” incidents. Nevertheless, our priority-based systems prevent us to allocate enough resources to conduct the required analytics in such data.

### **Project Description, Scope and Objectives:**

The aim of the project is to develop a prototype of a solution, where by using mathematical models and Artificial Intelligence, relevant insights on the fault report data can be obtained, where by the tool can point the organization, into the most critical areas where improvement projects need to be launched.

Siemens will provide a data set / sample of our grade 3 fault report data. The student / individual will then have to develop the AI solution, using such data as the test data, in order to validate if an AI solution is viable or not.

As part of the expected outcomes, we require

- Prototype of the solution
- Challenges on data / data quality (as it may be that we don't have the data granularity to implement an AI solution)
- Recommendations

## **Siemens Responsibilities**

- Provision of the data set
- Joined – Supervision alongside with the University
- Access to relevant process owners

## **Restrictions**

Ideally, we would like to use Siemens tools like Mindsphere, Mosaic, Operex, Qlik or Similar

However, the student has the freedom to select any other software

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Sponsor: Julio Rebollar

Role: Head of Digitalisation IGT

## **Project Name:**

### ***Customer Knowledge – Phase 2***

## **Introductions:**

The aim of any business is to make money. To this, we need a simple combination of a “need”, a product that satisfies that need, and a group of people (customers) that benefit from the solution. When it comes to product design, development of solution and positioning of existing products, it is key to understand the customer needs and drivers.

A common say in the industry is, if we only knew what we know.....; this is the objective this project.

## **Project Description, Scope and Objectives:**

Today, we have a significant amount of customer information / knowledge, however it is all scattered around different systems, tools, individuals etc. We have launched several initiatives to start centralising and digitalising the information; and the aim of this project is to continue with the next phase of such programme

On phase one; we created two digital repositories of information

1. A repository that contains relevant site information
2. A repository that contains commercial customer information

These two repositories of data, were created as an interim storage solution, pending integration into our core data repositories. These being SAP, PLM2020 and SFDC.

As part of our data strategy, we will aim to minimize the number of data repositories for master data, hosting them on SAP, PLM2020 and SFDC. However, we will not have one single data base.

In order to provide a user-friendly interphase to access the data, there is a need to create a data integration layer, with “business intelligence tools” (visualization) that consolidate the data based on the need of the users.

The aim of this project is to create a visualization that can pull the data from the temporary data repositories and our 3 core repositories into one visual tool.

The responsibilities for the individual to support the project are:

- Map all relevant data fields on the Core tools (SAP, PLM & SFDC)
- Cross check versus the data hosted on the temporary repositories, and remove the duplication
- Coordinate the activities and create and spec for the creation of the BI tool

## **Siemens Responsibilities**

- Software developers for the creation of the BI tool
- Access to our SAP, PLM & SFDC to map the data
- Access to the temporary data repositories
- Jones – Supervision of the project with the University
- Access to relevant process and data owners

## **Restrictions**

BI intelligence tool must be created on Qlik or Tableau.

Majority of the data must come from the core tools not the temporary repositories

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Sponsor: Julio Rebollar

Role: Head of Digitalisation IGT

## **Project Name:**

*Commercial Customer Knowledge – Use Cases*

## **Introductions:**

Data is a very powerful asset, but only if we can make use of it.

Following the implementation of the phase one of the customer knowledge project, a number of use cases have been identified, where a digital data centric approach can provide benefits by automatic some of the manual processes used in the business, in order to create additional capacity within the operating teams.

## **Project Description, Scope and Objectives:**

As part of our daily operations, there are several processes that require manual data input. Eg. Templates used for handing over contracts, field service brief, request for quotations etc.

The existence of these manual processes require time from the operational teams and create data duplicity. After completing phase 1 of the customer knowledge programme, where commercial information has been centralised in a digital format, a good amount of these manual templates can be automatically generated, or even trigger the activities they govern automatically.

The aim of the project is to identify the top 2 manual processes, and use the commercial customer database, to automate those processes, in order to show case what can be achieved with data.

The responsibilities for the individual to support the project are:

- Identify top 2 processes that require data entry
- Map the data required and understand how the data is used on the governing process
- Connect the information based on the platforms where the data is consumed, or by the creation of digital Apps. For example, team A fill in template to trigger an action on team B, team B then enters the data in SAP, and executes the process. In this scenario, it could be that the data used to execute the process was already existent in SAP, but not connected. In this case the solution must create an interphase to link the data and both processes.
- Coordinate the activities to create interphases by development teams.

## **Siemens Responsibilities**

- Software developers for the creation of the interphases
- Access to relevant process and data owners
- Access to template library
- Joined – supervision alongside with the University

## **Restrictions**

Interphases must be created using a Siemens approved tool Qlik, Tableau, Mendix etc, which will be defined once the use cases have been chosen, and the data mapped.

Optional: the individual could be trained and be able to develop the interphase.

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Sponsor: Julio Rebollar

Role: Head of Digitalisation IGT

## **Project Name:**

### ***VIB3000 Market Potential Analysis***

## **Introductions:**

Availability and reliability of our engines is key for our customer base. This is because often our gas turbines support critical processes for our customers, or even communities, eg. Providing power of a city.

Having confidence in the product is essential to ensure we are a trusted partner for our customers, and in order to deliver it, preventative maintenance with enhanced diagnostic tools is required.

Our gas turbine fleet has been supporting customer for over 50 years, and some of the equipment installed on the machine is now obsolete or was never fitted due to the technology restrictions at the time.

## **Project Description, Scope and Objectives:**

Siemens has developed an enhanced vibration system, that allow us to diagnose vibration on of our gas turbines remotely. The aim of the project is to assess the market potential for this equipment, with the view of developing a targeted sales campaign.

The responsibilities for the individual to support the project are:

- Analyse Fleet base, where vibration equipment is installed, and is obsolete
- Analyse fault report / breakdown data, to identify other potential units where customers may benefit from enhanced vibration equipment
- Coordinate the technical assessment of the vibration equipment by our engineering team
- Create cost calculation sheet for the tendering process, including any further cost for customization into our fleet
- Coordinate commercialization gate reviews
- Launch sales campaign using *Marketing Cloud*

## **Siemens Responsibilities**

- Provision of fleet data via SFDC download or access on to SFDC
- Access to relevant fault report & breakdown data
- Access to process owners for technical assessment and commercialization processes.
- Joined - Supervision alongside with the University

## **Restrictions**

Enhanced vibration equipment may not be beneficial for all customers, and could be perceived as an unnecessary expense, therefore the analysis on engines that have shown historic vibration issues, is key for the success and assessment of the sales campaign.

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## **Project Name:**

*Process Digital Twin*

## **Introductions:**

Digital twin is a concept that is becoming more popular now a day. Why is this? The answer lies on the benefits that provides to the customer or in this case Siemens as a business.

Digital twins aim to use simulation techniques, so we can test / try / model in the digital world, prior extrapolating in the real world. Often these techniques will allow us to predict behaviours on a system or a process. The challenge, as it is in most of the cased, is creating the data and the digital models.

## **Project Description, Scope and Objectives:**



As part of our digital programme, we have launched a project to create a digital twin for our overhaul factory in Lincoln. The aim of the project is to create a platform that can be used for the deployment of new digital products / services and simulate their impact on our factory capacity.

The responsibilities for the individual to support the project are:

- Be a contributor to a wider team, to develop digital models of given processes within the factory
- Map and model given processes
- Integration of models into the process digital twin programme

### **Siemens Responsibilities**

- Training and access to design software
- Support / guidance to create digital models
- Access to relevant process owners
- Project manager and project team
- Joined – Supervision alongside with the University

### **Restrictions**

Models are to be created on the designated software by Siemens

Models are to be created in line with the specification and as indicated by Project manager  
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Sponsor: Julio Rebollar

Role: Head of Digitalisation IGT

### **Project Name:**

***RDS predictive maintenance use cases***

### **Introductions:**

As and OEM, Siemens offers different products and services, where one of our key added values are our predictive maintenance services.

Our predictive services allow our customer to identify potential threats to the equipment to take mitigating actions, before they become emergent work, impacting productivity and availability.

## **Project Description, Scope and Objectives:**

The aim of this project is to identify new potential use cases for our remote diagnostic systems, by adding smart sensors. The project focus is not to develop the solutions, but to identify the areas where the development teams should focus.

The responsibilities for the individual to support the project are:

- Analyse our trouble shooting data (tech support cases, breakdown data, RCA's etc), to spot areas where we have recurrent issues or cases that would create a bigger impact to the organisation.
- Provide business case and recommendations to the development teams in CTS teams (customer tech support) for inclusion on to their roadmap

## **Siemens Responsibilities**

- Provision of trouble shooting data
- Joined – Supervision alongside with the University

## **Restrictions**

Project to only focus on the ideation / innovation elements, not development

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## **Project Name:**

### ***FS Laptops – Osborn 1 project***

## **Introductions:**

Over the past years, we've seen an exponential growth on the software industry. This has created also an explosion on different commercial and licensing models ([Floating licensing](#), [Free and open-source](#) , [Free](#), [Open source](#), among others)

These licensing models offer opportunities to improve our operational cost and the governance of licenses usage.

In this case, we've identified an opportunity to centralise the licenses used for our Field service staff, on their laptops, which are used to conduct maintenance on our gas turbines. This will not only improve our cost base, by maximising the usage and reducing the number of "dormant" licenses, but also will allow us to deploy a better support strategy that will comply with export and import regulations.

## **Project Description, Scope and Objectives:**

The aim of the project is to assess the feasibility of having a centralized management system to deploy the required licenses to our FS staff, in the region and the product lead centres. Allowing regional entities to procure hardware locally and using the licenses from a shared pool.

The responsibilities for the individual to support the project are:

- Create a technical specification in conjunction with the IT architect assigned to the team
- Define the feasibility by creating a business case defining cost of implementation and return of investment
- Coordinate the assessment of the defined solution with our purchasing team.

## Siemens Responsibilities

- Provision of a Project lead / PM, to guide, coach and distribute work
- IT architect to create the solution
- Joined – Supervision alongside with the University

## Restrictions

No development work for the implementation is included at this stage, only covers the conceptual phase.

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Sponsor: Julio Rebollar

Role: Head of Digitalisation IGT

## Project Name:

*Digital Training*

## Introductions:

Digi meets training, can we use Digital techniques to improve how we learn? Siemens has been providing its customers training on the operation of gas turbines for over 50 years, offering a unique training experience through our Training centre in Lincoln. This is not only what we believe, but also what we have feedback by our customers through our customer satisfaction surveys. Still, we believe that we can do more...

When asking our customers what their main challenge is when it comes to training, the answer was Knowledge retention.

## Project Description, Scope and Objectives:

The aim of the project is to create proof of concepts on how digital techniques could help us improve the way we deliver our training, but most importantly, on how could we help our customers retain the customer they've acquired post training at our Lincoln Training Centre

The responsibilities for the individual to support the project are:

- Create prototype of potential solutions using techniques like AR (Augmented reality), You Tube, Gaming, etc.

## **Siemens Responsibilities**

- Access to relevant process owners
- Access to sample data / information to develop prototypes
- Joined – Supervision alongside with the University

## **Restrictions**

Any platform and solutions are allowed as a prototype, as long as the solution delivers Knowledge retention, and not the digitalisation of the training content.

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Sponsor: Julio Rebollar

Role: Head of Digitalisation IGT

## **Project Name:**

***Social Networks for Technical Support***

## **Introductions:**

It is not what you know... it is who you know....

The use of social networks for technical support forums is not a new concept. This has been in use for years over the internet. Question is, can we develop an industrial use case?

Many of our customers and industries have been investing on increased connectivity, and although things like Skype, Face time seem to be normal, and in some cases old fashioned ways of communication, they have just recently started to creep into the corporate / business level.

### **Project Description, Scope and Objectives:**

The aim of the project is to conduct a pre-study on the feasibility of a use case for our Field Service personnel. The concept is around creating a forum or knowledge base, created by our Field Service engineers for Field service engineers. Where they can share tips / tricks on how to resolve complex situations they've faced on the field

The responsibilities for the individual to support the project are:

- Coordination of a pilot with a group of FS engineers
- Coordinate and gather feedback from FS engineers
- Report back on findings and next steps

### **Siemens Responsibilities**

- Platform is already in place – Industrial Circuit
- Provision of hardware – Mobile devices for FS engineers to use
- Access to a small group of FS engineers to pilot the project
- Joined – Supervision alongside with the University

### **Restrictions**

Use of Industrial Circuit and Hardware

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Sponsor: Julio Rebollar

Role: Head of Digitalisation IGT

**Project Name:**

***Machine Learning for Demand Forecast and Inventory Optimisation***

**Introductions:**

Balancing demand with Supply has been an old game that has been played for years in the industry. Businesses that can successfully implement a mechanism to align their inventory against their demand, are able to gain significant improvements on cost and on time delivery.

There are many strategies and tactics to address this issue, however, with new digital techniques and increased computational power, would it be possible to predict customer's behaviours thus predicting demand based on more "obscure" metrics?

**Project Description, Scope and Objectives:**

The purpose of this project is to develop a prototype(s) of predictive forecasting tools, that will allow us to optimise the inventory. The forecasting tool should use information that we gather from our multiple systems by trying to identify some data co-relation with the customer buying behaviour.

This is part of a larger exercise to improve our planning process. As the sources of data are quite varied, and with the aim of simplifying the reach of the project. Siemens has already identified several cases where it is believed, that further analysis on the data could lead on to strong correlation to the forecasting process.

The responsibilities for the individual to support the project are:

- Data analysis and validation of the hypothesis generated by Siemens on a given data set
- Provision of feedback and recommendations
- Potential support on gathering of data for a given data set

## Siemens Responsibilities

- Provision of data sets, and hypothesis to be formulated
- Access to process and data owners for data gathering (if required)
- Lead Data Scientist
- Joined Supervision alongside with the University

## Restrictions

- None / TBA

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Sponsor: Julio Rebollar

Role: Head of Digitalisation IGT

## Project Name:

***Block Chain for Logistics tracking***

## Introductions:

On today's world we are used to have information at the touch of our fingertips. The availability of these data helps us among other things, to book, buy and track things online. With the increased volume of data that we generate, and the complexities of a VUCA environment, having full transparency through reporting tools is becoming more relevant, so we can make the right decisions.



There have been multiple developments on tracking technology through out the years, GPS, WIF triangulations & RFID to mention some, however there has been a lack of integration through out the complete process steps (customs clearance, handovers to our Freight forwarders etc)

Block chain seems to be able to provide a solution that will integrate the process

## **Project Description, Scope and Objectives:**

Purpose of the project is to investigate the technical requirements needed to deploy a Block chain pilot, to improve transparency when tracking our shipments

The responsibilities for the individual to support the project are:

- Investigate use cases of block chain in other industries
- Assess the minimum requirements
- Compare versus current processes and existing technology to identify the gaps and potential costs / difficulty for implementation

## **Siemens Responsibilities**

- Access to relevant process owners
- Joined Supervision alongside with the University

## **Restrictions**

No proof of concept is expected to be developed, just a feasibility assessment and basic spec

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Sponsor: Julio Rebollar

Role: Head of Digitalisation IGT

**Project Name:*****Repair yield Optimizer & Predictive Repair yield forecast*****Introductions:**

As it is with most critical equipment, they need maintenance. Siemens offers repair services for our Small Gas turbine range in Lincoln.

To support the overhaul programme, Siemens has developed several repair schemes on the gas turbine components, so they can run for another life cycle.

Having a successful repair yield has a direct impact on our demand planning process, and as such it is important to keep such yield as high as possible.

**Project Description, Scope and Objectives:**

The scope of this project is to analyse data related to our competent repair process, comparing the cases where repairs took place, but did not pass our quality checks. The purpose of such analysis is to try to identify digital techniques that could allow us to predict which components are not worth putting through the repair process, providing an additional aid to our current inspection / assessment process.

The techniques to be used for the creation of such solutions are open, and could range from image recognition, data / tolerance analysis, among others

The responsibilities for the individual to support the project are:

- To develop prototype (s) to enhance our inspection and assessment process, enabling us to predict the repair success rate.
- Define potential cost of implementation

## **Siemens Responsibilities**

- Lead Data Scientist
- Access to sample repair data and a sample of the “to be repaired” components
- Joined Supervision alongside with the University

## **Restrictions**

None or TBA