



Internship Project Report
Summer Internship Programme 2020

With



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Submitted by:

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Area of Internship: Product Management

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Project Title: To identify various issues concerning Intelligent Transit Management System and to provide solutions for the same.

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Submitted to:

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Parag Gandhi

Executive Summary

Summer Internship is one of the most important components in the MBA program. This year, the covid-19 pandemic forced students to do summer internship virtually i.e. working from home. As a part of my summer internship programme, I worked as a Product Management Intern with Amnex Infotechnologies, Ahmedabad. This report summarizes my work during the two months period i.e. from 10th April 2020 to 10th June 2020. This report has three parts. Part A consists the details about the company (Amnex). Further it analyses the industry scenario, competitive position of the company in the industry, growth story of the company, its competitor, and strategic analysis of company using different frameworks like McKinsey 7s framework and porter's five forces analysis. This part also discusses about the problems (external and internal) that the company might face in near future i.e. in 3-5 years period. Part B provides details about my project specific work that I did during the internship. It includes situation analysis, nature of the problem, objectives, expected outcomes, adopted methodology during the projects and solutions and recommendations to the organization. To the end, Part C consists of key learnings that I got during the summer internship programme.

PART A

1 Amnex Infotechnologies Private Limited

Amnex is IT products and services company headquartered in Ahmedabad, India. The company excels in new age technologies like Artificial Intelligence, Machine Learning, Block Chain, Applications of IoT and Industry 4.0, and big data analytics. Amnex infotechnologies was established in 2008 and earlier it was known as Infinium Solutionz Private Limited. In the year 2018, as a part of their rebranding exercise, they changed their name and now it is known as Amnex Infotechnologies Private Limited. Thus, the company is 12 years old as of now and it is into IT products and services field since its inception. Amnex provides solutions for various applications ranging from Agriculture, mining, ports, and intelligent transit to smart city solutions. Amnex ranked 22 amongst Deloitte's technology fast 50 Indian companies. Amnex is providing end to end solution for inventory tracking, supply chain management, Adaptive manufacturing, which includes business process benchmarking, process harmonizing, solution blueprinting, execution involving hardware, middleware and system integration; and subsequent business support. Amnex has partnered with various Hardware Suppliers and Funding Research for various solution applications.

1.1 Historical Landmarks

- Amnex was founded in the year 2008 as Infinium solutionz private limited with the Technology and Market focus in mind, when the Indian IT industry was focused on ERP and IT services. Right from the start, the company was clear in mind that the future of IT belongs to Technology, Automation and Speciality products.
- From the year 2008 to 2010, Amnex was in to the business of RFID based solutions for asset driven industries like Oil and Gas, Mining, Port, Logistics and Manufacturing. To cater the IT need of these sectors, Amnex built solutions like Inventory Management, Asset Management, Library and Document Management, Supply chain management etc.
- From the year 2010 onwards, the company expanded its focus based on market assessment and entered in to advance technologies like GPS, GIS, IoT, Analytics, Algorithms, Machine Learning and Artificial Intelligence. With the help of these technologies, they developed new solutions and advanced their existing one which in turn helped them entering into Urban solutions, Agriculture and Dairy.

1.2 Products and Customers

Amnex provides a broad range of IT solutions as per the clients and business need. They have a strong presence in providing IT solutions to various state Governments and the Government of India. These solutions include Intelligent Transit Management System, Adaptive Traffic Control System, Solid Waste Management, Agriculture analytics (including soil health, crop pattern etc.), and Fuel Management System to name a few. They do have B2B clients also as their regular customer. However, their major client portfolio consists of various Governments because of their expertise over the years and having a core competency in developing and executing the Government projects. Below image shows their product portfolio for different applications and some of their clients.

Public Transit	
 AMTS Integrated transport management system & Passenger Information System for 900 vehicle	 GSRTC Integrated transport management system, Incident Management & PIS for 7000 vehicle
 Jaipur Bus ITMS, PIS, Electronic Ticketing machine for 500 vehicle	 NBSTC ITMS, PIS, Mobile application, OBITS, AFCS, OPIS for 400 Vehicle
 ibus ITMS, PIS, AFCS, Mobile application for 200 Vehicle - Project by World Bank	 Sitalink ITMS, PIS, AFCS, Common card based solution for 50 BRTS Vehicle
 AJL Integrated transport management system & PIS for 100 Buses	 NMMT ITMS, PIS, P & S, Mobile application, AFCS, PMS, BILMS for 450 Vehicle
 Parshwanath Automated vehicle location system & Passenger Information System for 50 Vehicle	 PMPML Integrated transport management system & PIS for 1000 vehicle
 RISL Integrated transport management system & PIS for 100 vehicle	
Oil & Gas	
 ONGC Vehicle Tracking System & Incident Management for 200 Vehicle	 IOCL Integrated vehicle tracking solution for 150 vehicle
 GSPL RFID Based Inventory & Asset Management	 GSPC Integrated transport management system for 200 vehicle
 GERMI RFID based biometric attendance management solution	
Solid Waste Management	
 JMC RFID & GPS based solid waste management Solution for 200 Vehicle	 AMC RFID & GPS based solid waste management solution for 700 vehicle
 DDSIL RFID & GPS based solid waste management solution for 100 vehicle	



1.3 Market & Competition

As mentioned earlier, their major clients are various state Governments and Government of India. However, other than that they do have non-government clients such as Ports, Parshwanath Travels, Het Graphics and Devraj Industrial Parks to name a few. The company operates in a highly competitive market as Technology in India has grown many fold in past one and half decade and many companies are currently operates in the same field. Amnex has its international presence and they have clients from Dubai, Japan, Malaysia and Singapore.

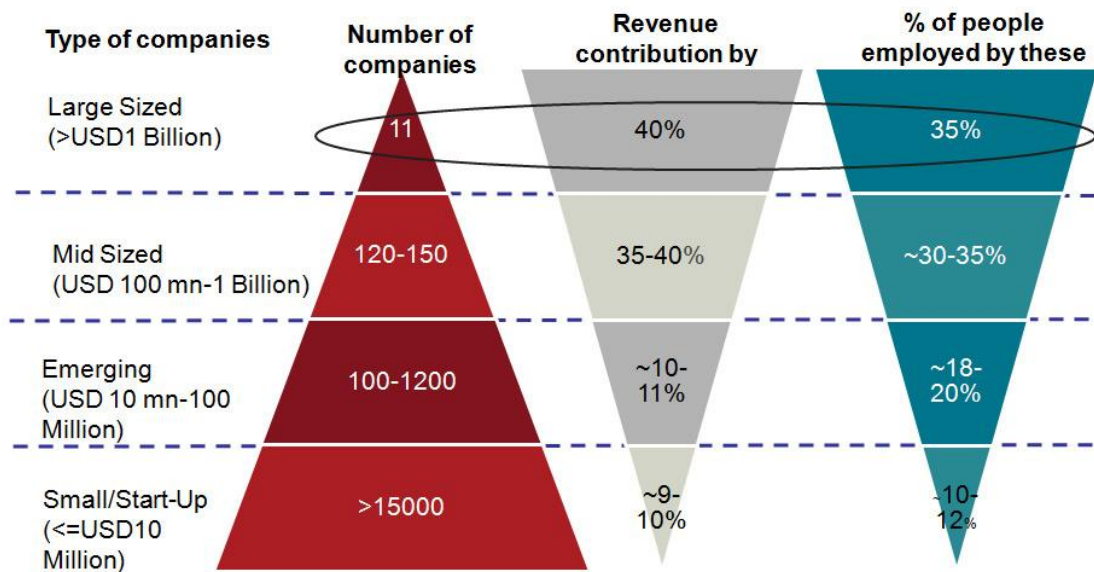
In recent years, the company has expanded its focus to provide various IT solutions related to smart city projects. Getting these projects is not an easy deal as one has to meet all the criteria being set by clients and then they need to bid for it. It's a complex task and many large and listed companies such as Larson and Toubro, Honeywell, KPIT, TCS, Tech Mahindra, Hitachi are direct competitor of Amnex.

1.4 Financial Performance

Since Amnex is a private limited company, they do not disclose their financial statements to the public. Thus, their financial figures are not available.

2 Industry Classification

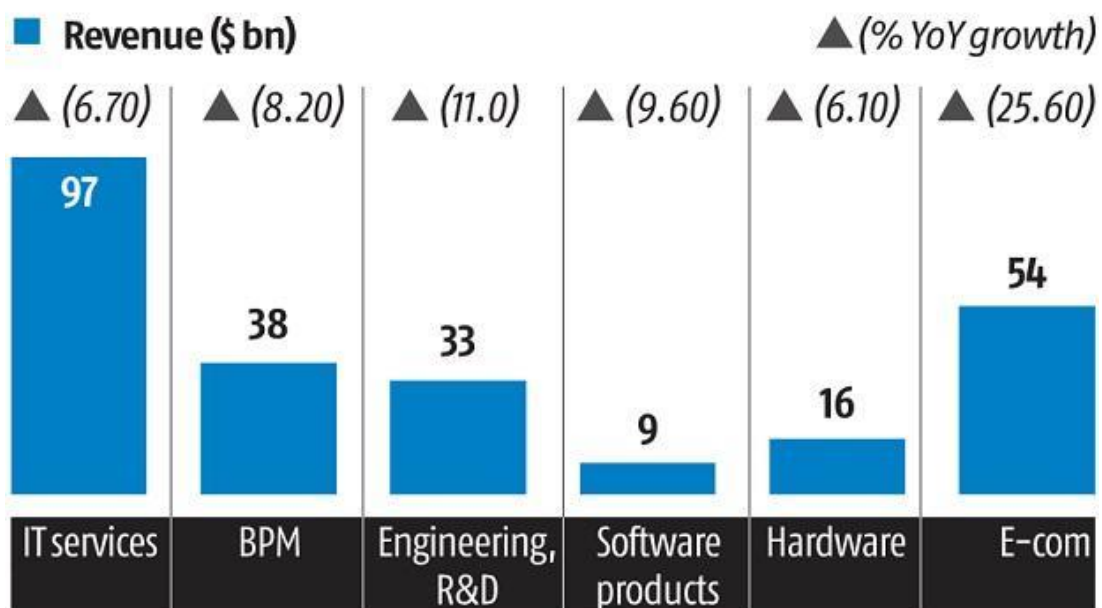
Amnexus is an Indian IT company and it can be classified as an IT/ITES product company. Further we can classify the IT industry in 2 broad areas i.e. IT product and IT services industry. We can further classify them into different areas such as software, hardware, e commerce, BPM etc. Below is the IT industry structure and number of people employed by each type is given by Nasscom.



1

According to Nasscom, the sector wise projections for the financial year 2020 are as below.

SECTOR-WISE PROJECTION



¹ Source: NASSCOM

2.1 Industry Structure

Broadly, IT industry can classify as large sized, medium sized, emerging and small sized. Further it can be classified based on their application such as IT services, hardware, software, e commerce, BPM and so on. Other than this, many people do work as a freelance IT consultant and they are also part of this industry. These people provide their consulting services to the Indian as well as foreign clients and there are many platforms which are dedicated to these types of services (Freelancer, Upwork etc.). All in all, we can say that Indian IT industry is very large and it has been grown multi fold over the years and it consist of large sized firms to the people working as a freelancers. Thus, the concept of gig economy is well adopted by Indian IT professionals.

2.2 External Environment Sector

Indian IT industry is highly growing and it adopts latest technologies very promptly. There are various external factors as well as Government policies which affects the Indian IT industry in different ways. Government of India is promoting the country's IT sector from last many years. It is known that India is global IT hub when it comes to knowledge, work force and its expertise over the years. However, most of the Indian IT trade happens with North American country. Thus, in the year 2012, Government of India introduced a new IT policy with focus more on expanding the Indian IT trade with other parts of the world, too. In that policy, Government put emphasize on making India a truly global IT hub with more focus on ICT, Cloud computing, virtualization and big data. Aadhar is one of the examples of the same where in the country developed the massive IT infrastructure to create and store the data of citizens in a secure way and which can be used as and when needed. Government put higher emphasize on using the latest technologies in the areas of agriculture, land and labour which are still being operated traditionally. In 2018, Andhra Pradesh government announced that they are making all the land ownership data on to the Block Chain technology. Now this is a much welcoming move as land records data are very prone to forgery and in many cases the farmers lose their land. Day by day governments are increasing their leverage on technology and their economic policies are also now being designed in that way. All these are positive moves particularly for the Indian IT industry.

Another external factor which is right now affecting the industry is the coronavirus pandemic. Due to the outbreak of it in the country, major part of the country went under the lockdown. However, in this difficult time, it is the technology and IT sector which has come forward to

provide necessary solutions to the problem. We have seen that mostly every business, schools, colleges and even court now operates online with the help of different applications which is being built on the IT infrastructure. Also, this pandemic has placed a new challenge to the mankind and it is believed that the IT has the capability to address those challenges. Now many IT companies are working on products like tracking the spread, how to maintain social distance via mobile applications, how to get fast and safe delivery of the essentials, how to address the broken supply chains, scan the people before entering any premises via thermal cameras and it found without mask or with high temperature then entry denied and so on. The point here is that external factor like pandemic will be an opportunity for the sector both in short term and long term as now people and businesses will leverage more on IT.

However, if we talk about India specific, we are one of the global IT hubs when it comes to software products of IT services but we do not have much hardware manufacturing facilities here. Now, it is no doubt that we can develop state of the art IT soft wares but we still have to be dependent on other nations such as China and Vietnam who manufacture cheap hardware. As we discussed above regarding coronavirus pandemic, the supply chain across the world has been now broken and more importantly the one with China. In this situation, the IT sector may suffer in short term until the situation become normal. The Government of India is pushing Make in India and many other initiatives to make electronics and hardware in India only. They also have announced a new Electronics policy in the year 2016. However, due to lack of skilled labour and various land and labour related laws are there which do not attract the foreign investment and also it is not much encouraging to local citizen also. However, recently the Government is announcing special measures and some state governments are revoking the labour laws for at least 3 years in order to attract the foreign as well as local investment in various sector including IT and electronics. It will be interesting to see how this will be executed in the future.

All in all, one thing is clear that the Indian IT industry will still be thriving in the upcoming years and it will grow at a pace it's growing over past decade. The sector is changing and adopting newer technologies very fast and we can surely say that the future Indian IT industry will leverage more on the technologies like AI, ML, Big Data, Block Chain and IoT.

3 Company Analysis

3.1 Growth story

Amnex started as an IT products and services company with a focus on a single technology called RFID in the year 2008. From there onwards, the organization has evolved itself in a way that today they are one of the major solutions providers for urban and agriculture solutions. Throughout these years, it has grown many folds in terms of their expertise, knowledge, human resources and of course its financials. Over the years it has developed a core competency in different areas as mentioned in below table.

Area	Why Amnex?	Value for Client
Knowledge	<ul style="list-style-type: none">• Amnex has RFID, GPS & GIS Experts• Implementation team has exposure to business processes of various Industries	<ul style="list-style-type: none">• Ease of achieving desire goal• Ease of sharing resources
Continuous Innovation	<ul style="list-style-type: none">• A platform created by Amnex to try out Prototype Products• Studying and analysing various aspects of relevant Domains to develop and Enhance Industry specific solutions	<ul style="list-style-type: none">• Clients can try out Amnex's new Prototype Products and offerings• Easy access to specialized skills
Infrastructure	<ul style="list-style-type: none">• Infrastructure backed by strong security and disaster recovery capabilities	<ul style="list-style-type: none">• Ensures continuous operations at reduced risks
Operational Cost	<ul style="list-style-type: none">• Deploy processes; methodology, toolsets, best practices and lessons learnt from various projects	<ul style="list-style-type: none">• Bring in productivity improvements in service delivery. Plan to leverage optimum work location to reduce cost of operations

3.2 Achievements and recognitions

Amnex has achieved many awards along its journey. Below are some of the awards and benchmarking practices that the company has adopted.

- CMMI Level 3 certified
- Ranked 22 as per the survey of Deloitte fastest 50 India survey 2019
- ISO 9001 certified practicing company

3.3 Comparative performance

Amnex has big industry players as their main competitors. However, the company has survived that competition and currently it is among leading solution providers when it comes to urban solutions and Agro tech solutions. Given below is the list of some of their projects and product portfolio.

Urban Transit

- i. Ahmedabad Municipal Transport Service: Integrated transport management system & Passenger Information System for 900 vehicles
- ii. Gujarat State Road Transport Corporation: Integrated transport management system, Incident Management & PIS for 8500 vehicle
- iii. Jaipur Bus: ITMS, PIS, Electronic Ticketing Machine for 500 vehicle
- iv. North Bengal State Transport Corporation: ITMS, PIS, Mobile application, OBITS, AFCS, OPRS for 400 Vehicle
- v. Indore BRTS: ITMS, PIS, AFCS, Mobile application for 200 Vehicle : Project by World Bank
- vi. Surat BRTS: ITMS, PIS, AFCS, Common card based solution for 50 BRTS Vehicle
- vii. Ahmedabad Janmarg Limited BRTS: Integrated transport management system & PIS for 100 Buses
- viii. Navi Mumbai Municipal Transport: ITMS, PIS, P & S, Mobile application, AFCS, FMS, BI, EMS for 450 Buses
- ix. Pune Mahanagar Parivahan Mahamandal Limited: Integrated transport management system for 1000 vehicle
- x. Parshwanath Travels: Automated vehicle location system & Passenger Information System for 50 Vehicle

Solid Waste Collection Management

- i Ahmedabad Municipal Corporation SWM: Ahmedabad Municipal Corporation for solid waste management covering 1000 community bins, 700 door-to-door vehicles, more than 2000 RFID tags and plus 100 RFID Readers with real time weigh bridge integration
- ii Jamnagar Municipal Corporation: RFID & GPS based solid waste management Solution for 200 Vehicle.

GIS Based Urban Solutions

- i. Directorate of Agriculture / Gujarat Agro Industries Corporation Ltd.: Crop Area Estimation and Loss Assessment using Remote Sensing & Geospatial Technology for the state of Gujarat
- ii. Bhavnagar Municipal Corporation: Customization and Implementation of Layers, Web based GIS Application, Property & Utility Mapping using High Resolution Image for Bhavnagar Municipal Corporation
- iii. Department of Mines and Geology, Gov. Of Karnataka: Section survey of ornamental stone quarry leases in government lands of Karnataka using Total Station and Lease Boundary Survey using DGPS
- iv. Department of Geology and Mining, Gov. Of TamilNadu / Electronics Corporation of Tamil Nadu Ltd. (ELCOT): Online Mining Tenement Registry System
- v. Adani Enterprise Ltd.: GIS Based Digital Land Data Management System (DLDMS) for Patna Coal Mine Project, Chhattisgarh
- vi. Gujarat Gas Limited: Creation, Capturing, Developing and Updation for Land and Gas features in GGL GIS Database for Bhavnagar and Botad Districts of Gujarat
- vii. Jamnagar Municipal Corporation: Design, Development and Implemetation of Web based GIS Application including all necessary ground survey along with GIS Database at Jamnagar Municipal Corporation
- viii. Larsen & Toubro Limited: Aerial Photography Work for Design and Construction of Roads and Services at Dholera SIR
- ix. Manan Agro Pvt. Ltd.: GIS based Software Application for Agriculture Modeling, Land Development and Planning

- x. Multi Media Consultants Pvt. Ltd.: Topographic Survey on Rajkot-Morbi (SH-24) road in the state of Gujarat using LiDAR technology
- xi. S.K.P. Projects Pvt. Ltd. / Gujarat State Petronet Ltd. (GSPL): Network Information System on GIS Platform for MBBPL project of GSPL

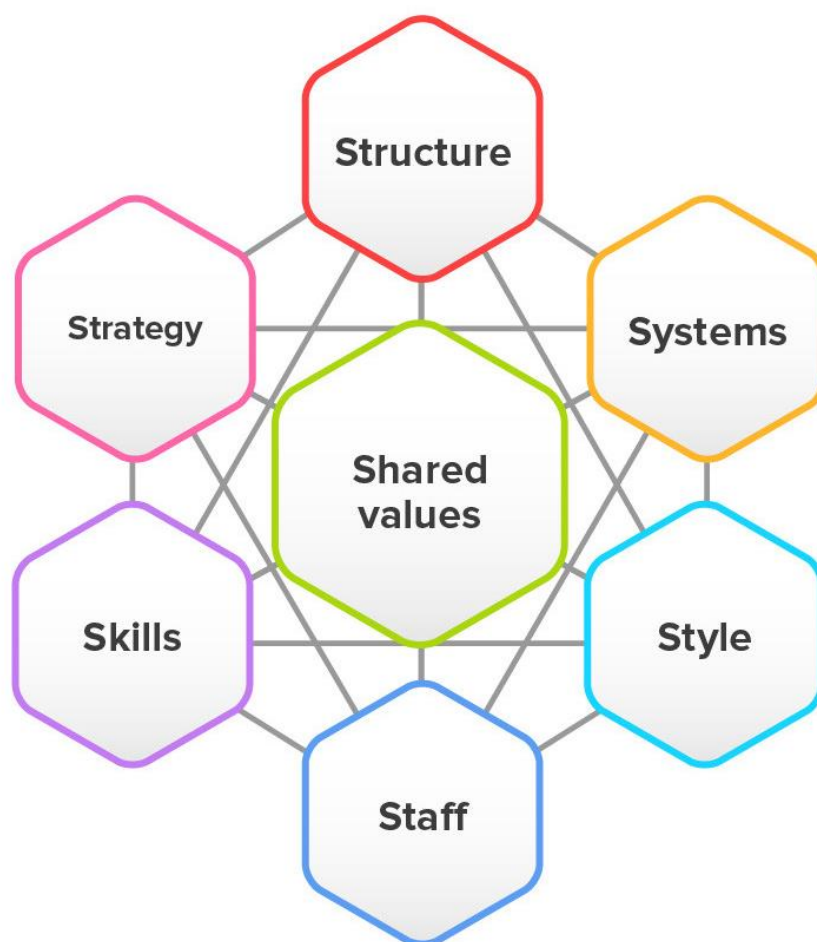
Mining

- i. Commissioner of Geology and Mining (CGM) Gujarat: RFID based Electronic weighbridge integration for 100 vehicles
- ii. Chhattisgarh Integrated Mines and Minerals Management System (CHHIMS)- KHANIJ ONLINE – Web integrated mines & minerals monitoring system
- iii. Gujarat Industries Power Company Limited (GIPCL): Integrated Mineral Dispatch Management System for 300 Vehicle
- iv. Department of Mines and Geology (DMG) -Karnataka: RFID Based Mineral Movement Dispatch Monitoring System
- v. Department of Mines and Geology (DMG) Tamilnadu: OMTRS – Online Mineral Tenement Registry System for Lease information & Monitoring
- vi. Adani: Fuel Management System, RFID based inventory/ warehouse monitoring system

4 Strategic framework

To analyse the strategic framework, we can use McKinsey's 7S framework. The 7S framework is generally used when we want to examine how various parts of the organization work together to achieve the organizational strategic goal. It can help to improve the performance standard and it can also be useful when a company wants to implement a proposed strategy. This framework is based on 7 "S" which further can be classified in 2 groups as hard elements and soft elements. These 7 elements are: Structure, System, Style, Staff, Skills, Strategy, and Shared Values.

Out of this, Structure, Strategy and System are hard elements and others are soft elements.



As mentioned in the image above, it is the other 6 elements which jointly make the centre one that is Shared Values. We will discuss each element briefly in this section.

Structure:

Amnex has a traditional top down structure wherein the company is being directed by its Chief Executives and directors. Below them are the Vice Presidents of respective divisions

who are responsible for their respective divisions. Then there are senior managers and project leads who reports to the vice presidents. Each senior manager leads a team consist of technical and non-technical sub ordinates. The technical team has a team lead followed by other developers and junior developers as well as interns. All in all, it is a top down structure and currently this structure is working well for the organization.

Systems:

Amnex has well defined system in place wherein they have a standard procedure and processes in place in order to address the client needs. However, the company has modified its systems a bit in a way that it provides platform and total freedom to upcoming talent. This they set up with a view to foster the R&D culture at the organization. All in all, Amnex has a hybrid model wherein they stick to their established system for the existing projects and services and they also provide freedom to the emerging talents.

Styles:

As we have already mentioned earlier that they still have a traditional corporate structure and well established systems at place. However, the company no longer behave in the older style of management. Instead, majority of the department today functions in very open and freely way and they have also guided the managers to not involve in the micromanagement. This can provide platform to the thinking, creativity and innovation at the company.

Staff:

Majority of employees at the company are IT professionals with engineering background. Only the senior managers, VP and CXO level employees are having dual background that is management and engineering. Most of the employees either have rich experience at top IT companies or they are fresh graduates from top universities in Gujarat including IIT Gandhinagar, DAIICT, Nirma University and Indus University among others.

Skills:

The employees are highly skilled and majority of them has robust technical skills in the areas of Data science, AI and Machine learning. Software engineers make the biggest share of the overall pie and they have very diverse skills ranging from web development, application development, UI/UX designs to the Data and analytical skills.

Strategy:

The company strategy is designed with the aim to be the market leader in the domains of urban solutions, agri tech and GIS solutions via utilising their core competency. To achieve this, they actively bid for the relative projects as and when it comes and the company has already built the technological capabilities to provide best in class solutions. The company is also leveraging high on the fact that they have the require expertise and experience both. They are also building the brand name and as mentioned earlier, they changed the company name from Infinium to Amnex Infotechnologies. As far as marketing is concerned, the

company takes part in various national and international summits (such as Vibrant Gujarat, IT India Expo, IoT Expo etc.) to showcase their skills and expertise. All in all, the company strategy is highly focused towards reaching the more customers and be a market leader in this field.

Shared Values:

As shown in the chart above, shared value is at the centre of all other 6 elements. This means that these 6 elements jointly make the shared value of the company. Shared value at Amnex is “to provide the best solutions to the clients by leveraging more on latest technologies and make the company a hub of knowledge and continuous innovation.”

5 Competitive position

Indian IT industry is highly competitive and to understand the effect of this competition and market position of the company, Porter's 5 forces model is useful.

Porter's 5 forces model includes those factors which affect the performance and business of any firm. These five forces are (1) Buyer power (2) Supplier power (3) Threat of new entrants (4) Threat of substitution and (5) Competitive rivalry. Now let us analyse each of these factor individually to understand the competitive position of the company.

(1) Buyer Power:

Majority of Amnex projects are currently Government funded. Thus various governments are main buyer of the company's offering. Working in this market is very difficult and challenging as Government has always more power in terms of defining their work and terms and conditions of the entire projects. There are various Government departments and authorities who involve in a project. This results into a very complex and tedious task for a company to meet their terms and conditions. There are certain criteria and conditions which a company has to meet in order to first qualify for the bid. For example, to get qualified for a bid, a company must have experience of at least 5 years; a company must have turnover more than 50 crores, a company must have done minimum 3 government projects earlier, a company must be employing minimum 100 people at the time of bidding and so on. To meet all these criteria is a difficult task for any company. The problem becomes more complex while the company deals with different states Governments as different Government has different set of rule. It is clear that the company has to meet all these criteria and Government has definitely an upper hand in this business. The company has to deliver on promise and the need of Government can also be changed time to time. The firm also need to keep good relation with the bureaucrats and politicians as they are the ones who decide the potential solution provider to their requirements. And every state and centre has different policy agenda on their hand and the company has to match those. Also, there are many players available in market thus the buyer has many options to choose from one of them. Thus, this force acts very heavily on the company.

(2) Supplier Power

Another industry force which acts on the company is Supplier power. As we discussed earlier, the company provides solutions based on RFID, GPS, AI, ML and IoT technologies. They are developers of the software and their solutions but for the hardware, they have to be dependent on their supplier. The company develops its products based on various kinds of hardware like Raspberry Pi, Arduino, GPS Tracking devices, Cisco routers, LoraWAN to name a few. All these hardware has to be imported from other countries like China and US. Thus, in that case the company has to bear the cost of shipping, foreign exchange charges and customs charges. In the present situation, the hardware manufacturing plants in China has been closed and this poses a threat to the company. Also, all these hardware devices mentioned above are patented which means no other manufacturer can produce them. This results in a dependency on a single supplier for a particular device which is being used extensively in one of the projects. However, in recent years now many new companies manufacture electronics devices here in India also and outside India also. They provide the same hardware products in terms of its functionality at very cheaper price. Thus, there are many suppliers available now in the market and there is less threat to the company because of the supplier power.

(3) Threat of New Entrants

As we discussed, Indian IT industry is highly growing industry and every day, many new players enter in the market. However, Amnex is in the domain of providing solutions to the Government funded projects where they have many predefined terms and conditions. Some of those are related to prior experience in this type of projects and the company's financial health as well as number of employee related details. It is obvious that a new entrant won't have any prior experience and they also do not have as robust balance sheet as the established one. Due to this, there is no direct threat to the company from the new entrants in short term. However, in long term there might be some effect of it but majorly there is no direct threat from the new entrants.

(4) Threat of Substitution

Amnex currently provides urban solutions like solid waste management, intelligent transport management system, and adaptive traffic light solutions to various municipalities, agriculture related solutions to the government of India and various states

and Dairy related solutions to many cooperatives among others. All these products and solutions are based on latest technologies like AI, ML, Block Chain, IoT and Big data analytics. All these technologies are advanced one but there is always a threat from upcoming technologies. Thus, there is no near term threat to the company in terms of any substitute products or technology, in long term there will be some new technologies in replacement of the current one. To tackle that challenge, Amnex is investing much in Research and Development activities.

(5) Competitive Rivalry

Amnex has some of the big players of the IT industry as their direct competitor with much higher capacities and resources. This creates a direct challenge to the company in terms of competition. Majority of those players are listed companies like L&T, TCS, Tech Mahindra, Honeywell and Hitachi to name a few. These companies has much stronger balance sheet, operates across the globe and they have well defined processes and products. Given that scenario, the market is highly competitive for Amnex and this force acts heavily on the company.

6 Specific problem areas

Every business faces the challenging situations time to time. And with the time, they need to apply and adapt newer style of functioning in order to operate smoothly in different and difficult time. Below are some of the areas where the company might face challenges in the near future i.e. in 3 to 5 years and their possible solutions.

1. Project planning and execution

Currently, the company has adopted the waterfall project management technique where in information flows and shares with employees via top to bottom order. This was effective in earlier time but now the working environment is changing and with the change in client requirement and advancement of various communication modes, I think they will face it challenging to deliver the project on time with the quality work. To address this issue, I would suggest that the company should adapt to the Agile Project management practices as it is very effective and it will remove the communication bottleneck which can be a problematic in near future as their business would grow.

2. Growing competition

Amnex is one of the leading firms when it comes to providing solutions to various smart city initiatives. However, the competition is increasing day by day as new players are entering in the field. Amnex has the advantage as an old player and expertise in this field but after 3-4 years, there will be many players in the market with somewhat similar experience. Many foreign firms are also entering in the Indian market and they will also pose a real challenge as they come with their globally trained workforce and their own expertise. Amnex need to train and develop their workforce to tackle this challenge and it will also help them increase their productivity. They should also invest in Research and Development activities partnering with universities in order to attract fresh and emerging talent in their organization. This will also help them in developing new products and diversify and expand their product portfolio.

3. Workforce and people management

As mentioned earlier, Amnex has been ranked 22 among the fastest growing Technology companies in India according to Deloitte survey 2019. One of the main challenges a company faces in their growth phase is people's management. Currently the company

employs more than 500 people and in next 3-4 years their projected growth is to reach at 2000. Managing that talent pool will be difficult for the company's Human resource department with the current capacity. For that, they need to increase their capacity by adapting advance technological solutions in their work such as People Analytics and HR analytics. They should also expand their team in proportion and the company will need to set up a proper communication across various departments and with the HR department, too. There might be possibility to introduce the organization structural change and introduction of a new structure. Managing a large talent pool will not be a cakewalk and it will come with its own challenges but to prepare themselves in that direction from now onwards will surely benefit the company in near future. Other than that, the current HR management and the organization culture are totally efficient, energetic and vibrant. To carry forward that culture in the upcoming years would be a challenge and they should prepare themselves in that direction.

PART B

7 Project Work

I worked with two different products during this internship. At the starting, I worked on a different product to understand various aspects of product management before start working on given product for this project i.e. Intelligent Transit Management System.

7.1 ATCS: Information Brochure

To start with, I worked on Adaptive Traffic Control System (ATCS) which was already developed by the company. The system is in use at various cities like Gandhinagar, Ahmedabad and Bhubaneshwar among others. My initial task was to identify the content to put on marketing document and an information brochure for the same.

Criteria taken into consideration while developing the document:

First, I studied the product from other sources like datasheet, technical document and discussed the same with other employees.

Amnex's Adaptive Traffic Control System has following features:

- Integrated City Management Control Centre (ICMCC), along with local DC
- Intelligent Signalling
- Variable Message System
- CCTV Camera Surveillance
- Emergency Response System
- Environmental Monitoring
- Citizen Mobile Application

Based on this, I focused on **4P's of marketing** i.e. Product, Place, Price and Promotions. The product was a technical one and document must include necessary technical specifications presented in a simple language so that client can understand it quickly. Next, company offers this solution to urban authority as well as private client across India but the product was designed by keeping in mind the larger audience beyond India also. Thus, the content should have information as per International Standard so that they also can understand. For example, if there are any technical specifications regarding the operations of the product, that should be

in standard units used in most parts of the world. There is no standard price for this product as it depends on various factors like total project budget, client's requirements, geographical factors and technologies to be included among others. Thus, we decided to not to put this on the brochure. For promotions, we have our target audience various urban authorities, Government bodies, State Government authorities, some private clients in mind. The content has to be crisp and to the point and has to be made by keeping this target audience in mind. To promote this, we suggested to promote this via different networks, conferences, summits, face to face meeting with authorities and through digital marketing in such a manner that it reaches to the target audience. Given below is a snapshot of the document. (while I gathered and curated the info for this document, it was designed by concept team of the company)



7.2 ATCS: Customer Pain Points

My next task was to find various customer pain points by studying the offering and through research. I identified these by understanding the offering and putting myself in the position of the customer. Ideally, this should also include interviewing them and then finding viable solution. But due to lockdown, this was not possible so I did it on my own by putting myself in place of user. The primary user of ATCS is our traffic police *jawans* who use this day in day out. Another stake holder in this project is Urban Authorities who monitors traffic and use this for surveillance purpose. Finally, urban residents are also a stake holder for which this system is being developed. Keeping all in mind, I found below pain points. In the description below, I have mentioned suggestions along with the pain points:

Noise Pollution

Traffic Police personnel are the end user of the ATCS. They need to deal with it in day to day life. However, with exponential increase in city's traffic, noise pollution is a rising issue. Traffic Police majorly spend their time at the cross road signals and continuous noise pollution can harm them as well as others, too. Particularly in India, drivers honk very often without any necessity. And at any signal, honking increases many folds when the signal is about to turn green. To combat this problem, we can attach decibel meters to traffic signal that will reset the timer if honking reaches to the pre-defined level.



Timer Settings

Currently signals are being operated (on/off) manually or as per the standard time set by authority. Which means that everyday local authority (traffic police) needs to switch it on at morning and switch it off at night. If it is configured by authority to on/ off at particular time, it will operate in that way. However, traffic density is not same for all the days and timing of it also changes. For example, let us assume that a signal is being set to switch on at 8:00 AM every morning. However, due to some event in that area, traffic may start increasing from let's say 6:30 AM onwards. In that situation, our pre-defined traffic signal won't work. And this problem can occur on many days in a year. We are already aware about less traffic in the morning on weekends than weekdays. However, that can be set via our software which comes with 32+ predefined modes including weekdays, weekends and evening hours. To address this issue, we can make the signal truly smarter by introducing **image processing** and **traffic density analytics**. So, the traffic cameras attached at every junction will capture the movement of traffic and via backend analytics of those images and moving traffic, software will decide whether to start the signal or to not. This requires the usage of deep learning algorithms, image processing, and predictive analytics to arrive at a solution.

Emergency Vehicle Movement

Nowadays, emergency vehicles like ambulances, fire brigades, police vehicles etc. faces speed issues due to highly dense traffic. These vehicles have in built siren to make a way but still the problem is it takes time to clear the road even for other vehicles because of heavy traffic. As per the current system, traffic police can manually operate the signal for any such emergency signal as well as for VIP movements. However, most of the time situation is as such that many vehicles are already there ahead of ambulance because of red signal. To give a road to ambulance or any such emergency vehicle out of that congested traffic still requires time. To address this issue, we can work on a solution that empowers drivers of these vehicles to **send early notifications** to the upcoming traffic signal's authority. Authorities, in turn, then manually operate the signal in advance so that when an emergency vehicle passes by, it can have a clear road. This can be done via adding a new feature in Citizen Mobile Application or it can be done via a separate application, too. Only the local authorities and authorized drivers of such vehicles shall have access to this feature. Also, all the records can be traced by this system i.e. the movement of such emergency vehicles. This way, it would prevent the misuse of it, too.

Peak hour Traffic Solution

Current ATCS can be programmed in a way that it can work on different plans i.e. holiday plan, weekday plan, day plan, evening plan and so on. However, as discussed earlier, the density of traffic can increase at any point of time due to many different circumstances. In those cases, traffic congestion will increase many fold and it would be a challenging task for anyone who is managing the traffic. To combat this issue, we can make the system fully automated and it will work according to traffic density at a particular time. This report already discussed how to address the issue of timer settings i.e. on/off time of the timer. Same technology we can adopt to address the peak hour traffic solution. Here, we can design a system in such a way that it will capture the traffic density through CCTV Cameras, process and analyse the data at back end and set the signal timer accordingly. This is the best possible solution due to several reasons. Most importantly, it will work based on real time traffic density which means, we can reduce the operational inefficiency and citizen can save their total journey time. Secondly, there is no need to control it manually. We know that traffic in different area is always different. Since this system is based on real time timer setting, we need not program every signal the same. In earlier system, it used to happen that the one with low traffic was also operating at a timer speed of the same signal at a busy cross road. This solution can remove that operational inefficiency.

Signal Failure due to Electricity cut-off

Our traffic controller works on 230 V AC power supply. Many a times, due to power failure, the system went off and authorities present there have to manage the traffic. This can be resulted in to an exhaustive work for them, too. Also, providing generators at every traffic signal point is not a feasible solution as it will increase the cost many folds. In that scenario, we can mount solar panels and connect it to the system. This way, we can make the system more environment friendly as it will then work on solar energy and it can also be a possible solution for those cities where power cuts are more often.

7.3 ATCS: Industry Analysis

My next task was to conduct Industry Analysis for this product. I was assisting the research team on this project. Aim of the project was to find various competitors for the same product and to find various OEMs for different parts of this product.

My role was to find other existing players, their key products and key customers. I also need to identify whether they provide **backward integration** or not.

As a part of this, I prepared the list of various companies along with other data in excel and submitted it to the company.

7.4 ITMS: Competitive Rivalry

My next task was to work on another product called Intelligent Transit Management System. This product currently is in use at various urban areas as well as it is deployed by private clients like Adani. This product was initially designed for urban bodies and for various government projects. However, company is finding ways to extend this product to mass market and for that, I conducted market research of firms which offers transport solutions by different means. Main purpose of this task was to identify various players and based on that, identify their core competency and which strategy the company should choose to enter the market. As a part of this project, I searched various players and classified them according to their offerings. Here is the list for the same.

S.No.	Car Rentals	Ride Sharing	Public Transport	Taxi/Bike/Scooter Sharing	Private Bus Services
1	Europcar	Uber	Trainline	Cabfind	Strides
2	Sixt my driver	Lyft	travelport	Gett	Shuttl
3	AVIS	Bridj Inc.	PCI	mytaxi	FlixBus
4	Thrifty	UbiGo	Deutsche Bahn	Tong Tar	
5	UbiGo	Grab	GTS	ComfortDelGro	
6	Enterprise Car Club	Ola	Aedge	JAYRIDE	
7	Car2Go	CarShare Australia Pty Ltd- GoGet	Woodlands Transport	SwiftRide	
8	Strides	Strides	Transport for West Midlands	DonkeyRepublic ApS	
9	Waze Carpool	ALD Automotive	National Express West Midlands	Cabonline	
10	Hertz	lahitaksi	Metro Tram	Free Now	
11	Veho	taksihelsinki	Helsinki Regional Transport	Tier	
12	Toyota	MoveAbout	Mitdtraffik	Clever	
13	First Rent-	GoMore	SL	Kapten	

	A-Car				
14	Stadtmobil	Zify	Trimet	MyShuttle	
15	Drive Now	Grab Holdings Inc.	Metro Transit	GOCATCH	
16	Car Next Door	Cabify	CTA	EKORENT	
17	ZipCar	Mobility 4 All	Virginia Railway Express (VRE)	ingogo	
18	Faxi		OCTA	Bay Area Bike Share	
19			PaceBus	Citibike	
20			PaceBus, Streetcar	niceride	
21			Transit Systems Group	Sobi Sociabikes	
22			AMTS	Hailo	
23			GSRTC	Wiwigo	
24			HRTC	GrabTaxi	
25			Delhi Metro Rail Corporation	Lecabs	
26			Kolkata Metro Rail	Lime	
27				Bird	
28				Voi Sweden	
29				Bolt	
30				Lilium	
31				Yulu	
32				Bounce	

7.5 ITMS: Problems and Solutions

My next task and final task during the internship were to identify and to address the issues pertaining to the Intelligent Transit Management System. ITMS is one of the successful products for the company but this product is facing various issues in development, implementation and post project activities. Also, this product is being developed as per the different client's need and there is no standard product from the company at this moment. Thus, it faces various implementations related issues. Company management wants to make this product a standardized one with the availability of customization so that, overall product remains the same and they can customize certain bits and pieces according to the client's need.

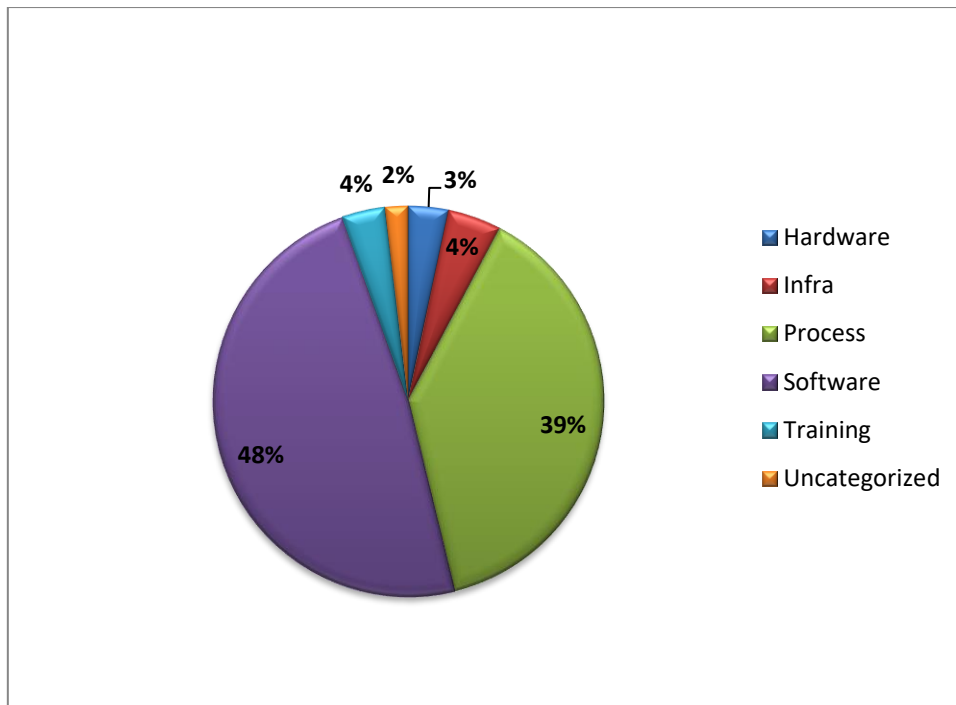
As a part of this project I am conducting following activities:

- Information gathering
- Inputs from various stakeholders
- Classifications of the data
- Finding probable solutions
- Communicating with technical team
- Communicating across departments
- Reporting and developing solution documents

I was assisting the product team during this project on identifying various issues and providing solutions as well as for product standardization. To understand the issues, we decided to first get the inputs from various stake holders of this project that is developer team, sales team, delivery team, implementation team, concept team and finally the project team. We float a mail regarding this with a Google Sheet in which they need to provide their inputs regarding issues they face. We asked them to provide their problem statement and a small description about them. Also, we captured their name and their department to understand which department faces greater issues.

The sheet was shared by my project guide, Mr. Vivek Shah and they collected the data internally. In total, we got 685 problem statements from different people working on this project across various teams. Many of these statements were repeating in nature and it is understandable as each individual provided their individual inputs.

My next task was to identify each of these statements in terms of whether it is a problem or an improvement request. Further, I need to classify this data according to the component related to which the problem statement is. For example, a statement like “coordination issues with other team” falls under “**process related**” issue. We identified six such components namely process, hardware, software, training, infra and unidentified. The share of each component varies and by analysing the data, we found that maximum number of issues that the project faces is related to software and followed by process related problems. This can be understood by below graph.



Further, I, with the other members of the team, discussed with technical team regarding these issues and further identified hardware type, software type and software sub type in which the issue pertains. Finally, with the help of my mentor, we classified the data according to respective department which is responsible for a particular issue.

My next task was to communicate and conduct meetings with technical team to discuss the problems and their possible solutions. Along with this, I need to update my report about the project time to time. To make the task easier, we addressed each of them by grouping them by component type. Thus, first I started addressing process related queries as these problems are somewhat less technical in nature than the software related issues.

Given below are some examples of problem statements and solutions to them.

#Problem Statement(s)

Below are the problem statements we got from various sources regarding the **testing and QA process**.

- Testing issues
- Publishing a new build without testing and then application down
- Field testing is not being done before launching any project
- Testing/QA process is not defined
- Unit testing mandatory before assigning it to QA
- Quality check is poor. All the changes pass through QA
- QA team getting involved in project very lately
- Ownership issue with QA team
- Changes are not being informed to QA team
- QA team need to follow android and iOS standard
- QA team should test in all android version and resolution
- Test case, Test scenario preparation by QA for each product changes
- Testing team is not testing the application in detail prior to acceptance testing at client end

Solution:

Above mentioned testing and QA related issues are critical as it is one of the final step before we handover the product to the client. By proper testing and QA only we can know about errors and bugs in the product and our system. So it is utmost important for us to address these issues. Many of these issues states that the testing process is not being followed properly i.e. poor execution of the standard process, less involvement; no unit testing is being followed and so on. Our suggestion is that the testing team should have a proper roadmap regarding their testing process for example first do unit testing, then batch testing and then finally assign it to the QA work. Another suggestion is that they need to get involved in the process at very **early stage** though it takes time to develop product. This will give them proper understanding and concept clarity at very beginning of the development. This will provide them an edge while they start their testing related work. For that, testing team can work on a solution like assigning one or two of their subordinates to the particular project so that they know everything about the developments which are being carried out. Another issue is Quality check is very poor. Now this is one of the serious issues when it comes to making a standard product. QA team need to focus on the work they are carrying out and there should be no compromise with this task. If there is any pressure regarding deadline or workload, they should positively communicate the same with company management. But letting the

unchecked or defective product pass through can ultimately affect the company in long run. To minimize the workload, they should get involved in the project at very early stage. One of the reasons could be less skilled testing and QA employees. Now here we need to hire skilled and knowledgeable professional at first place but then, we also should provide them necessary training and learning opportunities so that we can improve their efficiency, productivity and the overall output.

Surely this is the process related issue and it needed to be addressed as QA and testing is an integral part of any project. It is important to focus on the way QA team involves itself in the project but it is equally important for them to build a skilled team and upgrade their existing skills periodically. Understanding of the standard QA process and develop a one for them regarding any project is needed. This will help them only and will boost their productivity.

#Problem Statement(s)

Another major problem we are facing right now is in terms of coordination within team, between team and with the clients. Below are some of the inputs we got related to communication and coordination.

- Internal coordination issue
- Software support not available during holiday
- No weekly team meeting to fill the gap
- No quick response on email
- Communication gap between software and hardware team
- Communication gap between software and concept team
- Communication gap between onsite team and tester
- No proper communication between sales and delivery team
- No proper response from H.O. team regarding the issues (from development & concept)
- Changes are given verbally without any written communication
- No direct communication with developers of project coordinators
- WhatsApp is being used for project work

Solution:

All of the above-mentioned problem statements are related to communication gap in the project. Most of them are related to the inter department communication issues, reporting issues and no predefined channel of communication. To address these challenges, there should be a proper communication channel between the department and the people working on the project. Also, if possible, the company should adopt the **Agile project management** practices which can be helpful to solve these issues. There are many communications medium today and it is okay to use them in order to communicate faster. Use of WhatsApp to communicate something urgent is okay but then the communicated message should also be put into the official communication channel which, in most of the cases is E-mail. Many a time communication problem arises because of hierarchy and different people from the same team are dealing with the project. To overcome this, the company can develop a dedicated project team that work on the project until it gets completed.

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Towards the end of my internship we were able to address more than 70% of the issues. Since the total number of responses we got were more than 680+, it took time to address each of them. However, addressing these issues are not enough as the project team need to implement it.

PART C

8 Key Learnings from the summer project

Summer projects are one of the most important components during the MBA programme. This project provided me hands on learning and an opportunity to apply the knowledge and skills that I gained during the first year of the programme.

During this project I interacted with many people from different departments of the company. I learned about **processes and standards** in which the project execution done in an IT company. My task was basically related to an already implemented project and the issues it was facing. These issues were ranging from technical to processes to HR to executions related. This gave me an overall learning about a project and its different aspects and how they are related to the project. If there is any issue related to the product, one may think that it is because of some technical error, but during this project I learned that many a time those issues can also arise because of lack of training which in general falls under HR and Training department.

Communication skills are important. I learned this during my internship and importantly, when everyone in team were apart and at home due to COVID, having a proper communication channel was must. For that, my mentor created a single E-mail thread and project related information has to share with everyone through that channel only. In case of the project of ITMS also, we got many statements related to the communications gap between teams which created many further problems. Thus, a proper communication is needed between all the stake holder of the project.

Working and coordinating with different teams require patience. During this project, I needed to take inputs from technical teams. These people were already working on recent projects and they generally do not get enough time to provide their suggestions, that too someone from other departments. I faced this issue many a times during this internship but at the end, having a little patience would do the work. Also, this signifies the importance of **developing a connections and interpersonal relationships** to others as well in organization.

Time Management and People Management skills are very useful. ITMS product was facing many issues just because of there was a delay in implementing the project. This was an issue of time management. But looking further into it, I came to know that one of the reasons for this was lack of people management. Project managers need to coordinate with everyone from different functional areas. Though many a times it looks like a complex and challenging task, particularly during large projects, it has to be done to achieve the end goals.

A standard product can help organization reduce its overall cost and complex processes. I learned this with the case of ITMS where in non-availability of a standard product was a major challenge for everyone connected to the product.

I got a chance to apply some of the knowledge, skills and tools that I learned during first year. During ATCS project, I used **4P's of marketing**. In order to do competitive analysis, I used one of the **Porter's 5 forces analysis**. Technique learned in **Industry Analysis** course was very useful while finding various competitors, their offerings and their clients. **Concepts learned during Business Research Methodology** were also helped while conducting the research. **Report making skills** that learned during CFM course was also in handy as I had to deal with reporting. **Presentation Skills** that I developed was also helpful. My project was basically a problem-solving project and in while finding the solutions, I found concepts learned in **Organizational Behaviour and HR** were useful in many ways. Although there was no direct application of operations related concepts that I learned during first year, but while solving the problems I came across many processes that can be improved using an **effective project management tool**.

I gained couple of new skills during this internship. While working with the data, it was important for me to learn various MS office tools especially the **Microsoft Excel**. I learned various formulas, techniques related to tables and name ranges among other techniques. I also learned **basics of visualization with Tableau** as a part of this internship. While making the presentation and reports, working with Tableau was very useful.

All in all, this internship gave me an opportunity to apply the knowledge that I gained during the first year and to learn certain new skills, too. This internship provided me a great learning experience in this tough time and for that, I am very thankful to all those who helped me during this internship. I am also thankful to Institute of Management and my faculty mentor Prof. Chitra Khari for providing their constant support and guidance during the whole programme.