Digitalization of the canteen at Siemens EA Factory and

its Data Base Management.

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MBA in Human Resource

by

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Under the Supervision of / Mentor

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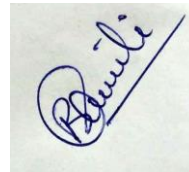Management Studies

GOA UNIVERSITY

Date: 28th April 2023

Seal of the School

Examined by:

DECLARATION BY STUDENT

I hereby declare that the data presented in this Dissertation / Internship report entitled, "Digitalization of the canteen at Siemens EA factory and its Data Base Management" is based on the results of investigations carried out by me in the (Management studies) at the Goa Business School, Goa University under the Supervision/Mentorship of Dr. Nirmala Rajanala and the same has not been submitted elsewhere for the award of a degree or diploma by me. Further, I understand that Goa University or its authorities will be not be responsible for the correctness of observations / experimental or other findings given the dissertation.

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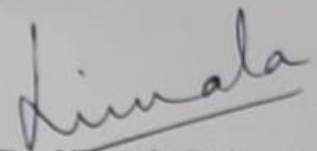
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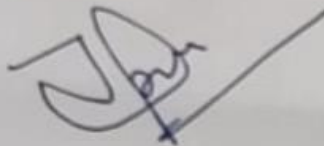Date: 27/04/2023

Place: Goa University

COMPLETION CERTIFICATE

This is to certify that the dissertation/internship report "**Digitalization of the canteen at Siemens EA factory and its Data Base Management**" is a bonafide work carried out by **Bharathi Bhimappa Karkannavar** under my supervision/mentorship in partial fulfilment of the requirements for the award of the degree of **Master of Business Administration** in the Discipline of Management Studies at the Goa Business School, Goa University.

Dr. **Nirmala Rajanala**

Management Studies

Date: 28/04/2023

Prof, Jyoti Pawar
Dean
Goa Business School

Date: 28/04/2023
Place: Goa University

SIEMENS

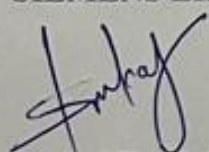|	
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TO WHOMSOEVER IT MAY CONCERN

This is to certify that Ms. Bharathi Bhimappa Karkannavar has completed her internship at Siemens Ltd, SI EA Goa - Verna Industrial estate, Verna – Goa for the period of 1st March 2023 to 26th April 2023.

During the internship, she was found to be sincere, hardworking & dedicated towards the tasks assigned to her.

We wish her all the best & success in her future endeavor.

For,
SIEMENS LIMITED

Pankaj Fondekar
Sr. Manager – P&O

<u>ACKNOWLEDGEMENT</u>

I take this opportunity to sincerely acknowledge and gratefully thank the HR manager, officers, staff and all those who helped me in providing necessary assistance valuable guidance and requisite information to complete my final internship.

I would like to thank Mr. Pankaj, Senior HR Manager and Mr. Prathamesh Naik, HR Manger for guiding me and reviewing my report and motivating me for completing my final internship Project.

I would also like to thank the Officers, Managers and employees who spend their valuable time with me and gave their responses during my interaction with them while collecting the data.

Last, but not least, I would like to especially thank Dr. Nirmala Rajanala, Goa Business School, Goa University, Department of Management Studies Taleigao, Goa for being available for weekly mentoring & guiding me towards completion of the internship project on time.

TABLE OF CONTENTS

COMPANY PROFILE

Siemens Limited, is an India-based Conglomerate services-providing company founded in the year 1847 by Mr. Werner von Siemens. They have their main office as a corporate office in Mumbai, Maharashtra, India. Siemens India provides power generation technology, industrial and building automation, medical technology, railway vehicles, water treatment system, fire alarms, PLM software, etc.

Siemens Limited is a technology company mainly focused on industry, infrastructure, digital transformation, transport, transmission, and generation of electrical power. It is the flagship listed company of Siemens AG in India. The company's business structure is well-oriented in meeting the needs of the industry in improving efficiency, quality, flexibility and speed. The company is in a good position to partner with the country in sustainable growth with its wide-ranging portfolio, market-oriented organization structure, global technology leadership and strong local competence.
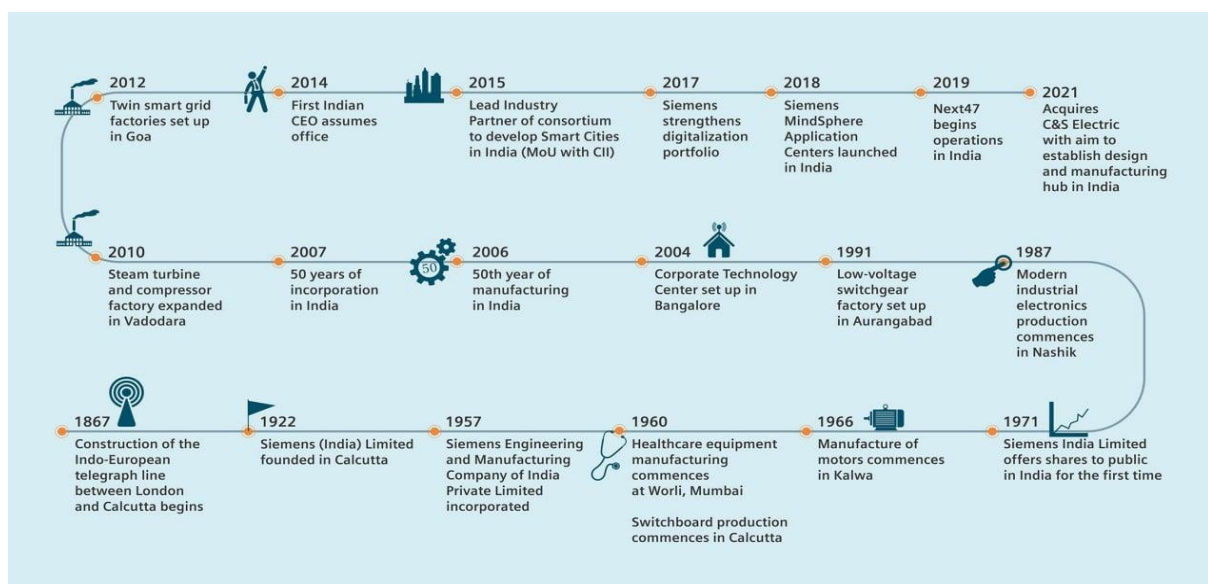
Siemens India Company Information

Industry: Conglomerate

Founded Year: 1847

Headquarters in India: Mumbai, Maharashtra, India

Siemens Logo

Siemens' long-term commitment to India began in 1867 when the company's founder Werner von Siemens personally supervised the setting up of the first telegraph line between London and Calcutta. Today, Siemens has a strong manufacturing footprint across the country, various Centres of Competence and R&D centres as well as a nationwide sales and service network. Mr Sunil Mathur is currently the CEO and CFO of Siemens India.

From more resource-efficient factories, resilient supply chains, and smarter buildings and grids, to cleaner and more comfortable transportation, Siemens creates technology with the purpose of adding real value for customers. By combining the real and the digital worlds, Siemens empowers its customers to transform their industries and markets every day for people.

Siemens is bringing Automation, Digitalization and Electrification solutions to every other industry in the world, be it the Power, Aircraft industry, oil and gas industry, etc.

The following are **its product categories** at the global level:

• **Automation technology**: Operator and Control Systems, Identification systems, Sensors, Process Control systems

• **Drive Technologies:** Motors, generators, DC converters

• **Consumer Products:** Switches, socket outlets, hearing aids, home automation systems, home security solutions,

• **Mobility:** Solutions that would help in better mobility such as IS for passengers to find routes, traffic management systems, rail automation and electrification services

• **Energy:** Electrical engineering and IT solutions for power plants, cyber security for digital substations, Smart grids, mechanical drives, etc.

• **Building technologies:** Fire safety products, fire detection, Evacuation and voice alarm, Meters, Valves, thermostats

- **Healthcare:** Laboratory Diagnostic equipment, medical imaging equipment, Hearing aid instruments, etc.

- **Financing:** Equity investments, Debt Financing, Equipment finance and leasing

- **Other services**: Global service partners that help factories operate their machines and systems.

Siemens locations by state In India		
Karnataka	Maharashtra	Tamil Nadu
Delhi	West Bengal	Goa
Telangana	Uttar Pradesh	Andhra Pradesh
Bihar	Kerala	Jharkhand
Orissa	Chandigarh	Puducherry

Siemens Competitors

There are several brands in the market which are competing for the same set of customers. Below are the top 8 competitors of Siemens:

1. ABB   Ltd
2. Alstom
3. Bombardier Inc.
4. Honeywell International
5. Emerson Electric
6. Rockwell Automation
7. Schneider Electric
8. Abbot laboratories
9. Larsen & Toubro Ltd
10. Bharat Heavy Electricals Ltd
11. Bharat Electronics Ltd
12. Honeywell Automation India Ltd

HISTORY OF SIEMENS

Siemens is a German company founded in the year 1847 by Werner Von Siemens as a small but promising craftsmen workshop working on the design of a pointer telegraph. This 165-year-old company is a global energy and powerhouse that focuses on automation, electrification and digitalization. Siemens is present in around 200 countries all over the world and has approximately 3,48,000 employees worldwide.

The first office of Siemens, however, was opened only in 1922 and in 1957 it was registered as a company under the Indian Companies Act, of 1956. Today Siemens has around 22 factories (at locations like Aurangabad, Bangalore, Goa, Hyderabad, and Gurgaon), 8 centres of competence and 11 Research & Development hubs in the country. It has 56 sales offices spread throughout the country in places like Bangalore, Hyderabad, Jaipur, Kolkata, Jamshedpur etc. For nearly 6 decades, Siemens has been the technology partner of the Indian Railways by digitalizing services, integrating functions and offering state-of-the-art transportation solutions.

ORGANIZATIONAL STRUCTURE
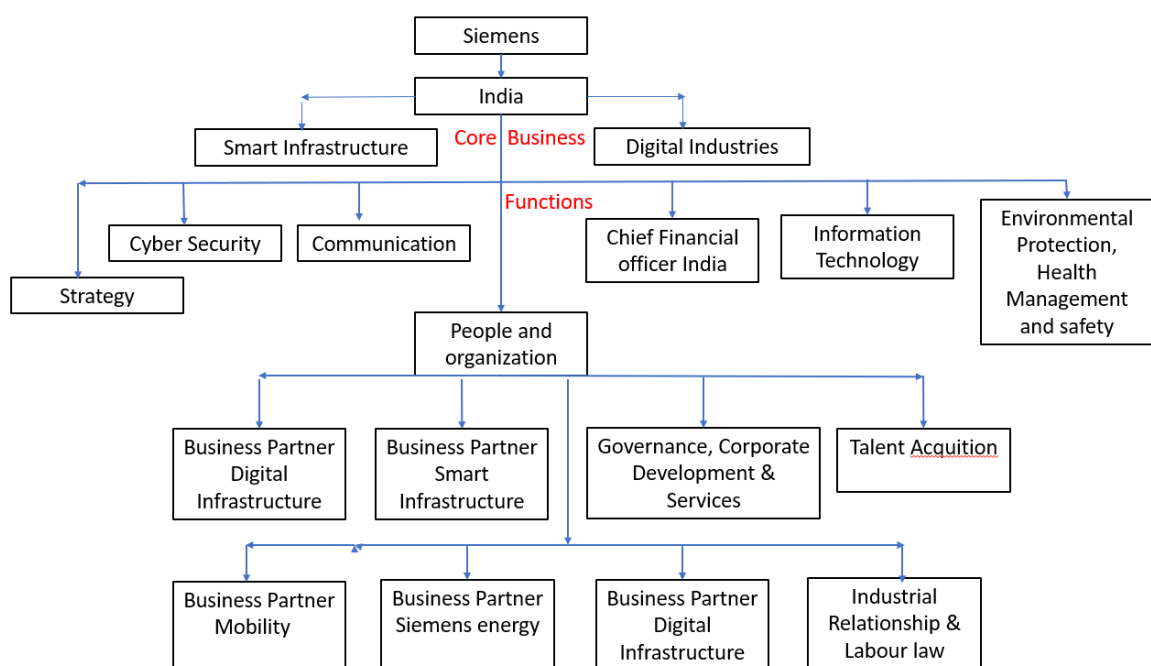
Siemens Goa Factory

Registered in **2014**, **Siemens Ltd.** has made a name for itself in the list of top suppliers of distribution board, Electrical Goods, Equipment & Supplies, gand as insulated switchgear in India. The Siemens factories located at the Goa location are situated at the Verna Industrial Estate and house five factories – Energy Automation (also called Digi Pro), Control Relay Panel (Digi Sys), Healthcare, Medium Voltage Switchgear and Energy Transmission. The Goa plant has approximately 1000 employees.

Siemens Ltd. is listed in Trade India's list of verified sellers offering supreme quality Flush Mounting and Hollow Wall Distribution Boards, Arc Fault Detection Units Air-insulated switchgear for primary distribution systems etc. Buy distribution boards, Electrical Goods, Equipment & Supplies, and gas-insulated switchgear in bulk from us for the best quality products and service.

Siemens Energy Automation Factory

Energy automation – intelligent and future-proof Flawless operation of the entire grid in our increasingly distributed energy landscape is the basic prerequisite for any network operator, electricity supplier, and industrial enterprise today.

Siemens offers a whole spectrum of innovative products and solutions - for energy protection and automation as well as communication technology including data analytics technologies based on digital twin solutions and IoT applications. This allows you to design your energy infrastructure flexibly, and operate it more reliably, sustainably and efficiently. It also increases the safety of your operating staff. The Siemens Energy Automation Factory (also called Digi Pro) has around 400 employees. This site was established in the year 2012.

HUMAN RESOURCES DEPARTMENT

The HR Department is primarily responsible for supporting all other departments by performing all roles relating to the employees of the company.

Vision

'To be a strategic Business partner, transforming Siemens into a world class learning organization, creating value to all its shareholders' Functions

● **Manpower planning:** The HR department is responsible to collate information from other departments for drawing out annual plans of a number of employees needed and the number of new hires to be made. This is also accompanied by the possible rise in the labour cost as a result of these new hires. The same has to be presented to the HR Head of factories, keeping the respective Factory Head and the Business Administration Head informed.

● **Recruitment**: When there is a job vacancy in any department, the HOD of that department will send the job requisition to HR and HR takes up the duty of posting the job description on internal platforms and then external job sites. It also maintains a record of job applications, past apprentices, etc. and scans through this database in times of a job vacancy. Once candidates are shortlisted, HR directs them to the HOD for an interview.

● **Induction and Training**: The HR is responsible for organizing training programmes relevant to the job of employees. At Siemens, various behavioural, technical, employee awareness, health and well-being training programmes are conducted. An induction programme is organized by HR for every employee who joins the company. The managers are responsible for analysing the training needs of their department employees. These training needs are communicated to the HR department which is then communicated to the Training Team of Siemens which is situated in Bangalore. The team is responsible for contacting an appropriate trainer and discussing the content of the programme with him or her. Once the course content

and trainer are finalized, the HR head of the factory is contacted. She or he will then contact the trainer, communicate any special objectives to be met through the programme and finalize the training date. Later, the employees are called upon to attend the training. A training evaluation is done and feedback is received from the employee.

- **Administrative function:** The HR department is responsible for handling administrative functions like employee compensation, leave management, attendance records management, etc. The mandatory monetary benefits given to 14 employees at Siemens include Provident Fund, Gratuity and ESIC (insurance policy for employees earning Rs. 15,000 and below per month).

- **Employee Benefits:** Besides the statutory monetary benefits, other benefits given to employees include a Medi-claim policy (covering the employee, spouse and up to 2 children to be redeemed on hospitalization), a life insurance policy. The department has an education support scheme that can be availed by employees who want to pursue a relevant educational course. As part of this scheme, fees up to a certain amount are reimbursed and educational leave is granted to employees. Other benefits like canteen, and transport facilities are provided to employees by a third party.

- **Performance Management:** The HR department coordinates the entire performance appraisal system and ensures that quarterly and half-yearly reviews of employees are done by their managers. The Instant Puraskar and Jubilee Puraskar are given in order to manage and award good performance and long service of employees.

- **Employee Engagement**: This department believes that allowing employees to catch a breather to spend time with family and colleagues can boost employee morale. Fun and cultural programmes are organized for employees on special days like Diwali, Christmas and for other major local and national festivals. Family days are celebrated annually by Siemens. The department also organizes picnics for its employees.

- **Liaising with Government authorities**: The HR and Administration Department liaisons with the Government and local agencies such as the Chief Inspector of Factories, GIDC, the Labour Board, etc. It ensures that the site follows personnel policies on PF, ESIC calculation, minimum wages, and compulsory facilities to be provided to workers and employees. The department also conducts contractor audits to ensure that contractors function in a transparent way, maintain correct records and comply with labour laws.

- **CSR Activities**: Siemens HR is also responsible for carrying out CSR projects to show solidarity and concern towards the society of which we all are part of. It has collaborated with the NGO Aroehan to implement Project ASHA in the Amla village. The project aims to improve the living conditions of this village of around 1000 people and have a sustainable model in place that will provide electricity, drinking water, health facilities and sources of income for all the inhabitants. The project makes use of Siemens water solutions, renewable energy solutions, etc. Besides this, the company supports the underprivileged students working with them by sponsoring their education. It has also kick-started the Sanjeevan mobile clinic that reaches out to villages that lack access to proper healthcare facilities. Sanjeevan mobile clinic travels to villages of Haryana, Gujarat, and Maharashtra and offers x-rays, mammography, ultrasound and other diagnostic aids.

INTRODUCTION TO THE PROJECT

RESEARCH TITLE: Digitalization of the canteen at Siemens EA Factory and its Data Base Management.

Siemens provide canteen facilities to their employees. The entire process from giving the contract to the canteen vendor to the billing and sending it to the finance department is taken care of by the HR department. The usage of the canteen depends on many factors such as food quality, service, simplicity in operations, etc. Besides, it is not possible for organizations with a large number of employees to handle the canteen with manual processes.

That's where the canteen management system comes into action. Just like time attendance software creates transparency between an employer and its employees, the canteen management system creates transparency between the company, vendor, and employees. The canteen management system not only helps you manage visitors in the canteen, but it also keeps a track of the number of meals taken by the employees.

Siemens have a canteen facility on contract to provide food/meal at an economical price for their employees. Traditionally, the practice followed is maintaining the records manually by the vendor and employees use a google form to scan and fill in the details for the meal for the purpose of company records wherein both the records are not matched while billing. However, this system demands a fair way to record the information of the employees at the canteen, i.e., canteen management and moreover maintain the account of each employee's entitlement.

Hence to reduce the complexity of handling the canteen management system a solution where there is no need for any manual system and the information flow to the employee, to the canteen contractor and to HR is seamlessly available. The idea is to implement a smart cafeteria using smart cards in the organization. The smart card Software Manages all tasks related to issuing coupons internal/ external to permanent, outsourced employees and Visitors. Coupons can be issued by the user logging on to the system using the card authentication provided by the organization. Provides all details regarding coupons issued to different employees for a cycle.

Siemens has a catering vendor – **Shiva Hospitality Services**, on contract for canteen food. They Provide all the meals for different shifts.

Shift 1 (7:00 am to 3.30 pm)	Shift 2 (3.30 pm to 12:00 am)
6:30 am – Breakfast 12:00 pm – Lunch	3:15 pm - Snacks 8:00 pm – Dinner
Shift 3 (12:00 am to 7:00 am)	General Shift (8:00 am to 5:00 pm)
3:00 am – Tea, snacks	8:00 am Breakfast 12:30 pm Lunch

The canteen facility is provided to all Employees, Interns, apprentices and Team leases (Contractors).Siemens Provide a free canteen facility to **Apprentice, Interns, and Team Lease.** They pay the food bill to the vendor. **Employees** get their food allowances in their salary or in the **Sodexo** card wherein they can pay the vendor directly at the time of service using a UPI transaction. No cash payment is allowed.

SCOPE OF STUDY

In today's fast-moving world, there is a need for quick and efficient service in every sector of life for the public in general. As we know, many employees use the canteen and food facilities in their workplace on daily basis, there is a need to provide quick service at billing counters. This work is focused on developing an efficient smart canteen management system to counter the delays occurring during billing services. This proposed system can be used in large industries as it is less time-consuming than the existing system. The results reveal that the proposed system offers cost-effectiveness in addition to quick and easy-to-use service.

Also, there will be transparency in the calculations between the organization and the vendor. Introducing the new canteen system can help in database management. Employee satisfaction in the organization creates a positive impact on the functionality of the organization.

LITERATURE REVIEW

Sr. No	Journal	Title	Findings	Relevant
1	2021 IEEE Asia-Pacific Conference on Computer Science and Data Engineering (CSDE)	Canteen Automation System: An Approach for Smart City Planning	They have designed and built an online-based canteen management system for organizations so that employees can quickly get food without wasting their time and also, to ensure that there will be no error in their bills. It is very common to have a long queue for the canteen and this will avoid the same.	To avoid the long queue and the scanning system to enter the data using google Forms for canteen purposes, the company is using a card-based canteen management system.
2	International Research Journal of Engineering and Technology (IRJET)	Canteen Automation System	1. To order food fast. 2. Using an Automation system is convenient for people who have limited time to do the same. 3. Cost reduction using the new system 4. Reduced paperwork/ Manual writing. 5. Computerized Oder and billing system	It reduces the paperwork wherein all the data was entered manually and later entered into the excel sheet and calculated. It's time-consuming. Wherein the smart cafeteria will replace the manual system.

3	International journal of Advance Research, Ideas and Innovations in Technology	Canteen management system using the E-wallet	This paper discusses the crowded canteen issue and finally proposes a working solution for the same. It further discusses the importance of the El-Gamal encryption for the security of the E-Wallet while doing the payment for canteen in the company.	Here the crowded issue also rises up this could be resolved and no need to collect cash for the meal, employees can pay through an online system where security is also taken care of. And for Apprentices, interns and Team leases the company pays the vendor at the end of the month.
4	International Research Journal of Engineering and Technology (IRJET)	Web-based E-wallet Canteen Management System using RFID	Traditional Method V/s Modern **Traditional Method** The existing system uses a traditional canteen management system. It is not an automated system. Traditional canteen uses cash payment. This case is manageable only for small canteens. The user always needs to carry cash. Canteen people get busy with handling manual accounting, more paperwork, data recording and delivering a service to users. This	Siemens faces the same disadvantages and advantages of using the traditional method and modern method for canteen system respectively.

			increases the crowd in the canteen.	
			Modern method	
			1. Post-paid canteen payment methods. 2. Time based auto menu. 3. Manage multiple staff canteen with central database. 4. Provide menu and bill with coupon print format. 5. Generate report.	
5	Sentimental Analysis and Deep Learning	Smart Food Fare Canteen: Automation of Bills and Serving	Manual billing is avoided, and automatic billing is accounted for using debit cards or QR codes through authorized payment gateway apps. Each item in the canteen is assigned a certain price and a scanner and QR code for it; the user has to choose which items to eat. This automated billing and efficient catering of quality food and its items would be the demanding in the business in the future.	Siemens using to do manual billing and QR code scanner for canteen. The automated system would resolve this issue.

| 6 | IEEE International Conference on High Performance Computing and Communications (HPCC) | Implementation of a Smart Canteen System for a University Campus | The emergence of the Internet of Things (IoT) in various fields has replaced traditional methods. It has led to increased efficiency and effectiveness making tasks less cumbersome and our life much easier. Traditional canteen systems usually consist of manual tasks, involving paperwork and the need for human intervention.

Usage of IoT in a smart canteen system enhances several processes

1.System consists of a wireless menu ordering system

2.The smart canteen system to provide improved access control and attendance management

3.The paper illustrates how various sensors installed in the canteen can help to detect food spoilage and gas leakage | As siemens is a technology company focused on industry, infrastructure, digital transformation, transport as well as transmission and generation of electrical power. it has to adopt the newest technology to improve its daily activities and functions in all expects including canteen. |

			4.The system also provides early warnings and alerts as a measure of providing increased safety and minimizing food wastage	
7	Proceedings of the 1st International Conference on Applied Economics and Social Science (ICAESS 2019)	Design of Form for Managing Green Line Canteen in PT. Infineon Technologies Batam	This research paper provides information on how to produce a form to record data and to manage the green Line canteen based on Microsoft access, which provided clearly, transparent, and up to date records. This study describes the design of form that use for recording canteen data, terms of order, actual order, and also the Presence of caterers.	The new system introduced in siemens will produce records and can be managed easily which provides clear and transparent up to date records. Hence the company and canteen vendor issues could be resolved
8	International Conference on Industrial Engineering and Management Science (ICIEMS 2013)	A New Staff Canteen Service of Transparent Screen Display Technology by Using Triz-based Service Design Approach	Triz Principle applied Canteen management - Replacement of mechanical system This study uses Triz-based service design methodology to find out how to develop an e-new service model.	Triz principle is also applied in Siemens which uses a service designed model and application for staff canteen

			To create the industry's first intelligent display technology applications for the staff canteen	
9	International Journal of Innovative Science and Research Technology	Food Chain-Based Canteen Automation System	The research on canteen automation system involves many phases like employee management system, Inventory management and product management. In primary phase the system designed at module level. This system will help to improve food quality, service, variety and pricing. The module is created on the basic analysis done during the identification of various software present in the market. Different modules are developed to fulfil the need of a food company having many units in the city or a country.	Siemens in verna has 3 units and each unit has diffident canteen. All the 3 canteen has the same canteen vendor.
10	Proceedings of the 1st International Conference on Information Technology and	Analysis of Canteen Services in Educational Institutions using	This research aims to determine the improvement of canteen services in all faculties	Employee satisfaction is also important to benefit the company in its functions. canteen cleanliness,

	Education (ICITE 2020)	Force Field Analysis Approach	identifying problems using the method based on force field analysis, which includes the level of employee satisfaction and as a means of criticism and suggestions for canteen managers. The method used in this study is a qualitative approach with descriptive analysis to determine the level of canteen service, canteen cleanliness, food hygiene of the canteen, as well as canteen facilities and facilities.	food hygiene of the canteen, as well as canteen facilities is important in an organization.
11	NHBA Ahmad – 2007 utpedia.utp.edu.my	UTP Cafeteria Cashless Payment Using Fingerprint Recognition	Using a system will help to improve the performance of daily cafeteria transactions. No cash is involved, transactions will be much faster than the manual based. The database is also important in this project. It will be used to store student's particulars as well as the transaction details such as price of foods purchased and the	Database management helps the user to record analyze and make changes much easier way than manually. As they need to handle huge data of day to day of canteen activities.

			current balance of student's account.	
12	IEEE International Smart Cities Conference (ISC2)	vCanteen: A Smart Campus Solution to Elevate University Canteen Experience	vCanteen aims at reducing queuing time when ordering food, and allowing users to know the estimated crowd density in a university canteen in real-time. The crowd estimation system has been developed using a multi-column convolutional neural network (MCNN). This paper discusses the vCanteen prototype that was developed and tested at the canteen.	Siemens also aims to reduce queuing time when ordering food, and allowing users to know the estimated crowd density in a company canteen in real-time.
13	Engmann, S. M. (2017). E-commerce for canteen services.	E-commerce for canteen services	Food ordering applications for restaurants and eateries in Ghana have features such as make orders, select options for delivery or pickup, and provide various options of payment.	Make can ensure the advancement of the new system can make work more efficient and convenient for the employees.
14	Journal of Survey in Fisheries Sciences	Smart Cafeteria	They have food in the canteen at the time of more crowded times. Most of the people can go	In Siemens, the different department has different time for lunch, this reduces

			to the canteen at the same time, because, in educational instructions, corporate offices giving the same lunchtime for all employees, so within a few hours the canteen employees serve a crowd. So, they need an application for taking orders online. In this application, people can order food online using sites, once they have paid for food, they can get the order id or booking id.	some crowed in the canteen. Time management is important and also good services can satisfy employees in an organization.
15	International Conference on Advanced Information Networking and Applications	Opportunities and Advantages of Cloud Migration of a Smart Restaurant System	The system was proposed to design a system that would allow automated and intelligent control and management of a restaurant using IoT for product safety in the kitchen and booking of parking spaces, tables and meals through an interactive Menu. So, something that would provide ease of organisation in the process of ordering food, regularly checking and	To ensure all the canteen functions run smoothly and also the process of ordering food, regularly checking and monitoring its quality to maintain proper hygiene

			monitoring its quality to maintain proper hygiene.	
16	Applied Science, Business & Industrial Research – 2019	Analysing the University Canteen Performance: A Case Study	The report analyses the performance measures of the university hostel canteen. The results showed that the performance of the canteen was not efficient since the customer waiting time and the number of customers waiting was higher. If this waiting time could be reduced, the efficiency of the system can be enhanced.	The number of employees waiting for the meal is high. If this waiting time could be reduced, the efficiency of the system can be enhanced.
17	Vision and Scope Document for Arasan Canteen Ordering System	Software Project Management for canteen digitalization	The Arasan Canteen Ordering System is a new system that replaces the current manual and telephone processes for ordering and picking up lunches in the Process Impact canteen.

The system is expected to releases, ultimately connecting to the Internet ordering services for several local restaurants and to credit and debit | There the smart cafeteria replaces the manual system of the siemens company. |

			card authorization services.	
18	International Research Journal of Engineering and Technology (IRJET)	QR Code Based Effective Employee Maintenance System	1. biometric is concern with the measurement of unique human physiological or behavioral characteristics. The technology had been used to verify the identity of user. 2. system which totally works on QR code based identity card	Here in the company, we are using a smart card system wherein an employee will punch the card and take to coupon for their meal.
19	International Journal of Scientific Engineering and Science	An Empirical Study on University Canteen Satisfaction Survey-A Case Study of Jiangsu University	The quality of universities canteens and how satisfied students are with the canteen are directly related to the stability of the university. In order to improve the management level of the university canteen and effectively improve the student's satisfaction with the university canteen, work can be strengthened from the following aspects. 1.importance to students' opinions and	Employee satisfaction with canteen facility is important for the better functionality of organization.

			communicate more with students.	
			2. improve the quality of diet products	
			3. enhance staff's overall quality and service awareness.	
			4.improve the hardware facilities of the canteen.	
20	International Research Journal of Engineering and Technology (IRJET)	Workplace cafeteria and other multicomponent interventions to promote healthy eating among adults: A systematic review	Impact of an intervention on the availability and consumption of fruits and vegetables in the workplace	Employee health is also a concern in this sicario.

RESEARCH GAPS AND QUESTIONS

Siemens provide canteen facilities to their employees. The entire process from giving the contract to the canteen vendor to the billing and sending it to the finance department is taken care of by the HR department. The usage of the canteen depends on many factors such as food quality, service, simplicity in operations, etc. Besides, it is not possible for organizations with a large number of employees to handle the canteen with manual processes.

Siemens have a canteen facility on contract to provide food/meal at an economical price for their employees. Traditionally, the practice followed is maintaining the records manually by the vendor and employees use a google form to scan and fill in the details for the meal for the purpose of company records and also the vendor records in his register manually wherein **both the records are not matched while billing**. However, this system demands a fair way to record the information of the employees at the canteen, i.e., canteen management and moreover maintain the account of each employee's entitlement.

For Siemens employees, monthly DA is credited to their salary account or Provided a Sodexo card wherein they pay online or swap the card while taking their meal. The apprentices, interns and Team lease use a scanner to scan the QR code and have the meal.

Below is the sample Google form and QR code for the siemens canteen at EA Factory.

Below is the canteen data of the EA factory (Energy Automation Factory) for the period of one year. Here the total records found are 16002 from google Forms scanned by the Intern, Apprentice and Team Leases for the canteen. Their meal payment is done by Siemens as the company provides a free canteen facility for them.
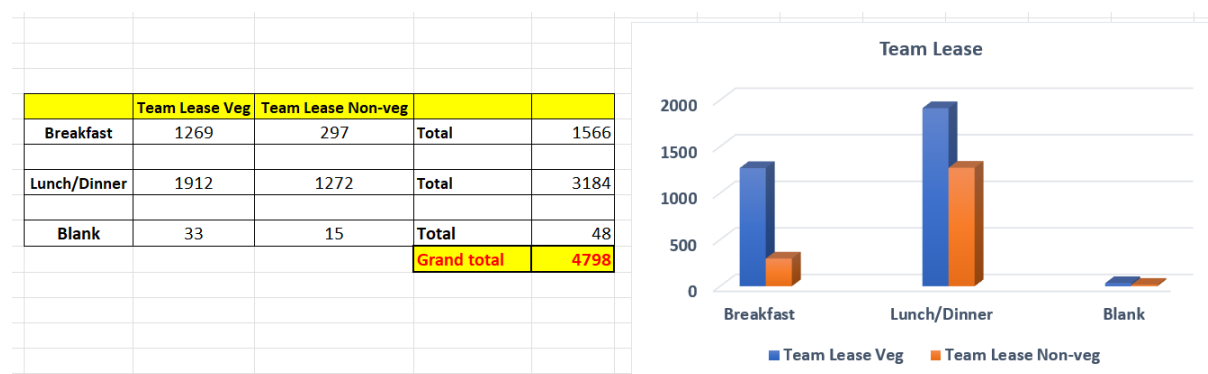

Canteen Details of EA for the Period of 1st jan 2022 - 16 feb 2023

Total	16002			
	Apprentice Veg	Apprentice Non-veg		
Breakfast	2224	763	Total	2987
Lunch/Dinner	3533	2554	Total	6087
Blank	24	15	Total	39
			Grand Total	9113
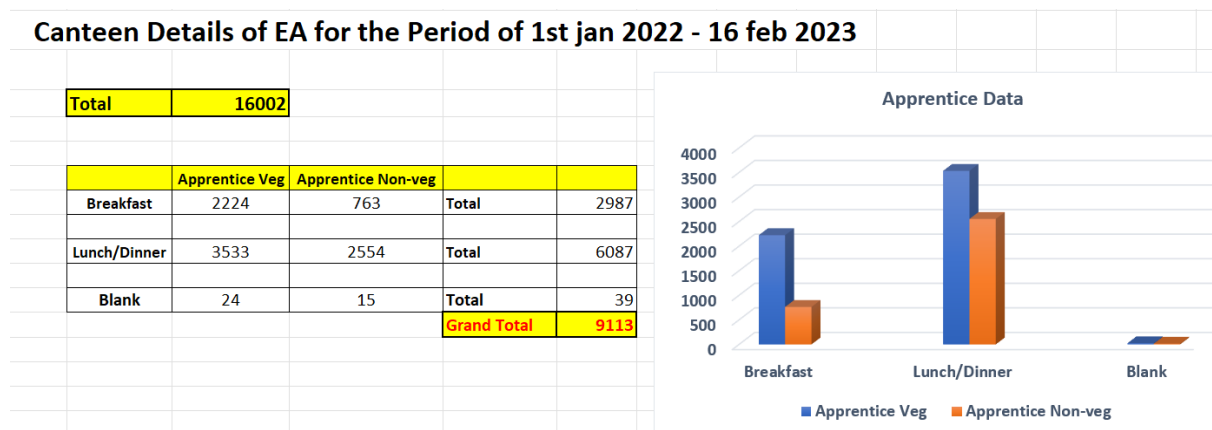
Above is the data of all the Apprentice who had their breakfast, lunch and dinner at siemens by scanning the QR code entering the data and choose the option for veg or non veg.

	Intern Veg	Intern Non-veg		
Breakfast	465	124	Total	589
Lunch/Dinner	825	671	Total	1496
Blank	6	0	Total	6
			Grand total	2091

Intern Data
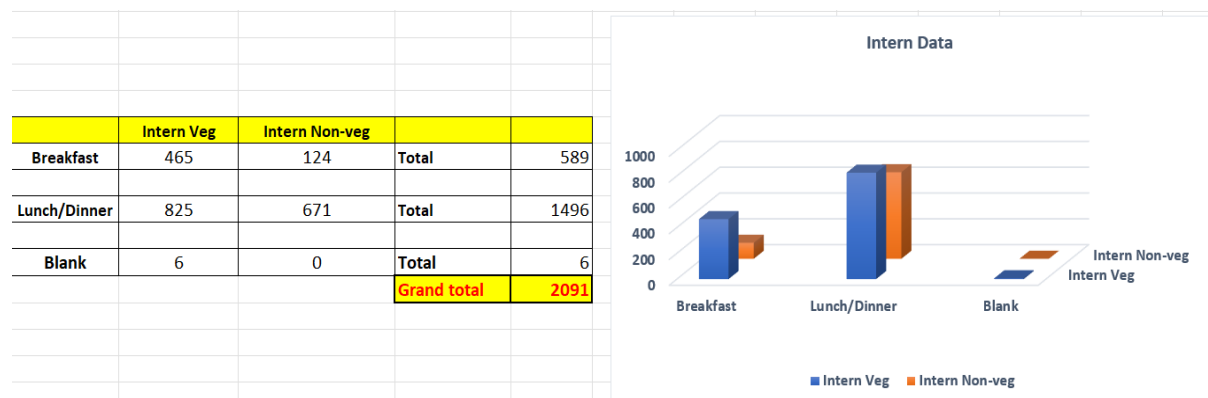
Above is the data of all the Intern who had their breakfast, lunch and dinner at siemens by scanning the QR code and entering the data and choose the option for veg or non veg.

	Team Lease Veg	Team Lease Non-veg		
Breakfast	1269	297	Total	1566
Lunch/Dinner	1912	1272	Total	3184
Blank	33	15	Total	48
			Grand total	4798

Team Lease

Above is the data of all the Team lease who had their breakfast, lunch and dinner at siemens by scanning the QR code and entering the data and choose the option for veg or non veg.

From the above data the total record found is 9113 but the vendor who recorded manually shows completely different.

For Example, let's analyse the data for one month

Below is the data found from the google form for the month of January 2023 from all the interns, apprentices and team lease for breakfast and lunch.

Month of Jan data for breakfast and lunch	
Veg	1185
Non Veg	650

Total = 1835

SHIVA HOSPITALITY SERVICES PVT. LTD.
Unit :- Siemens Goa
Credit Sale Details EA

Date	Dinner Veg	Dinner Non Veg	Lunch Veg	Lunch Non Veg	Diet Coke	Sparklin Water	Nimbuj	Dry Fruits	Biryani	Special Lunch	Break fast
1-Feb-2023	0	16	67	114	24	0	0	0	0	0	78
2-Feb-2023	7	0	170	0	0	0	0	0	0	0	81
3-Feb-2023	2	16	65	95	0	0	0	0	0	0	83
4-Feb-2023	2	8	60	87	0	0	0	0	0	0	70
5-Feb-2023	0	0	0	120	0	0	0	0	0	0	110
6-Feb-2023	17	0	162	0	0	0	0	0	0	0	79
7-Feb-2023	2	23	67	97	0	0	0	0	0	0	86
8-Feb-2023	2	18	56	101	0	0	0	0	0	0	76
9-Feb-2023	25	0	137	0	72	0	0	0	0	0	70
10-Feb-2023	5	28	70	102	0	0	0	0	0	0	82
11-Feb-2023	2	45	47	163	0	0	0	0	0	0	123
12-Feb-2023	0	0	0	150	0	0	0	0	0	0	140
13-Feb-2023	16	0	167	0	0	0	0	0	0	0	78
14-Feb-2023	4	25	73	105	0	12	10	0	0	0	83
15-Feb-2023	2	27	68	185	0	0	0	0	0	0	85
16-Feb-2023	17	0	141	0	0	0	0	0	0	0	86
17-Feb-2023	2	18	65	101	0	0	0	0	0	0	80
18-Feb-2023	6	9	64	91	0	0	0	0	0	0	76
19-Feb-2023	0	0	0	140	0	0	0	0	10	0	130
20-Feb-2023	12	0	138	0	0	0	0	0	0	0	75
21-Feb-2023	4	9	69	102	0	0	0	0	0	0	81
22-Feb-2023	3	14	68	105	0	0	0	0	0	0	80
23-Feb-2023	13	0	166	0	0	0	0	0	0	0	83
24-Feb-2023	4	16	63	113	0	0	0	0	0	0	80
25-Feb-2023	10	35	89	156	0	0	0	0	0	0	127
26-Feb-2023	0	0	0	150	0	0	0	0	20	0	130
27-Feb-2023	19	0	175	0	0	0	0	6	0	5	86
28-Feb-2023	9	25	66	158	0	0	0	4	0	10	79
TOTAL	185	332	2313	2435	96	12	10	10	30	15	2517

Now let's have a look at vendor bill for the month of January 2023

Lunch and breakfast both veg and non veg

LUNCH	
Veg	2313
Non - Veg	2435

Breakfast	Total= 7,265
2517	

If we compare both the data, through google form there are 1835 records found and the vendor recorded 7265 for the whole month.

There is a huge difference recorded in the month of January.

Why there is a huge difference between company records and vendor records of the canteen?

This happens usually because of the following reasons form apprentices, interns, team lease and vendor.

1. Few enter the wrong data in the google form.

2. Some do not scan the google form.

3. Some show screenshots of the earlier scan data.

4. Network issue.

5. Mobile software issue etc.

6. Vendor recorded twice in his register as he records manually.

7. Mistakes by the vendor with the choice for veg and non-veg.

There are many exceptions for the reason for unequal data.

Hence, the company has decided to use a smart cafeteria for canteen management which provided clear, transparent, and up-to-date accurate records.

How this issue can be solved?

Problem Statement

In the existing system, there will be queues and consists of a manual workload that involves the paperwork of the billing system and maintaining the files too. Also, there is no transparency in the functionality of the canteen and we do not get accurate data.

PROJECT OBJECTIVE

- To maintain transparency in the canteen management and to get accurate data.

- To manage the details of the Canteen, Meal and their type using canteen management system.

- To enhance and upgrade the existing system (manual system) by increasing its efficiency and effectiveness with the computer-based system.

- To reduce the crowd at the counter in the canteen for the meal.

- To check the employee satisfaction level by introducing a new Canteen Management system

PROJECT METHODOLOGY

Smart canteen management systems efficiently use the company's cafeteria, ensuring that the facility is used correctly. The software that you install for this purpose becomes the hub of all the activities related to canteen management. Therefore, it is essential that you adopt a solution that allows this kind of centralization. This canteen management solution helps organizations in bridging the gap between the canteen and its usage. The system is entirely paperless, so you don't have to struggle with coupons and their distribution to employees. They can use card-based solutions to manage their canteen needs at Siemens.

The project is built at the administrative end and thus only the administrator and the HR has the authority to access it. The purpose of the project is to build an application program to reduce the manual work of managing the Canteen. It tracks all the details about the Canteen Meal and its type.

Functionalities provided by Canteen Management System are as follows:

- It tracks all the information of interns, apprentices, team lease and employees, Bill Payments, Meal Type, etc.

- Provides sorting and searching facilities based on various factors. Such as Company Canteen, employee Meal, and Meal Type.

- Manage the information by Editing, adding, and updating Records is improved which results in proper resource management of Company Canteen data.

- Manage the information on Meal Type.

- Accurate data is provided

- It is user friendly

- Easy to track and calculate

- Clear, transparent, and up-to-date accurate records.

- Provide menu and bill with coupon print format.

Tool used:

A canteen management system is a tool that helps a canteen manager to process the daily activities and transactions of a canteen with high accuracy. It is designed to automate the processes of managing and running the canteen.

How does it work?

Smart Card Authentication. Using smart card given by Siemens for punching attendance the same card can be used for canteen purpose.

Smart Card Authentication – Smart Cafeteria - This process is pretty simple. Employer provides a card to their employees and they need to authenticate the Smart card every time they want to place an order for lunch and breakfast according to their shift and pay the bill online or using Sodexo card.

Types of Set-ups in Canteen Management System

There are three basic set-ups in the canteen management system that allows employees to place an order.

Item and Quantity: In this setup, employees are allowed to place an order as per their choice which is available on their menu on that particular day.

Fixed Quantity and Item: In this setup, the quantity and number of items are fixed per the company's policy. For example, if it's lunchtime, employers can remove the snacks item and only display lunch meals.

Below is the image where the company can manage, record and access the data.
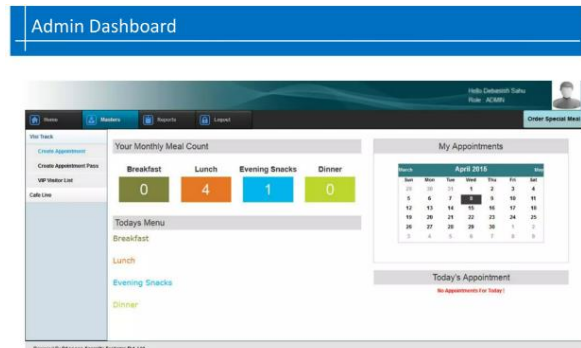
For Apprentice, interns and team lease contractor smart punch card is given, they can use that card for canteen purpose. They can use that card for meals and the data is recorded automatically in the software – Smart Cafeteria.
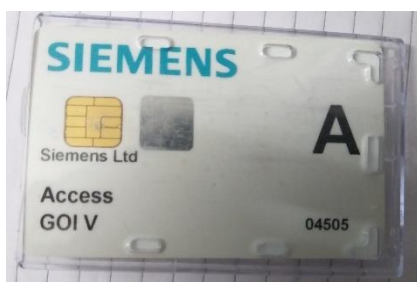
DATA ANALYSIS AND DISCUSSION

A survey was conducted on the research topic "Digitalization of the canteen at Siemens EA Factory and its Data Base Management". This research aims to provide a digital service and a good management to the employees for canteen and also its easy for the HR department to monitor and also motivate employees within the company. The canteen can play a huge role in **reducing stress among employees**. By providing a comfortable and relaxing environment, the canteen can help employees take a break from their work and relax. In addition, the canteen can also offer healthy food options that can help improve employee's overall health & well-being.

What is your gender?
60 responses
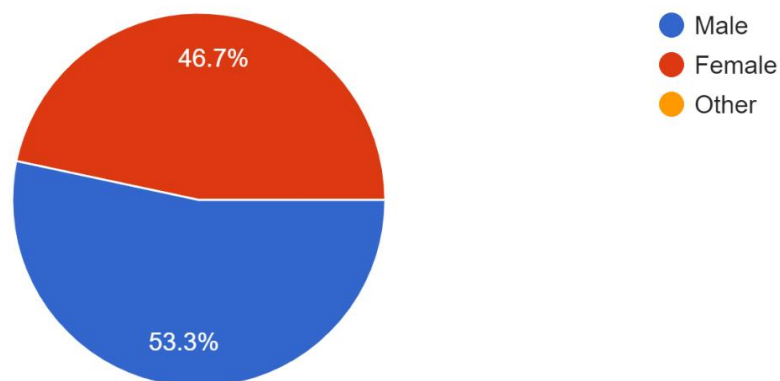
The above show is the pie chart which gives you the data on how many males and females have responded to the questionnaire. So, 46.7% of the female and 53.3% of males gave their opinion on the canteen system.
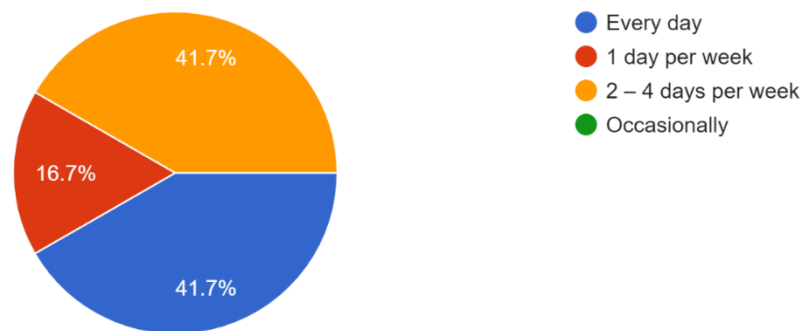
Who are you in the organization?
60 responses
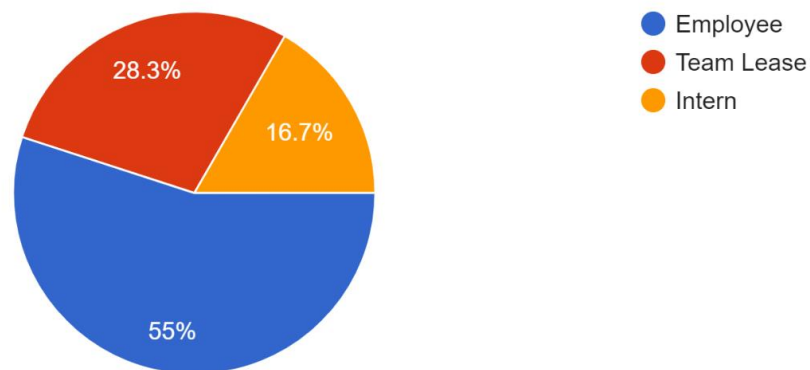
From the above graph, we can see that 28.3% are Team Lease, 16.7 % are Intern and 55% are employee responses.

How often do you use the canteen?
60 responses

The above graph shows the percentage of how many days an employee, team lease or intern takes up the canteen facility provided by the organization. 16.7% of them use the canteen one day per week, 41.7% use the canteen two to four days a week and 41.1% use the canteen every day.

How long do you wait in a queue to take your meal?
60 responses

Legend:
- 1 – 2 minutes
- 3 – 5 minutes
- 6 – 8 minutes
- More than 8 minutes

20%
63.3%
15%
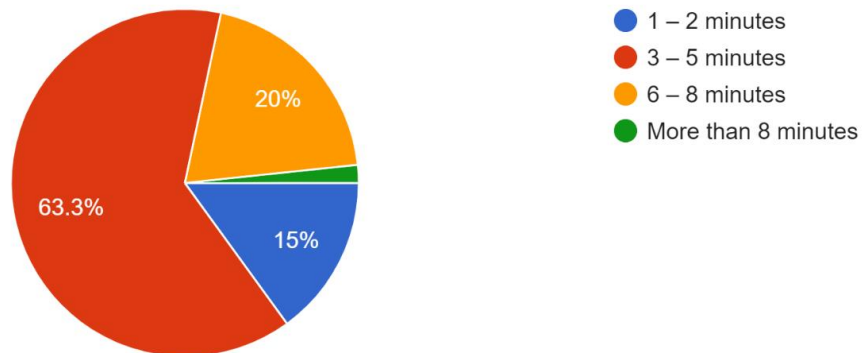
As shown in the above graph, it takes 1-2 minutes for 15% of the people to wait in a queue for the mean, 3-5 minutes for 63.3% of people, 6-8 minutes for 20% of people and for very few it takes more than 8 minutes.

How long it takes you to make the payment for the meal?
60 responses

Legend:
- 1 – 2 minutes
- 3 – 5 minutes
- 6 – 8 minutes
- More than 8 minutes

58.3%
15%
26.7%
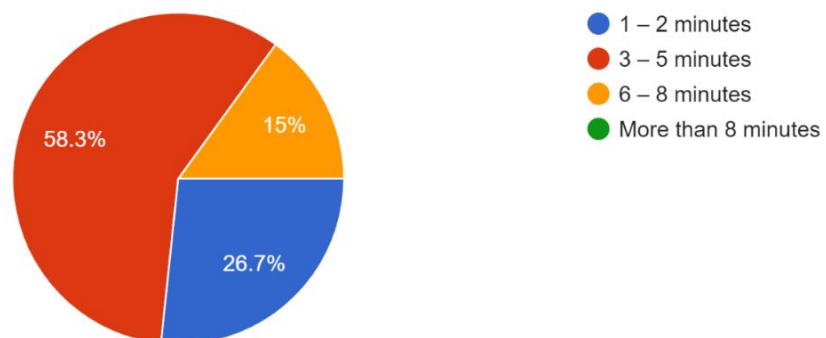
After waiting in a queue people had to scan the QR code for the meal and choose veg or non-veg and make the payment accordingly. As the above graph shows it takes 1-2 minutes for 26.7% of people to make the payment, 3- 5 minutes for 58.3% of people and 15% of people take more than 8 minutes.

Are you satisfied with the system of scanning the QR code and entering your details to take a coupon for a meal?
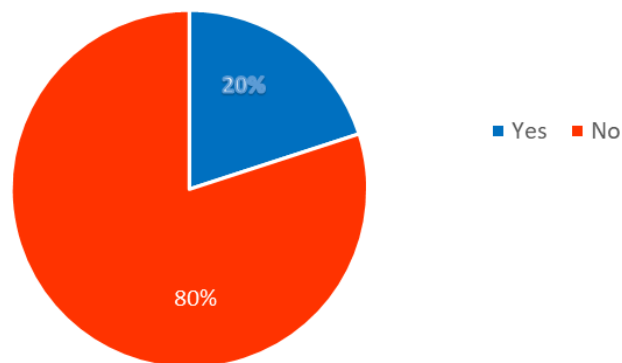
From the above graph, only a few were satisfied with the QR code system for the canteen and many were not satisfied as it would take a longer time to complete the task of scanning the google form entering the data and paying for the meal.

How would you rate the following aspects of our canteen's service? 1- Poor 2- Fair 3- Good 4- Very good 5- Excellent   Variety of food
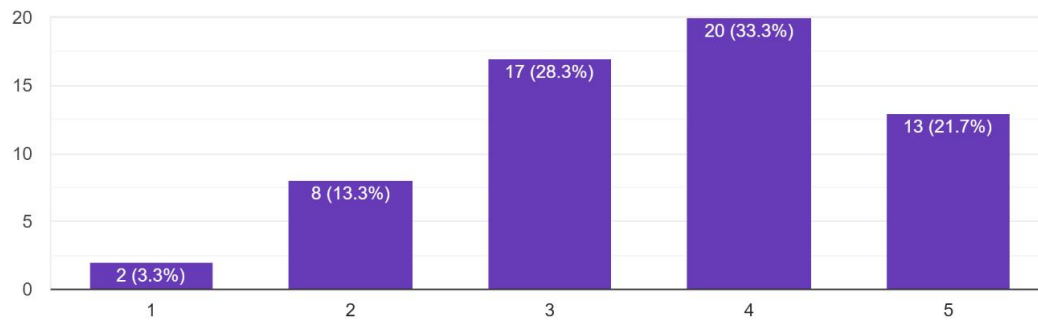
60 responses
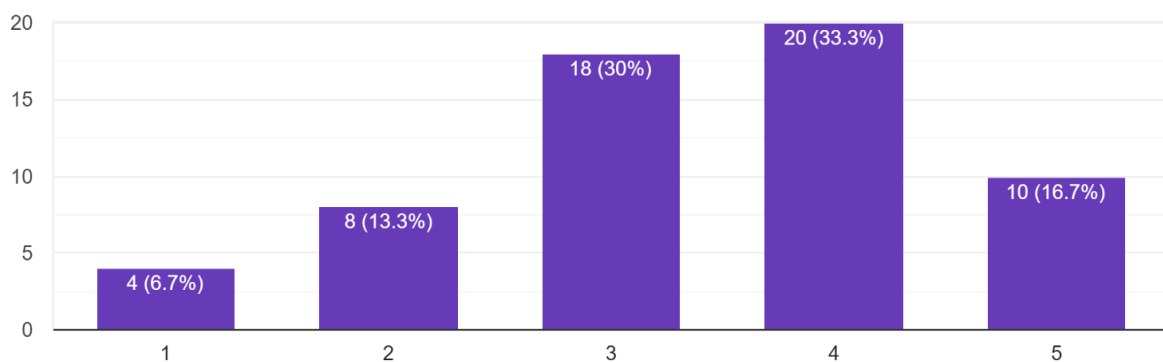
Variety of food

As shown in the above graph, the variety of food severed to people in the company gave their opinion that 16.7% felt excellent, 33.3% felt very good, 30% said good but 13.3% were not satisfied and felt the variety of food is fair and for few poor.
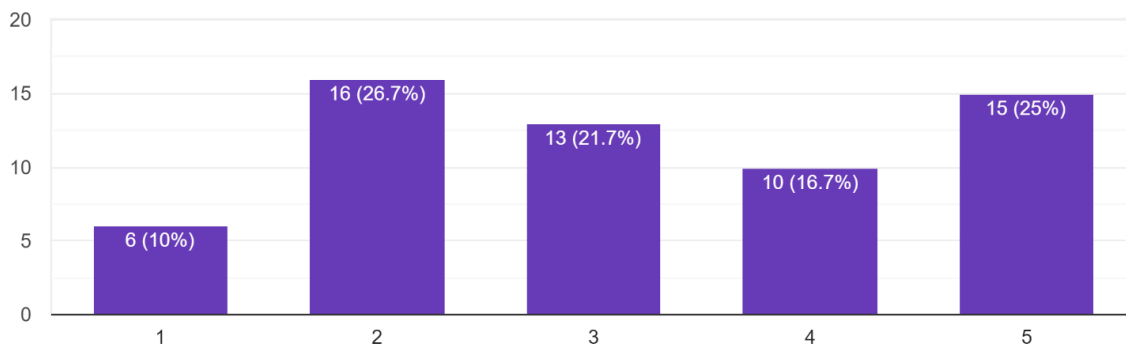
Quality for food
60 responses

Quality of food

As shown in the above graph, the Quality of food severed to people in the company gave their opinion that 21.7% felt excellent, 33.3% felt very good, 28.3% said good but 13.3% were not satisfied and felt the Quality of food is fair and for few poor.
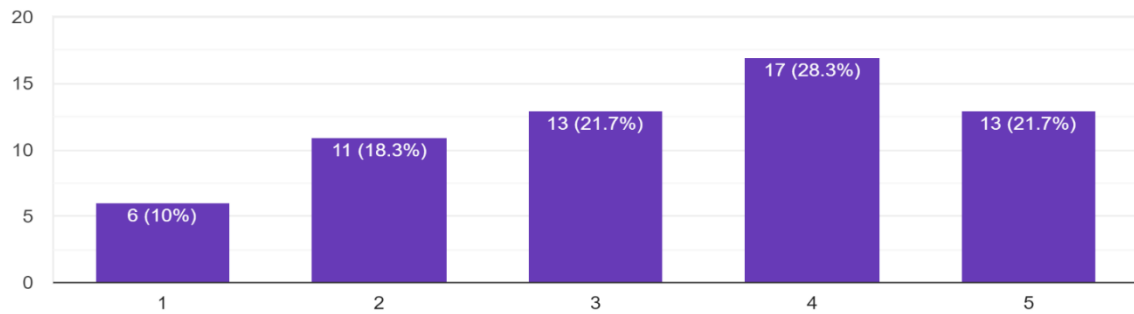
Cost of food
60 responses

Cost of foodAs shown in the above graph, the cost of food offered to people in the company gave their opinion that 25% felt excellent, 16.7% felt very good, 21.7% said good but 26.7% were not satisfied and felt the cost of the food is fair and for few poor.
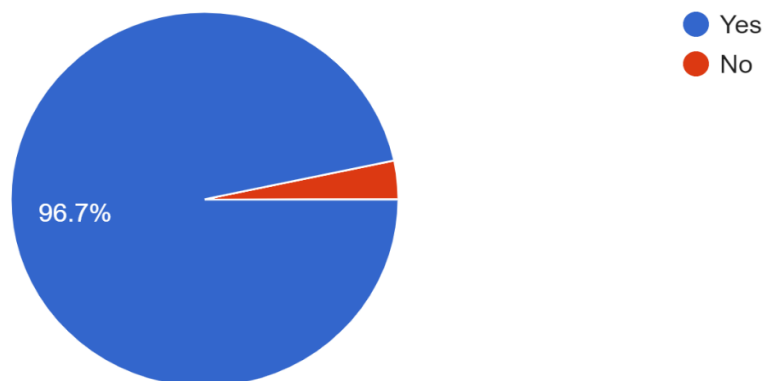
Canteen hygiene

60 responses

Canteen Hygiene

As shown in the above graph, people gave their opinion about the canteen hygiene in the company, that 25% felt excellent, 16.7% felt very good, 21.7% said good but 26.7% were not satisfied and felt the cost of the food is fair and for few poor.

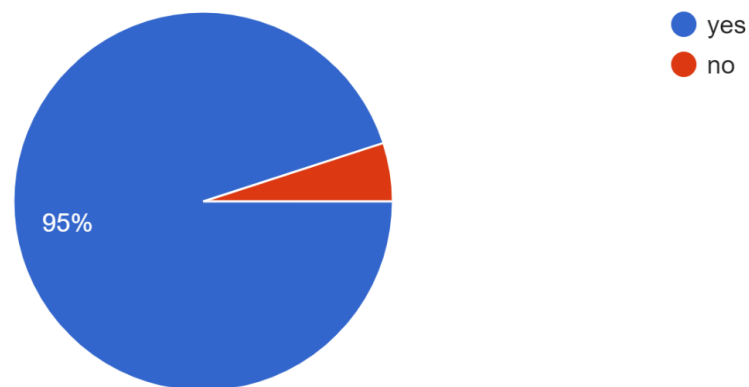Are you happy with the new digitalization of the canteen system?

60 responses

As shown in the above graph, people gave their opinion about the digitalization of the canteen. Wherein the majority of them were happy with the new canteen system introduced in the organization.

The card system in the canteen to take meals is more efficient?
60 responses

- ● yes
- ● no

95%

As shown in the above graph, the majority of the people in the organization felt smart card

canteen digitalization is more efficient than earlier systems of QR code scanning.

Is the canteen functionality using digital mode now convenient?
60 responses

- ● yes
- ● No

96.7%

As seen in the above graph majority of them are convenient to use the new digital canteen

system compared to the earlier QR code and Google form.

How would you rate the older manual canteen system? 1- Poor 2- Fair 3- Good 4- Very good
5- Excellent

60 responses

As shown in the above bar graph 40% of the people in the organization rated as poor for the

QR code and Google form canteen system and 23.3% as fair. Only a few felt it was good

practice.

How would you rate the new digital canteen system? 1- Poor 2- Fair 3- Good 4- Very good
5- Excellent
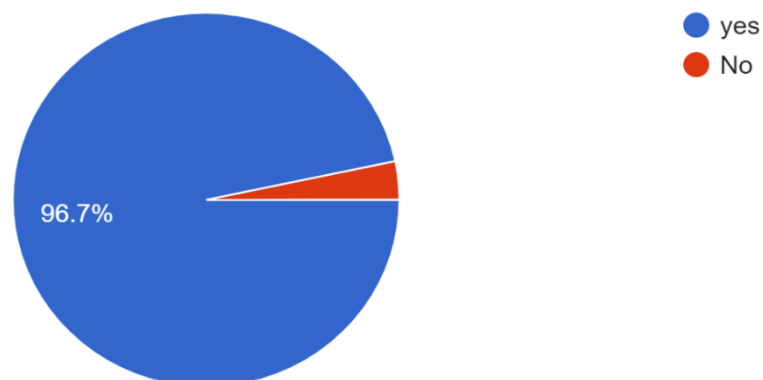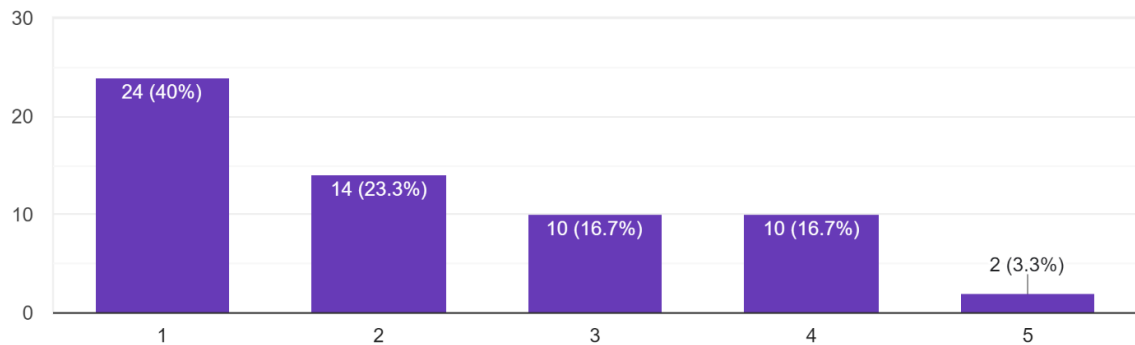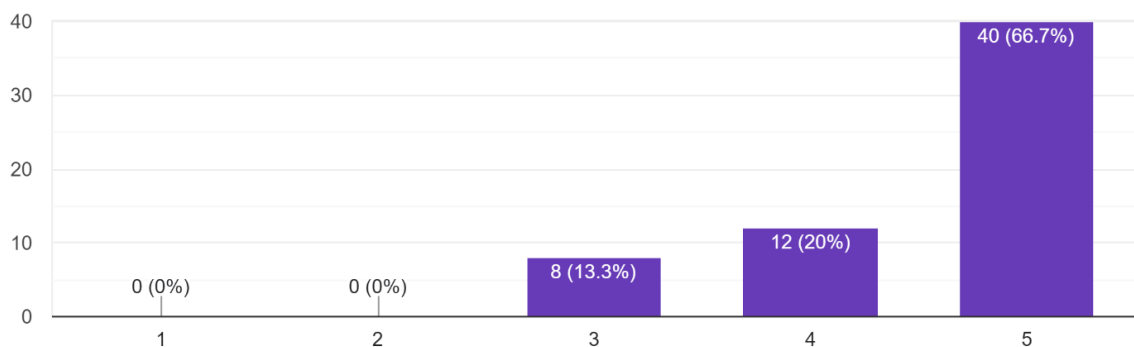
60 responses

As shown in the above bar graph, the majority of the people in the organization felt

digitalization of the canteen is much more convenient and excellent as it was less time-

consuming and easy to use.

HYPOTHESIS

1. To compare the mean values of two variances – rating of older manual canteen system and new digital canteen system.

   H0 - There is no significant difference between the older manual canteen system and new digital canteen system.

   H1 – There is a significant difference between the older manual canteen system and new digital canteen system.

t-Test: Paired Two Sample for Means

	How would you rate the older manual canteen system? 1- Poor 2- Fair 3- Good 4- Very good 5- Excellent	How would you rate the new digital canteen system? 1- Poor 2- Fair 3- Good 4- Very good 5- Excellent
Mean	1.6	4.533333333
Variance	0.447457627	0.524293785
Observations	60	60
Pearson Correlation	-0.42691804	
Hypothesized Mean Difference	95	
Df	59	
t Stat	-644.5143068	
P(T<=t) one-tail	1.6116E-115	
t Critical one-tail	1.671093032	
P(T<=t) two-tail	3.2233E-115	
t Critical two-tail	2.000995378	

AS seen above, the P (T<=t) , P value is 106116E-115 which is Much smaller than 0.05

(t<0.05)

At 95% of significance level since P value is smaller than 0.05, we reject the null Hypothesis.

HYPOTHESIS

2. To check how the happiness of new digitalization of canteen satisfy the employees to

    rate the system.

H0 – Employee satisfaction is not dependent on Happiness and convenience of new canteen

system.

H1 - Employee satisfaction is dependent on Happiness and convenience of new canteen system.

SUMMARY OUTPUT

Regression Statistics					
Multiple R	0.267241379				
R Square	0.071417955				
Adjusted R Squ	0.05540792				
Standard Error	0.175933893				
Observations	60				

ANOVA

	df	SS	MS	F	Significance F
Regression	1	0.138074713	0.138074713	4.46082433	0.038998319
Residual	58	1.795258621	0.030952735		
Total	59	1.933333333			

	Coefficients	Standard Error	t Stat	P-value	Lower 95%	Upper 95%	Lower 95.0%	Upper 95.0%
Intercept	0.663793103	0.145189117	4.571920514	2.58443E-05	0.373165509	0.954420698	0.373165509	0.954420698
you rate the new digital canteen	0.066810345	0.031632692	2.112066365	0.038998319	0.003490632	0.130130057	0.003490632	0.130130057

As seen above, P value is 0.038998319 which is less than 0.05 (p<0.05)

At 95% of significance level since P value is smaller than 0.05, we reject the null Hypothesis.

CONCLUSION

As new digital canteen introduced in the company has created a positive environment. It is much convenient for all the employees, team lease, and Interns to use the canteen. As the software generates the coupon faster the waiting time for employees in the queue is reduced and also there is no crowd at the counter for meal. Also, this digital software for canteen has created a transparency in canteen database management as it automatically provides all the data in a data base to both the organization and the vendor. All the details received through the software are accurate and even does the billing for payment. This has helped the HR team to get accurate data and manage all the employee data systematically. Also, employees are satisfied by the introduction of the new canteen system. This Software is efficient in maintaining all the day to day canteen details and can easily perform operations on platform.

RECOMMENDATIONS TO THE COMPANY

Some recommendations that may be helpful to improve the overall performance and efficiency of the HR department:

1. Develop a Comprehensive HR Strategy: Siemens Limited EA factory in Goa can develop a comprehensive HR strategy that aligns with the overall business goals of the factory. The strategy should include clear goals, objectives, and metrics to measure success.

2. Implement an Effective Recruitment Process: Siemens Limited EA factory in Goa can implement an effective recruitment process to attract and retain talented employees. This can include using social media, job fairs, and employee referrals to reach a larger pool of candidates.

3. Provide Employee Training and Development Opportunities: Siemens Limited EA factory in Goa can provide training and development opportunities to enhance the skills and knowledge of their employees. This can improve employee performance, job satisfaction, and employee retention.

4. Implement an Effective Performance Management System: Siemens Limited EA factory in Goa can implement an effective performance management system to evaluate employee performance, provide feedback, and set performance goals. This can improve employee performance and contribute to the overall success of the factory.

5. Foster a Positive Work Culture: Siemens Limited EA factory in Goa can foster a positive work culture by promoting open communication, teamwork, and employee engagement. This can improve employee morale and contribute to a positive work environment.

6. Ensure Compliance with Legal and Regulatory Requirements: Siemens Limited EA factory in Goa can ensure compliance with legal and regulatory requirements related to employment practices, such as labor laws, equal employment opportunity laws, and workplace safety regulations.

These are just a few general recommendations, and Siemens Limited EA factory in Goa may need to tailor its strategies to suit its specific needs and challenges in the HR department.

Some recommendations that may be helpful to improve the overall performance and efficiency of the canteen management:

1. Focus on Quality and Nutritional Value: Siemens Limited EA factory in Goa can focus on providing high-quality and nutritious meals in the canteen. This can include offering a variety of healthy food options, using fresh ingredients, and reducing the use of processed foods.

2. Conduct Regular Customer Feedback Surveys: Siemens Limited EA factory in Goa can conduct regular customer feedback surveys to gather input from employees about the canteen services and offerings. This can help to identify areas for improvement and ensure that the canteen is meeting the needs of employees.

3. Optimize Food Ordering and Inventory Management: Siemens Limited EA factory in Goa can optimize food ordering and inventory management processes to reduce waste and improve efficiency. This can include implementing a food ordering system that tracks inventory levels and ordering patterns to avoid overstocking and understocking.

4. Ensure Hygiene and Safety Standards: Siemens Limited EA factory in Goa can ensure that the canteen meets hygiene and safety standards by implementing proper food handling and storage practices, providing employee training on food safety, and conducting regular inspections of the kitchen and food preparation areas.

5. Offer Cost-Effective Meal Options: Siemens Limited EA factory in Goa can offer cost-effective meal options that meet the needs of employees at different income levels. This can include offering subsidized meal plans, providing discounts for bulk orders, and sourcing food items locally to reduce costs.

These are just a few general recommendations, and Siemens Limited EA factory in Goa may need to tailor its strategies to suit its specific needs and challenges in canteen management.

WORK DONE & LEARNINGS

Being a part of the HR department, I learnt about the leave muster roll, and how HR handles employee records. Also been a Part of the canteen digitalization Project which was implemented during my internship for two months, analysed the data and gave a fair report on the older QR code scanning system and the difference in HR database and vendor data collected from the canteen manually. Also, learnt how employee satisfaction is important in an organization.

The Factories Act, of 1948 made some provisions to ensure the welfare of the workers. In every factory wherein more than two hundred and fifty workers are ordinarily employed, a canteen shall be maintained for the use of workers to motivate them in their work.

Providing an on-site canteen to the employees of the organization can significantly improve staff wellbeing and productivity, and reduce the frequency of workers being late back from their meal.

Proper management makes functionality fall in place and nowadays the world is adopting digitalisation so using modern methods in day-to-day life can reduce time and create efficiency in work.

Work done and learnings in the HR department with canteen management system experience during my internship:

Work done:

1. Assisting in managing the day-to-day operations of the canteen, such as ensuring timely delivery of food, coordinating with vendors, and managing inventory.

2. Helping to develop and implement food safety and hygiene protocols, including monitoring food quality, inspecting the kitchen and food preparation areas, and conducting food safety training for canteen staff.

3. Assisting in developing and implementing cost-effective meal options, such as analyzing food costs, preparing menus, and exploring local sourcing options to reduce costs.

4. Coordinating with the HR team to manage employee meal plans, including billing and record-keeping.

5. Conducting customer satisfaction surveys to gather feedback from employees and identifying areas for improvement.

Learnings:

1. Knowledge of canteen management systems, including inventory management, vendor coordination, and food safety protocols.

2. Understanding of cost-effective meal planning, including analyzing food costs, preparing menus, and exploring local sourcing options.

3. Experience working in a team-based environment, collaborating with canteen staff, HR colleagues, and other stakeholders.

4. Understanding of the importance of customer satisfaction and gathering feedback to improve services.

5. Exposure to compliance with legal and regulatory requirements related to food safety and hygiene, such as local health department regulations.

Work and learnings as an intern in the HR department experiences during my internship:

Work done:

1. Assisting with recruitment processes, such as screening resumes, scheduling interviews, and preparing offer letters.

2. Providing administrative support to the HR team, such as maintaining employee records, updating HR databases, and preparing reports.

3. Assisting with onboarding and orientation programs for new employees, including preparing materials and conducting orientation sessions.

4. Helping to develop and implement employee engagement initiatives, such as surveys, feedback sessions, and recognition programs.

5. Supporting the performance management process by tracking employee performance, preparing performance reports, and coordinating employee feedback sessions.

Learnings:

1. Knowledge of HR policies and procedures, such as recruitment, onboarding, performance management, and employee engagement.

2. Understanding of HR software and databases used to manage employee records, data, and information.

3. Exposure to the importance of compliance with legal and regulatory requirements related to employment practices, such as labor laws, equal employment opportunity laws, and workplace safety regulations.

4. Understanding of the role of HR in supporting organizational goals and objectives, and the importance of aligning HR strategies with business objectives.

5. Experience working in a team-based environment and developing effective communication and collaboration skills with HR colleagues and other stakeholders.

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