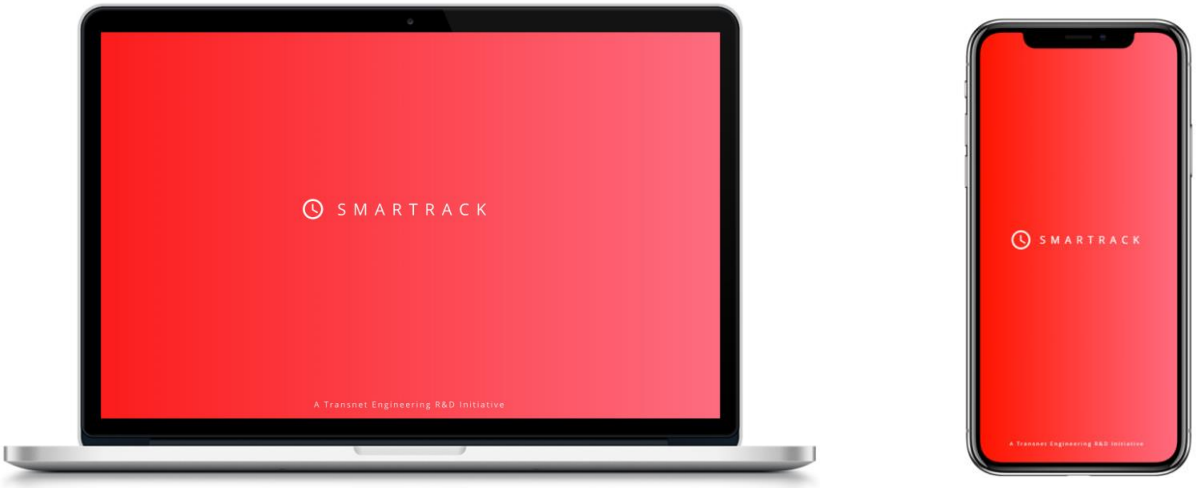

I & I Summative Report

Time Tracking System for Transnet Engineering R&D

Jediael Krishnasamy
Imraan Vawda
Susan Mani
Wing Lau
Thapelo Senosi

August 2018

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1. INTRODUCTION

1.1. DESCRIBE THE OPPORTUNITY YOU TARGETED.

At Transnet Engineering (TE), various methods to address work hour allocation to projects for company audit purposes, customer billing and team productivity have been experimented. However, none of the systems put in place have gained any momentum and have very low usage. Users get frustrated with all the admin the system brings and complain about the time it takes away from the actual work they need to do.

Develop an easy-to-use and low-administrative time-tracking system for Engineers with good user experience that will increase system usage enabling a clear trail of billable working hours for audit purposes and customer billing while allowing Management to view team productivity.

1.2. WHY WAS IT A NEED?

The Research & Development (R&D) team at TE are, as explained in their title, responsible for research and development into new, uncertain and unknown solutions to problems.

The **business need** for a time-tracking system is two-fold:

- *With Transnet being a parastatal, the South African Revenue Services (SARS) incentivises companies to spend money in R&D by allowing them to claim back spent project hours for tax incentives/rebates per approved research project.*
- *Secondly, with TE's aim to be an Original Equipment Manufacturer (OEM) into Africa and the Middle East, the number of billable worked hours must be captured per resource per project in order to determine the price at which the product/service must be sold at.*

This project is needed because the current system usage is low and the mandatory requirements stated above are still not addressed. The need is to create a system that will increase user usage. This project aims to understand why the current system is not being used and what can be changed to make the user experience better.

1.3. WHO WERE KEY STAKEHOLDERS?

Stakeholders were identified and are listed. Their role and use of the system is also noted in the table below.

Table 1: Stakeholders and use of system

Stakeholder	*Role*	*Objective*
Engineers	Direct Users (Input to System)	Daily project tracking
Principal Engineers (Managers)	Direct Users (Input to System) Team/Project Management: (Output of System)	Project tracking Team Performance View resource allocation
Project Managers	Project Management (Output of System)	Improve project tracking Project end date forecasting
Finance, SARS & DST	Auditors (Output of System)	Reports: - Billable working hours per project - Audit trial of engineer time spent - % time worked on projects

1.4. WHAT MADE IT CHALLENGING?

At least two different systems were implemented in the past but it was difficult to get buy-in from the engineers (core users of the system) and everyone constantly complained. It became extremely tedious to have to log the hours daily, and if left to the end of the week – engineers forgot what they did during the week and it becomes a check list and guess exercise. Either engineers did not use it or the data captured was not accurate. Some also complained that the system was borderline invasion of privacy.

Engineers are busy individuals and dislike repetitive tasks that they see no value in. If anything becomes tedious and takes away time from their work, they will not adopt the system.

The challenge was to design a system that will require minimal interaction from the user, quick to conclude on a daily basis while remaining within the limits of it being a work requirement versus micro-management and personal privacy.

2. APPLYING THE DESIGN THINKING PROCESS

2.1. THE DESIGN THINKING PROCESS

With the Engineers being the core users of the system and providing all the input required to output relevant information to other stakeholder, they were seen as the focus group. Their interactions with the system was given priority. Reports based on this information would be handed over to Finance as and when required. The figure below depicts the Design Thinking process, adapted for the time tracking system.

Figure 1: The Design Thinking Process applied to the Time Tracking System

2.2. EMPATHIZE

In order to understand the poor usage of the previous time tracking system, various methods were implemented to empathize with the users:

- Surveys,
- In-person interviews, and
- Hands-on experience sessions with the previous systems.

The **feedback survey** consisted of requesting current users to provide feedback on the previous solutions and to also provide improvements they would like. The improvement section also requested users to motivate the reasons of suggesting such improvements. Appendix A contains a list of the responses that were captured.

The **in-person interview** was split up into two audiences (interview questions in Appendix A):

- to understand the main focus of the time tracking system;
- and to understand the frustrations or problems which lead to low usage of previous implemented solutions.

Many Engineers, Principal Engineers and Project Managers were randomly selected for unbiased opinions. Engineers were interviewed mainly on the user experience they had – their challenges and pain points are listed in Section 2.3 Define.

Principal engineers were interviewed to understand the objective of the time tracking system and what the output would be for Finance. *It was noted that all that was required for Finance was to determine the number of hours spent, % of time spent per resource and the type of resource that is (engineer, Senior Engineer, Principal Engineer, etc.) on a project*.

Project Managers were also interviewed to determine what they'd like to see from a Project Management perspective. They indicated a need to understand the time allocation per project they were managing so they could be proactive in informing Senior Management on delays in projects and if any resources would be required additionally.

List of responses are provided in Appendix A.

Hands-on experience sessions **(shadowing)** were also conducted by trying the two previous solutions implemented. This assisted in better understanding why the previous system failed. Figure 2 and 3 illustrates the current system, Chronos, that is in use. It can be seen clearly in Figure 3 that no one has captured time at least in the past week and highlights the low usage problem.

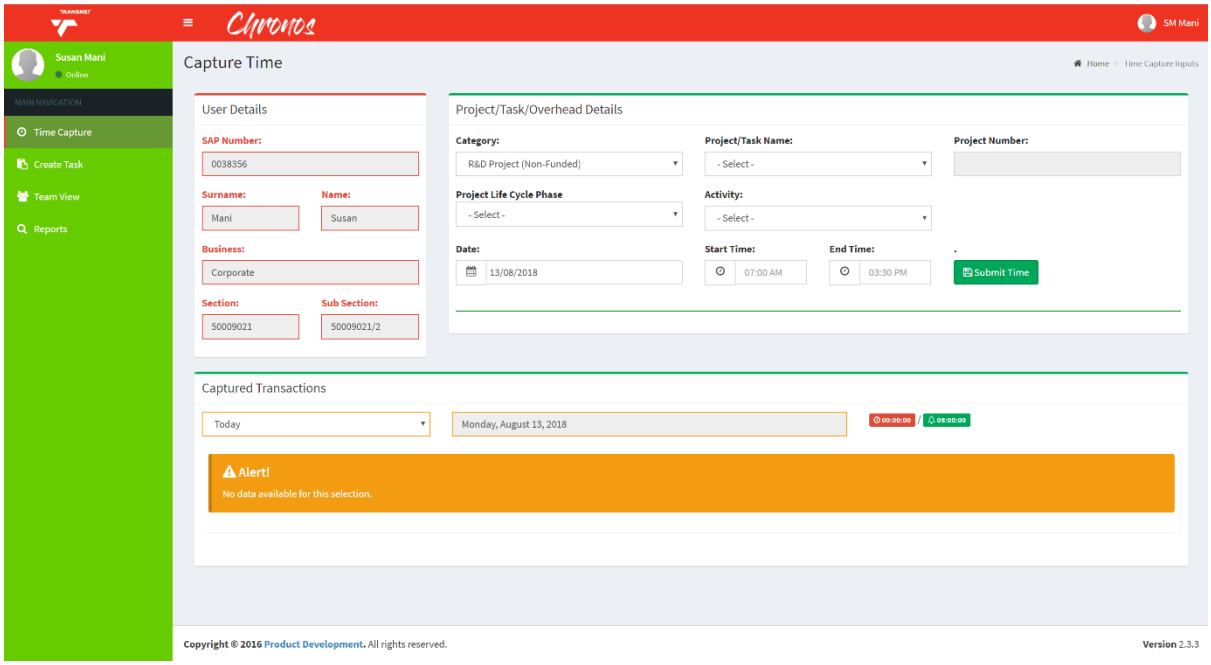


Figure 2: Chronos Landing Page

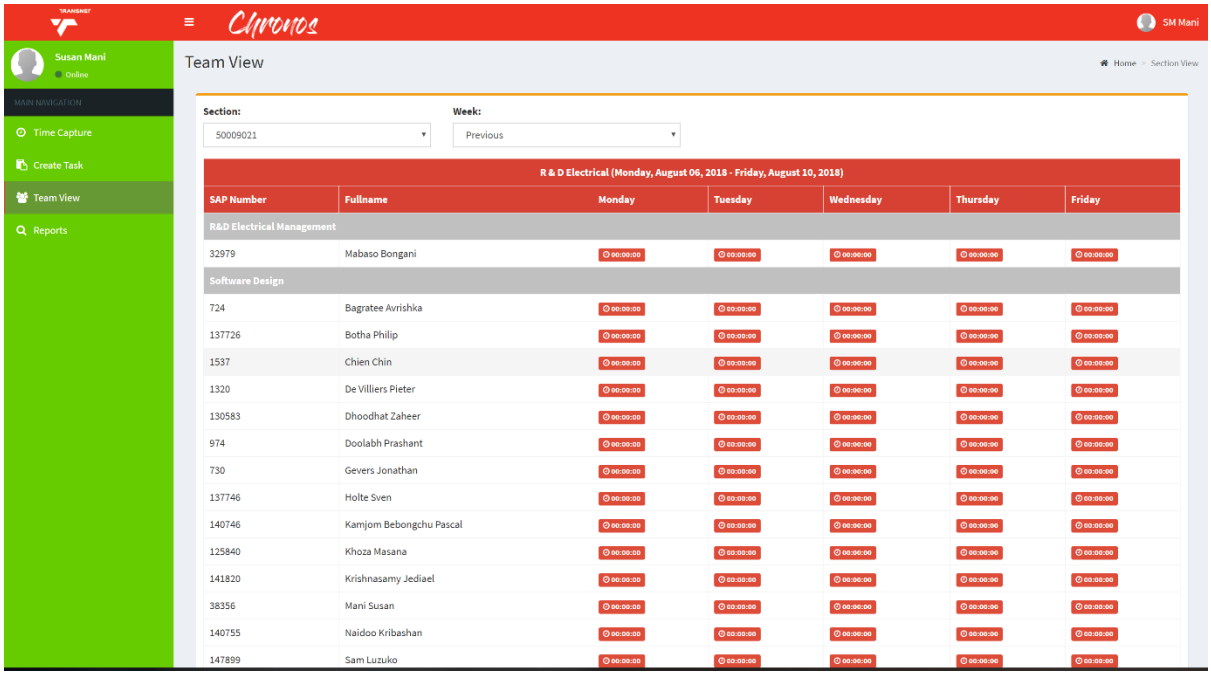


Figure 3: Team View - Red indicates no time was captured for the day.

2.3. DEFINE

After empathising with the relevant core users (Engineers and Principal Engineers), it was realised that the Problem Statement had multiple constructs.

It was decided that the following **Problem Statements** needed to be addressed if we wanted to compass the entire system domain.

- *Develop an easy-to-use and low-administrative time-tracking system for Engineers at TE R&D that will increase overall system usage.*
- *Create a clear trail of billable working hours of Engineers on R&D Projects for audit purposes and customer billing for Management reporting to Finance.*
- *Develop a time tracking that allows Management to view complete Team Productivity and Resource Constrained projects.*

The stakeholders are as defined in Table 1 in the sections above.

The **following Pain Points and Challenges** were gathered from the stakeholders:

- must be captured daily and cumbersome (a lot of cumbersome admin)
- most engineers rather do it at the end of the week and could lead to forgetting what one did
- have to capture leave and meetings manually
- have to capture lunch
- only on desktop platform the app
- request to capture time every 30 min
- it was project dependent and not able to assist other project if not on system
- had to enter time manually
- too many things to fill-in before able to capture time
- user interface was too much
- app or program was slow
- when in field, difficult to track time
- felt like you were micro-managed
- tracking phase of project which didn't matter
- had to fill 8 hours of working hours and project dependent
- minimum customizability

The following were main suggestions for improvements

- Automated (integrated with one's lifestyle) and
- High level tracking only

It was discovered that there were two overall objectives that needed to be achieved. The first part was the User Experience (the Engineer) to increase the usage and the second was Reporting (Management – Principal Engineers, etc.) to enable correct feedback to the relevant external stakeholders.

The **User-Experience** was to ensure that it was low admin and easy to use, and that the user will easily adopt the new solution. After the challenges and pain points were established, the following **Decisions** were taken. The system must have:

- minimal interaction,
- system integration with HR, outlook calendars and third-party systems,
- quick to conclude on a daily base,

- not invade personal privacy or encourage micro-management; and be
- multi-platform.

The **Reporting** was to ensure that management could track the team productivity and that there is a clear audit trail for billable working hours for customer billing and auditable hours for audit and SARS purposes. The following **Decisions** was taken; the reports shall have:

- Project feedback on hour spent per resource per project,
- % time spent per resource per project,
- Type of resources per project,
- Easily provide relevant Reports to Finance,
- Improve project tracking and possible future project time forecast, and allow for
- Team or project performance tracking.

2.4. IDEATE

Brainstorming sessions were held to think of ideas for solutions to the time tracking problem as well as possible features that could be provided to ease the capturing. The following solutions were ideated during this session:

- Use existing tools on the market (RescueTime, Tutos, Jiggl, etc.)
- Voice controlled time tracker
- Camera – face tracker
- Timesheet (manual)
- Biometric tracking
- App that pops up and requests confirmation on current work
- Pocket camera that checks what is being done
- Create a customised tool solution

An advantage and disadvantage matrix were created for each of the above ideas. It was then decided that the consolidation of ideas would be used: Customised tool solution with confirmation of work in a timesheet view was most appropriate since it could be customized to TE R&D specific needs.

A feature brainstorm session was held. The following feature list was brainstormed for the customised tool solution:

- Less than 2 clicks to track a task
- No user input, only confirmation of allocation
- List of assigned projects automatically added
- Log only hours per project not time sequentially
- Must be able to add ad-hoc projects and include till allocated to site work
- Link to SAP, other sharing platforms like Calendar, Google Keep, TFS, etc.
- Sign on machine means you at work
- Use a machine learning model to see what you generally would be doing at a time and predict options for you to select
- Views:
    - Project view
    - Personal view
    - Finance view
- Use counters instead of inserting time
- Multi-platform: mobile and laptop
- Shortlist tasks – 5 max per personal, management and project
- Possible to add management as a task

2.5. PROTOTYPE

Figure 4 shows the logical components that makes up the solution. It is used to understand and develop a solution framework regarding choices around appropriate hardware and software, data sources and formats, analytics tools, data storage decisions, and results consumption.

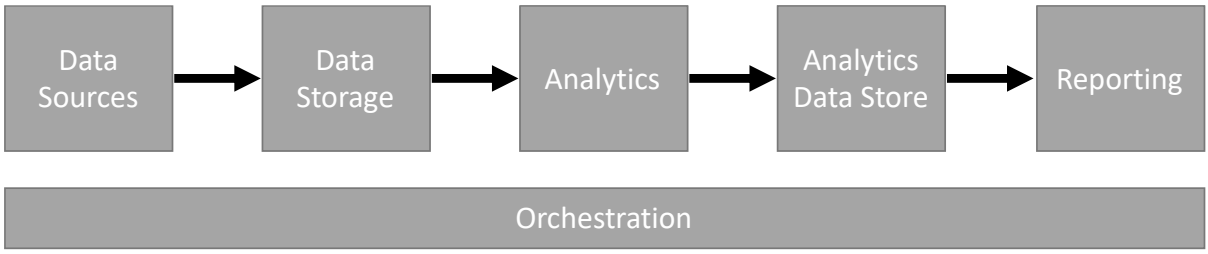


Figure 4. Logical architecture for the SMARTRACK solution

Data sources: Data for analytics purposes can come in various formats. Data source examples include enterprise applications like ERP or CRM, MS Office docs, data warehouses and relational databases, mobile devices, sensors, social media, and email.

Data storage: Data is typically stored in a distributed file store that can hold high volumes of data in their original format. Options for implementing this include an on-premise Hadoop Distributed File System, Data Lake Store on Microsoft Azure, Bigtable on Google Cloud, Amazon S3 on AWS.

Analytics: The analytics layer interacts with the stored data to extract insights and business intelligence. Analytical notebooks, such as Jupyter and Databricks, are a preferred choice for analytics.

Analytics Data Store: Once data has been processed it needs to be served the in a structured format that can be easily queried. Options for this would typically by a SQL database or Datawarehouse.

Reporting: The goal of most data solutions is to provide insights into the data through visualisations and reporting. Options for implementing this include dashboarding tools, such a Tableau and PowerBI, or custom websites and mobile applications.

Orchestration: A data solution usually consists of multiple repeated data processing workflows, that transform source data, performs data movement, load the analysed data into an analytics data store, or publish results straight to a dashboard. Orchestration is used to automate these workflows, options available include Azure Data Factory, Apache Oozie and Sqoop, and Google Cloud Composer.

Various **representations** of the solution design were done. Figure 5 depicts the final detailed solution design for the prototype. This helps to define the available data sources, the analytics that is to be developed, and the user interfaces required by the solution.

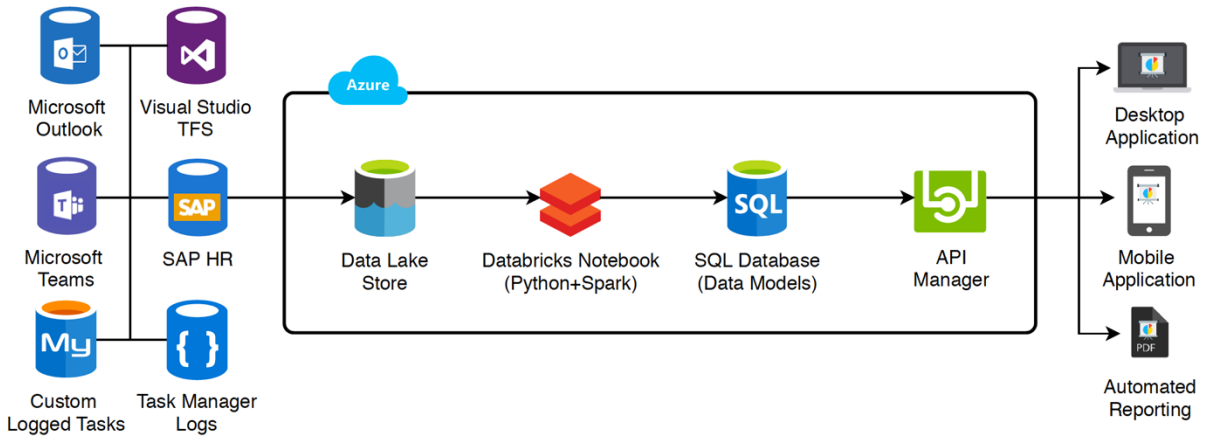


Figure 5. SMARTRACK detailed solution design

Data Sources:

From the architecture above in figure 5 there was a few data sources that were identified to be critical for the success of the project. In this section each data source is explained and then data that will be ingested from each source is outlined.

- *Microsoft Outlook Exchange Server:* This is an email server that manages emails transportation. From this source we interested in knowing planned work items that the user might have already planned on the Outlook calendar. Data from the exchange server that we interested on is all the planned meetings for the day and appointments saved on the user's calendar. This data will be ingested in the data processing platform every day in the morning.
- *Visual Studio Team Services (VSTS):* Is a development management platform that is used by software developers across the world. This tool allows developers to source control their code as well as plan their work. Planning is done by creating tasks on VSTS and assigning them to individual members in the teams. This platform will be used to get all tasks that are assigned to each user each day. This is achievable as every two weeks we plan work for the next two weeks. This data will be ingested in the data processing platform every day in the morning.
- *SAP Human Resources:* SAP is a platform that Transnet uses for employees to manage their leave days as well as for managers to approve the leave. We saw this as a good source for days users are on leave. In this case as users can take leave before the leave is approved SAP notifications will be generated and shared with the SMARTRACKER platform as it happens.
- Custom Added Tasks: This is custom tasks that are manually inputted either using the mobile application or web app and saved in the SQL database. This data is then persisted in the data lake for further analysis and report purposes.
- Task Manager Logs: Task manager log is a custom service running on each user's individual PC that tracks which applications are running currently. This service will be configurable for the user to specify which processes can be tracked. It should be noted that this service will not be there to invade the privacy of the user and that it will be optional for the user to use. Also, only the user will be able to see their data and not managers or peers. This service will track process name, CPU usage and memory usage. This data together with data from VSTS will be used to map what processes or programs are used to complete a task.
- Microsoft teams: All admin tasks will be ingested in the smart tracker platform from Microsoft Teams.

Azure Platform:

- Data Lake Store: Data from the various sources described above are stored here in their original format. System log files and archived data will also be stored here. This storage method was selected due it's low cost.
- Databricks Notebook:
- SQL Database: Roles, Profiles, Tasks
- API Manager:

Database Model:

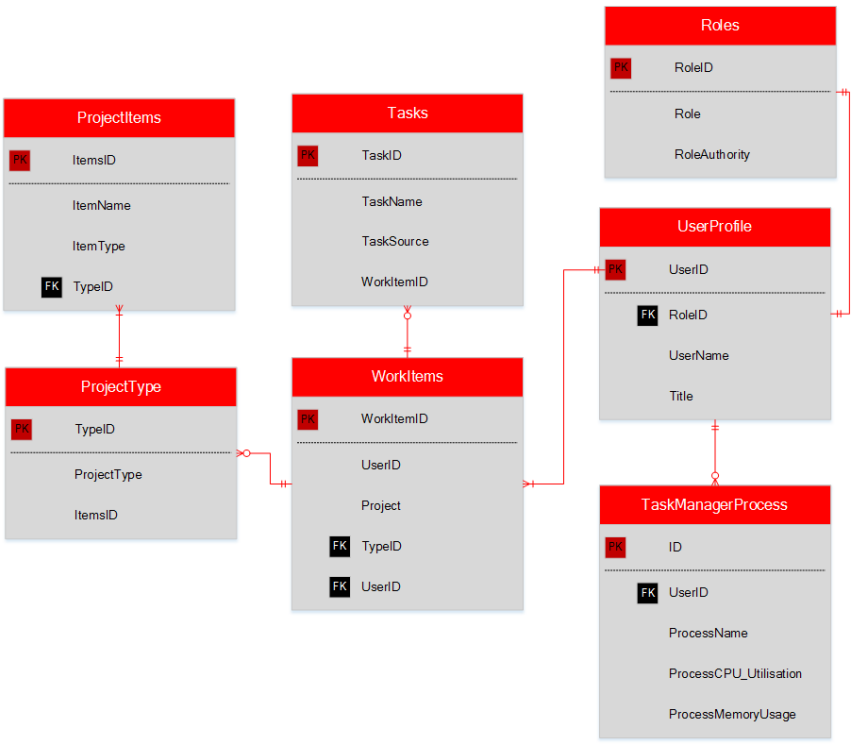


Figure 6: Data Model

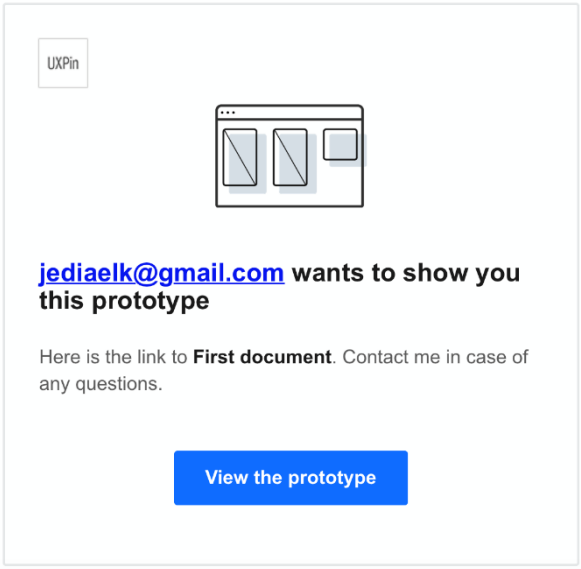
Software Application:

User interface concepts for the SMARTRACK solution were designed on an online wire-framing and user interface design platform called '**UXpin'**. A great feature of this platform was that it allowed for sharing of the prototype solutions via a link or email as if it were live. This provided an efficient way for multiple users to experience the software application and at the same time and provide feedback.

2.6. TEST

The SMARTRACK system concept underwent evaluation by randomly selected R&D team members to identify if it passed all the mentioned critical success factors as well as all the stakeholder requirements. If any feature was unclear, its origin was traced throughout the design thinking process. All aspects of design in the system was intentional and focused on effective user experience, minimal input and optimal reporting.

As described in Section 2.5, **UXPin** allowed users to easily test the SMARTRACK prototype solution. Users were sent an email request to view and test the prototype.



Verbal feedback from the users were gathered. This was useful as it identified "gaps" in the initial prototype. Some of the comments are listed below:

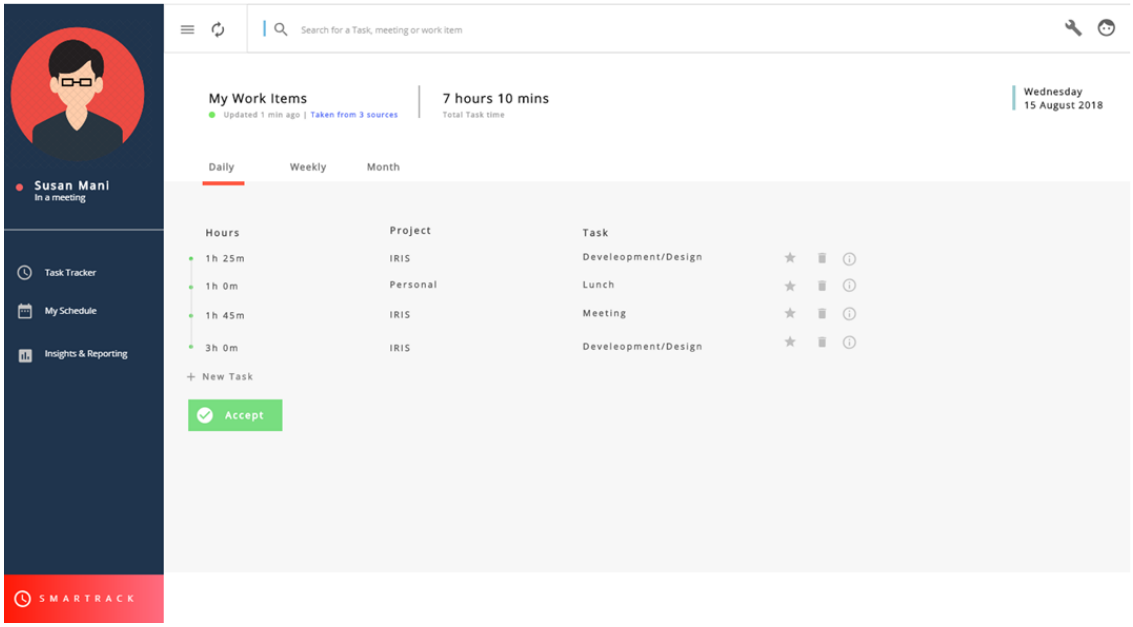
> *"There is no way that a user can add their own task, there should be a button that allows the user to add a task manually"* – Kribashan Naidoo (Engineer)

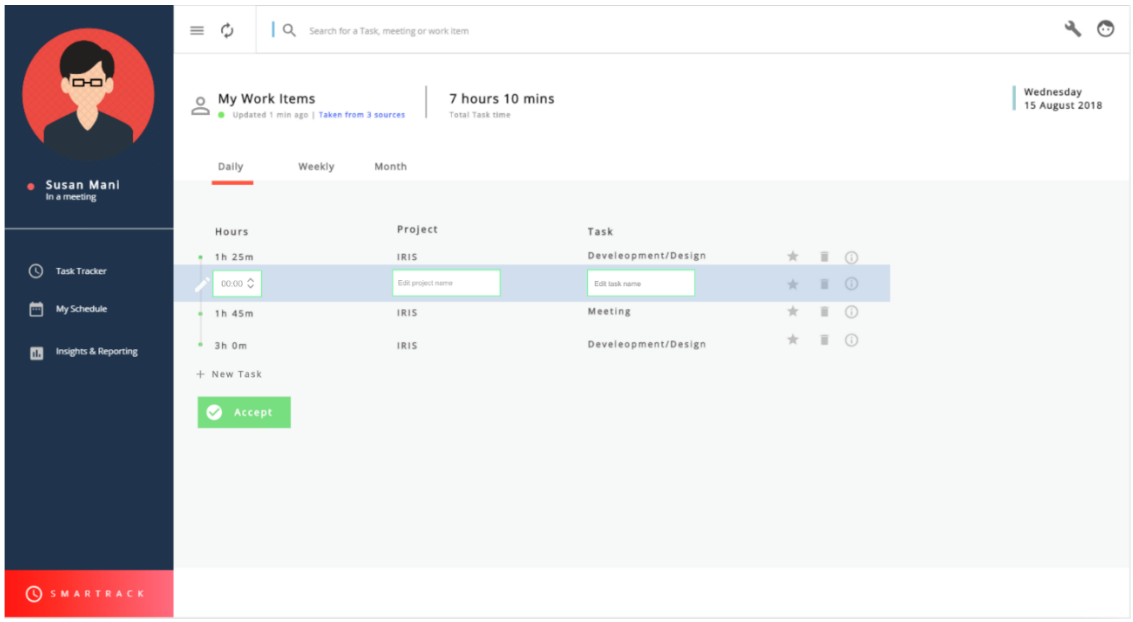
> *"Clicking to complete a task for every task is a tedious process. This was one of the concerns of the previous systems, it would be great if there was a way to just click once for everything"* – Jeff Chin (Engineer)

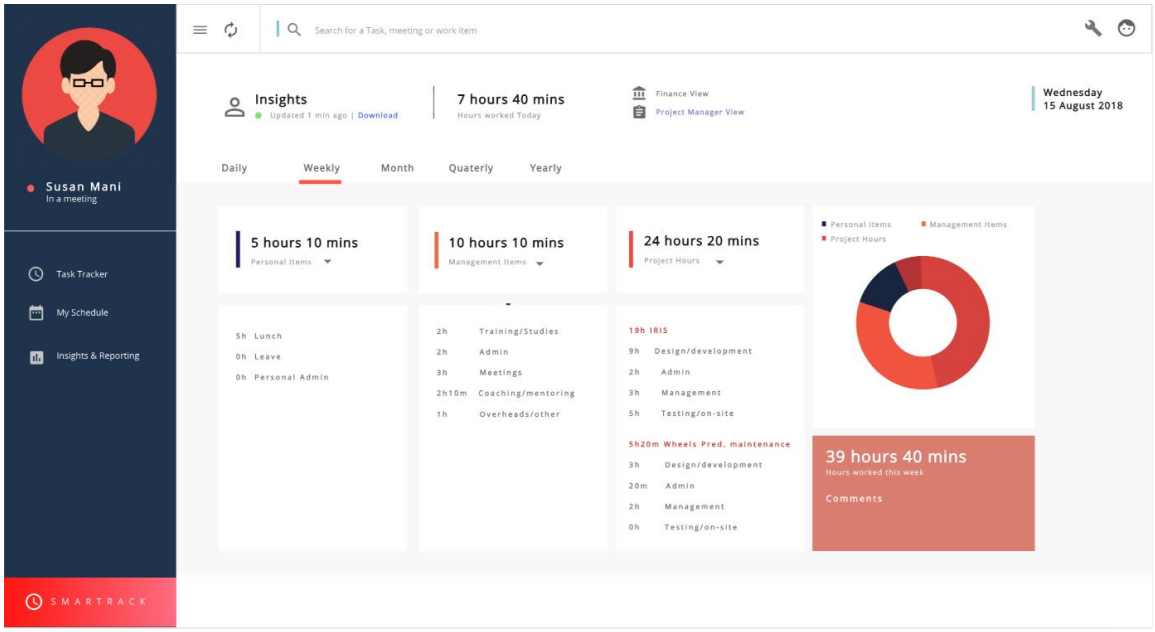
> *"For intellectual property sake, it may not be ideal to display the costing and financing figures to everyone. Perhaps allow for administrators and managers to view it. Maybe have it visible, but locked in a way"* – Nadim Mahomed (Principal Engineer)

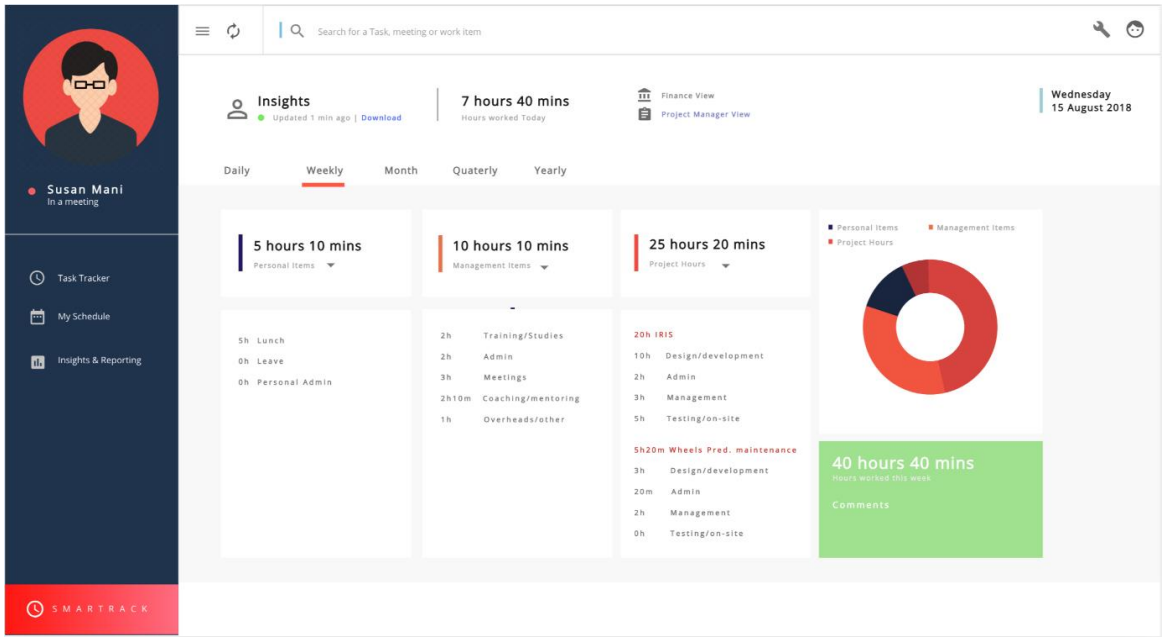
Majority of the feedback obtained, apart from those mentioned above, indicated that the system was well received. The issues that were raised were then resolved with further prototyping enhancements. The concept was then sent out again for feedback. The feedback indicated that the concept of the SMARTRACK was functionally feasible.

2.7. FINAL PROTOTYPE CONCEPT AFTER TESTING






Susan Mani
In a meeting
Task Tracker
My Schedule
Insights & Reporting
SMARTRACK
Search for a Task, meeting or work item
Insights
Updated 1 min ago | Download
7 hours 40 mins
Hours worked Today
Finance View
Project Manager View
Wednesday
15 August 2018
Daily
Weekly
Month
Quaterly
Yearly
5 hours 10 mins
Personal Items
10 hours 10 mins
Management Items
24 hours 20 mins
Project Hours
Personal Items
Management Items
Project Hours
5h Lunch
0h Leave
0h Personal Admin
2h Training/Studies
2h Admin
3h Meetings
2h10m Coaching/mentoring
1h Overheads/other
19h IRIS
9h Design/development
2h Admin
3h Management
5h Testing/on-site
5h20m Wheels Pred. maintenance
3h Design/development
20m Admin
2h Management
0h Testing/on-site
39 hours 40 mins
Hours worked this week
Comments


Susan Mani
In a meeting
Task Tracker
My Schedule
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SMARTRACK
Search for a Task, meeting or work item
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Updated 1 min ago | Download
7 hours 40 mins
Hours worked Today
Finance View
Project Manager View
Wednesday
15 August 2018
Daily
Weekly
Month
Quaterly
Yearly
5 hours 10 mins
Personal Items
10 hours 10 mins
Management Items
25 hours 20 mins
Project Hours
Personal Items
Management Items
Project Hours
5h Lunch
0h Leave
0h Personal Admin
2h Training/Studies
2h Admin
3h Meetings
2h10m Coaching/mentoring
1h Overheads/other
20h IRIS
10h Design/development
2h Admin
3h Management
5h Testing/on-site
5h20m Wheels Pred. maintenance
3h Design/development
20m Admin
2h Management
0h Testing/on-site
40 hours 40 mins
Hours worked this week
Comments

3. APPLYING SYSTEMS THINKING AND ENTREPRENEURSHIP LEADERSHIP

The principles of systems thinking were ideal to apply in this specific project. With all the examples of how projects failed when jumping straight into the solution, encouraged the need to follow a systematic approach in solving problems.

We began the project by finding a need within our organisation that we could solve within a short space of time. We then ran through the systems thinking approach to familiarise ourselves with the phases and what would be required to correctly apply the steps.

To understand the exact need and problems, we attempted to emphasize with the users in various ways as mentioned in the sections above. This helped us understand the extent of the problem domain, define the project, identify stakeholders and roles, as well as produce an apt problem statement. We realised we needed to solve a few problems to cover the entire scope of the system and ended up with a number of problem statements. We then tried to throw some ideas around for solutions. When we agreed on the general approach and determined the minimum applicable success criteria's that we could test against after building the prototype. We had to iterate through prototype and test a few times to get the final feasible solution interface.

One thing that stood out for me was the realisation that a direct link between innovation, business change and leadership exists. That innovation doesn't always have to be major but even strategic innovative step changes can also have a great impact. But in order for that change to happen in any business or organisation, leadership is required for support and ensure it thrives. This project was one such example – we were recreating an already attempted problem-solution for the 3rd time!

We requested approval from our executive management and our vision was supported and encouraged. This problem has been pain over the years so us taking it on was positive. The team had the same commitment, alignment and direction and worked well together. We had an unfair advantage (and used it to our own benefit) in that we already work together and know each other pretty well, also, the current systems already directly affected us and it was a personal problem too that we wanted to solve. We recognised the strengths that each of us brought onto the team and the work split was done accordingly. The problem space was big enough and we each had the opportunity to lead on elements of the design process. We also were able to quickly list the issues we had with the system to speed up the empathise process.

I saw that change management would be a big concern when roll out happened and that we'd need to manage it well. We, obviously, had some resistance from the team when we mentioned we wanted to take on this challenge, but we made sure their voices were heard so that they too could be part of the process and support to our vision. Getting their approval in advance could ease the change process.

Without proper personal leadership – understanding the need, having a vision to better the environment, commitment to pursuing the problem even when we got resistance, ensuring we aligned to the organisational goal/need for the system and making sure we didn't veer off course to design what we wanted as opposed to what serves the majority of users, encouraging the change and selling the idea in the organisation even though engineers dislike the idea of logging time – this project would not have been successful.

Taking into consideration that the VUCA world (volatile, uncertain, complex and ambiguous) is ever-changing and constantly uncertain, I see and recognise the need for a systematic framework and change-enabling leadership to ease innovation – and without it we'd probably waste more time and produce less useful products.

4. PEER PRESENTATION FEEDBACK

The peer presentation went very well. The group only had positive comments.

Edward appreciated the fact that I had incorporated the comments the group had made in the check in session. He loved the look and feel of the slides. He asked a question about Change Management and I told him it was being taken into consideration in the report even though I didn't have a portion in the presentation on it and tried to explain how we started to cater for it.

Bovarin said it was awesome and he liked the fact that the slides had pictures and the text was just enough to understand what we were doing. David commented that the prototype was well done and the slides were good.

All in all, the session went great.

5. MANAGER/SPONSOR FEEDBACK

The presentation to our manager and team went well. We ran through how we applied the design thinking process and it was noted how similar the concept was to systems engineering. We discussed the use of this systematic thinking approach in our environment and agreed it may be useful for our Ideation phase in our Product Lifecycle Model.

The users said they felt included in the process because we sat with many of them to ask what their views and pain points were, so when the system was finally presented they recognised most of the critical requirements. They mentioned how happy they were about how little input they needed to provide to log their time.

The Manager had positive comments about the concept of the prototype, but raised the practicality of implementing such a system. He was very excited seeing the use of machine learning application in the prototype as his background is in AI. Some questions were asked around who would develop the system (internal or external third party) if we went through with this and whether it would be feasible or not. It was noted that this could be a great business opportunity in general!

6. PERSONAL LEARNING & GROWTH

I have clearly seen the use and need of design thinking in every problem solving. Being Engineers we've already been introduced to systems engineering and are well acquainted with it. But I have realised that they may be over kill for projects that may not be engineering related, even if the principles are similar. This is a much lighter weight version of Systems Engineering and I can apply it to generic problem domains. I will definitely encourage my team to start using it, especially in Ideation phase, for quicker turnaround times for prototyping and testing feasibility.

The Empathise phase was the most valuable to me. Really understanding the need and engaging with the user provided such a holistic picture of the actual issue. In this case, I have realised that Change Management is going to be very critical – it is something that we don't always think about. Making sure the system is actually used is key. I may design the perfect system taking into account all the user requirements but if there is no buy in and excitement from the actual users, nothing really matters. And this is where entrepreneurial leadership becomes extremely important.

Personal development for me in terms of capabilities – I think being in the position that I am within the organisation I need to appreciate and understand the part I play in leading innovation and positive changes through my leadership role. I need to be more supportive of the initiatives that are brought to me and make sure that it is the best vision for the organisation and my team going forward. There

are area's I have that are strengths and weaknesses. I need to understand which if those I can use to my full potential and is most needed in the spaces I am active in. Values may not always be the same for everyone – what some people view as weaknesses could be used as a strength in specific areas. I look forward to working on areas, specifically in Effective Communication, Humility, Unity and Responsibility to Pan-Africanism. The latter, especially, is an area I would like to put in more effort in – promoting the interests of the African Continent. It's one I don't always get the opportunity to be part of and must be a conscious effort.

7. MY REFLECTION: PEER PRESENTATION

I was very happy with the way the presentation went. I felt I gave enough background and information so they could understand what I was trying to do. I tried to show enough pictures so it's also clearer to understand our trains of thought. It's hard to squash weeks of work in 10 slides. The presentation went seamlessly and I was pretty content with the comments. Took my team some time to get the slides in order and look like it did so the comments from my peer group was well received.

I enjoyed the other peer presentations, a lot of effort was put into completing them. Some of the ideas were very cool and I would love to see the implementation. I thought we had a good peer group and we supported each other the best we could and gave good feedback.

8. MY REFLECTION: MANAGER PRESENTATION

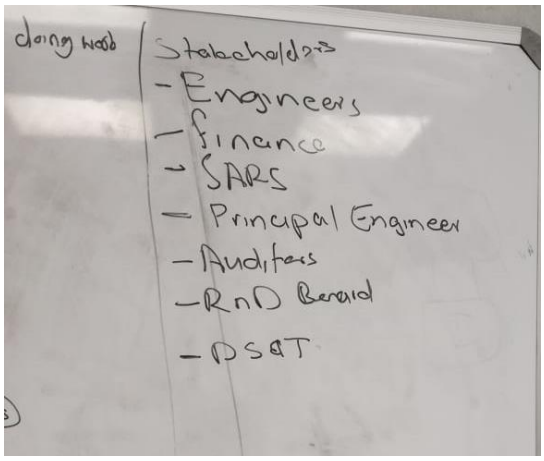
I think the presentation went very well. Everyone was very excited with the new features we proposed and the minimal interaction that was needed. We had good discussions with the manager regarding the concepts we learnt on this course and how we can take it forward in our teams. He seemed really keen in actually running this as something we could use in the space.

I am glad we got him on-board from the beginning of this project. So he knew what we were trying to solve and do. In order to sell this concept to the rest of the teams, we will need proper methods of change management and cannot be done without his support.

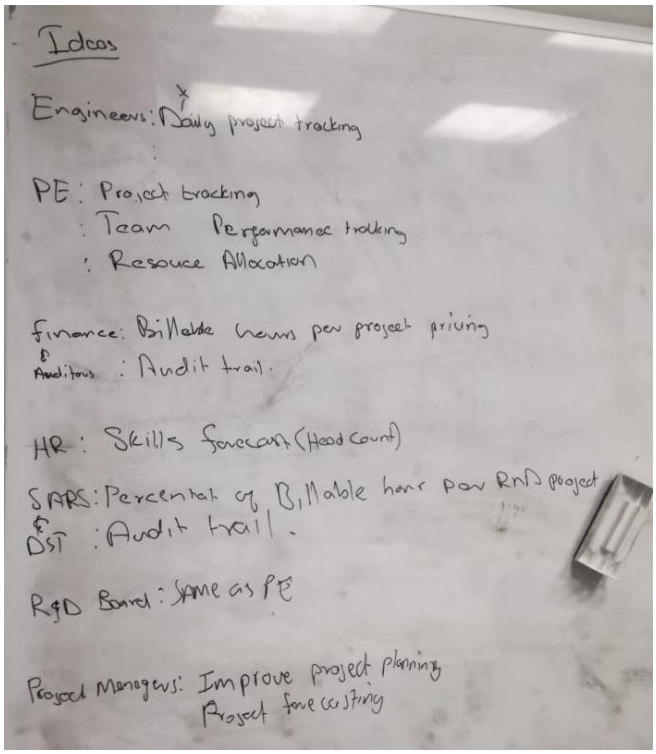
APPENDIX A: EMPATHISE AND DEFINE

A.1 STAKEHOLDERS

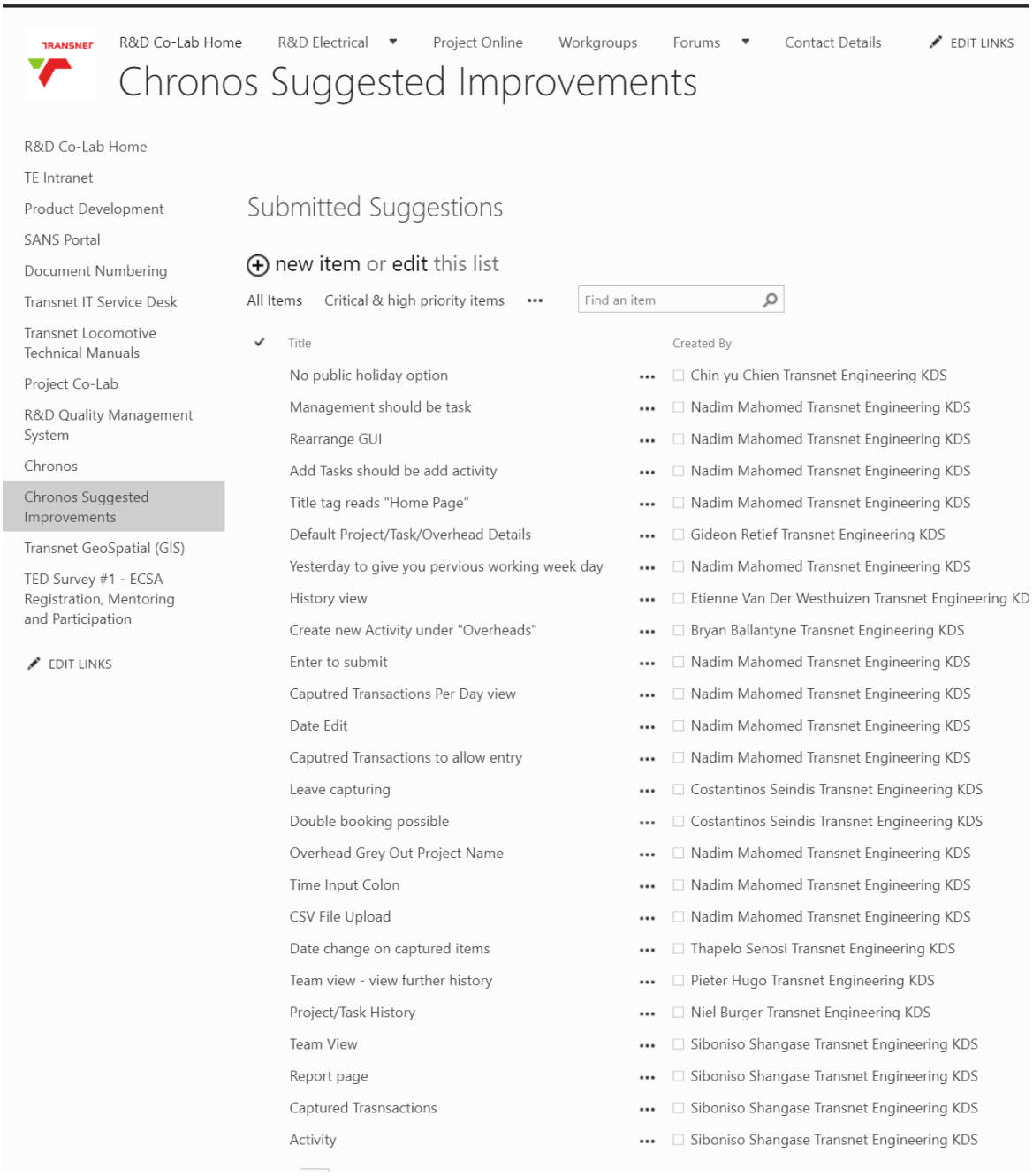
Identification of Stakeholders



Stakeholder Requirements



A.2 SURVEYS AND RESPONSES



R&D Co-Lab Home | R&D Electrical | Project Online | Workgroups | Forums | Contact Details | EDIT LINKS

Chronos Suggested Improvements

- R&D Co-Lab Home
- TE Intranet
- Product Development
- SANS Portal
- Document Numbering
- Transnet IT Service Desk
- Transnet Locomotive Technical Manuals
- Project Co-Lab
- R&D Quality Management System
- Chronos
- Chronos Suggested Improvements
- Transnet GeoSpatial (GIS)
- TED Survey #1 - ECSA Registration, Mentoring and Participation

EDIT LINKS

Submitted Suggestions

new item or edit this list

All Items | Critical & high priority items | Find an item

Title	Created By
No public holiday option	Chin yu Chien Transnet Engineering KDS
Management should be task	Nadim Mahomed Transnet Engineering KDS
Rearrange GUI	Nadim Mahomed Transnet Engineering KDS
Add Tasks should be add activity	Nadim Mahomed Transnet Engineering KDS
Title tag reads "Home Page"	Nadim Mahomed Transnet Engineering KDS
Default Project/Task/Overhead Details	Gideon Retief Transnet Engineering KDS
Yesterday to give you pervious working week day	Nadim Mahomed Transnet Engineering KDS
History view	Etienne Van Der Westhuizen Transnet Engineering KD
Create new Activity under "Overheads"	Bryan Ballantyne Transnet Engineering KDS
Enter to submit	Nadim Mahomed Transnet Engineering KDS
Caputred Transactions Per Day view	Nadim Mahomed Transnet Engineering KDS
Date Edit	Nadim Mahomed Transnet Engineering KDS
Caputred Transactions to allow entry	Nadim Mahomed Transnet Engineering KDS
Leave capturing	Costantinos Seindis Transnet Engineering KDS
Double booking possible	Costantinos Seindis Transnet Engineering KDS
Overhead Grey Out Project Name	Nadim Mahomed Transnet Engineering KDS
Time Input Colon	Nadim Mahomed Transnet Engineering KDS
CSV File Upload	Nadim Mahomed Transnet Engineering KDS
Date change on captured items	Thapelo Senosi Transnet Engineering KDS
Team view - view further history	Pieter Hugo Transnet Engineering KDS
Project/Task History	Niel Burger Transnet Engineering KDS
Team View	Siboniso Shangase Transnet Engineering KDS
Report page	Siboniso Shangase Transnet Engineering KDS
Captured Trasnsactions	Siboniso Shangase Transnet Engineering KDS
Activity	Siboniso Shangase Transnet Engineering KDS

A.3 INTERVIEWS

Principal Engineer Questions:

1. What is the ultimate purpose of a Time Tracking Tool for R&D?
2. What would Finance require if a report was to be compiled for them?
3. What type of information is required for SARS tax rebates?
4. What would you like to do with the information captured on the tool?
5. Pain points?

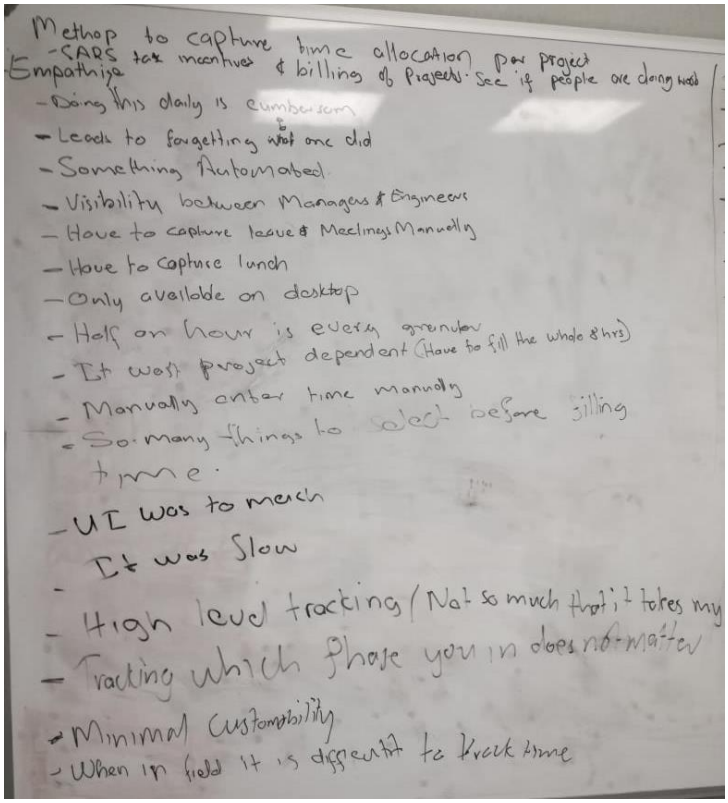
Engineer Questions:

1. Did you used the current Chronos system?
2. What did you find most frustrating about the system?
3. What features would you like in an ideal word?

Project Managers:

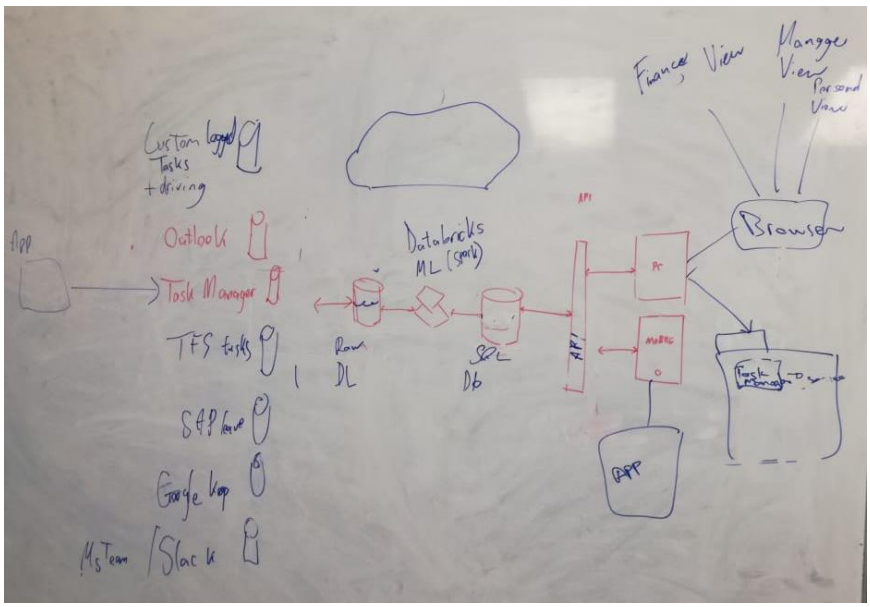
1. Could you retrieve adequate project specific information that you as a project manager would require?
2. What would you like to see as a Project Management view?

APPENDIX B: IDEATE



APPENDIX C: PROTOTYPING

B.1 SOLUTION ARCHITECTURE



B.2 APPLICATION UI DESIGN