Internship Report
On
Product Development Process
Of
Technohaven Company Limited

Submitted To:

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Date of Submission: August 9, 2017

Letter of Transmittal

August 7, 2017

Zaheed Husein Mohammad Al-Din
Senior Lecturer
BRAC Business School
BRAC University

Subject: Submission of Internship Report on Technohaven Company Ltd.

Dear Sir,

It is indeed my pleasure to submit the internship report to you for your kind appraisal. I have completed my internship at Technohaven Company Ltd. During internship, I got huge amount of support from the officials for preparing our report in time. The experiences I have gathered will be very helpful in the professional life.

I believe, this report will be quite interesting and fulfill your expectation. I have tried to give my best efforts to prepare a comprehensive report. I will be grateful if you accept my report and your kind consideration will be highly appreciated.

Sincerely Yours,
Shaila Parvin

DECLARATION

I hereby declare that, this internship report has been done by me under the supervision of Zaheed Husein Mohammad Al-Din, Senior Lecturer BRAC Business School, BRAC University I also declare that neither this report nor any part of this project has been submitted elsewhere for award of any degree.

Supervised by:

Zaheed Husein Mohammad Al-Din
Senior Lecturer
BRAC Business School
BRAC University

Submitted by:

Shaila Parvin
BRAC University

ACKNOWLEDGEMENT

This internship report cannot be completed without significant help from others. First I gratefully acknowledge the help and support from our parents, teachers, employers, friends and others, whose support has been invaluable for me. I would like to thank the following people for their contribution in this report:

- I am grateful to our honorable Managing Director Habibullah N. Karim, for the official letter to join Technohaven Company Ltd.
- I express my gratitude to my honorable academic supervisor, Zaheed Husein Mohammad Al-Din, Senior Lecturer, who has monitored and directed me for this report.
- I thank Mr. Showkath Ali Head of HR for admitting me at Technohaven Company Limited
- I also thank Mr. Ruhul ALi, Head of Microfinance Product & Services, Technohaven Company Limited for his extreme support and guide
- I also grateful to Mr. Partho Podder, Softaware Engineer, Technohaven Company Limited
- I thank Anisur Rahman Alamgir, Senior Software Engineer, Technohaven Company Limited
- I also thank Jahidur Rahman, Software Developer, Technohaven Company Limited

PREFACE

Technohaven Company Limited is one of leading software developing company in Bangladesh. They develop innovative and cost effective software services in both commercial and government sectors. With the advent of modern technologies they also incorporate their customers with new application and ideas. They have well trained professional to develop software and meet the customer demand. Their unique approach to train and develop human resources to adapt to the market demands leads them to national as well as international market.

The Software Engineering Institute's (SEI) Capability Maturity Model Integration (CMMI) is a respected industry yardstick used to measure the maturity of software development processes."Achievement of CMMI Level 3 rating" is a prestigious recognition of Technohaven's engineering capabilities and a testament in its quality management system and software applications. Also, the rating of Maturity Level 3 confirms that Technohaven has established well-defined, repeatable, and effective standards for project management, software engineering and quality assurance maintaining a focus on continuous process improvement & as well as operational excellence.

With the huge support of professional developers Technohaven is trying to emphasis the newer technologies like Mobile application development, Bioinformatics, Microfinance and many more. They have a lot of experience to work with rest of the software industry. They have developed many software solutions to the corporate leaders and government.

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Chapter: 1
Background of the Report

1.1 Background

I was lucky to get the opportunity to complete my internship report at Technohaven Company Limited. Since Technohaven is one of the leading software companies and developing software from a long ago in Bangladesh I consider myself timely to get chance to take a deep look to their development methods, working models, deals and industrial behavior. I worked in main office located at 9th floor, 70 Green roads, Fattah Plaza, Dhaka-1203, Bangladesh. I intended to look into the software industry and how it looks like, what are their rules, responsibility and environment. Obviously they work with almost every platform and technologies. I worked as a business development officer for 2 years. While developing the business strategy of Technohaven I tried to follow their business strategy and user satisfaction criteria to maintain the quality of the software. Software quality assurance is one of the main challenges of the industry.

1.2 Objectives of the Report

The report has broad and specific objectives to follow.

1.2.1 Broad Objective:

Theoretical knowledge can never fulfill the knowledge of developing software. The industry has to maintain lot things to reach software to root level users. These workings and thinking can only be achieved by working with them.

1.2.2 Specific Objectives:

Besides the main or broad objective, the report has some specific objectives, which are given in the following:

- To know about the problems faced in the software industry
- To know how these problems are solved
- To know the coding style and conventions of the industry
- To go through the development cycle and models
- Working with documentation and customization
- Understanding software maintenance

1.3 Scope of the Report

This report is made only for academic purpose and to fulfill the requirement for industrial attachment. This report has covered the direct and indirect aspects of software industry and their challenges. In addition, the report is focused on mobile application development. With the advancement of these mobile applications all over the world Bangladesh is also trying to cope with that.

1.4 Methodology

For this report, information has been gathered from both primary and secondary sources.

1.4.1 Primary Sources:

For primary data, several face-to-face interviews have been conducted with officials from different departments of Technohaven. Information provided by them has been very important for this report. We conducted with the following professionals:

- Showkath Ali Head of HR Technohaven Company Limited
- Mr. Ruhul ALi, Head of Microfinance Product & Services, Technohaven Company Limited
- Mr. Partho Podder, Softaware Engineer, Technohaven Company Limited
- JahidurRahman, Software Developer, Technohaven Company Limited
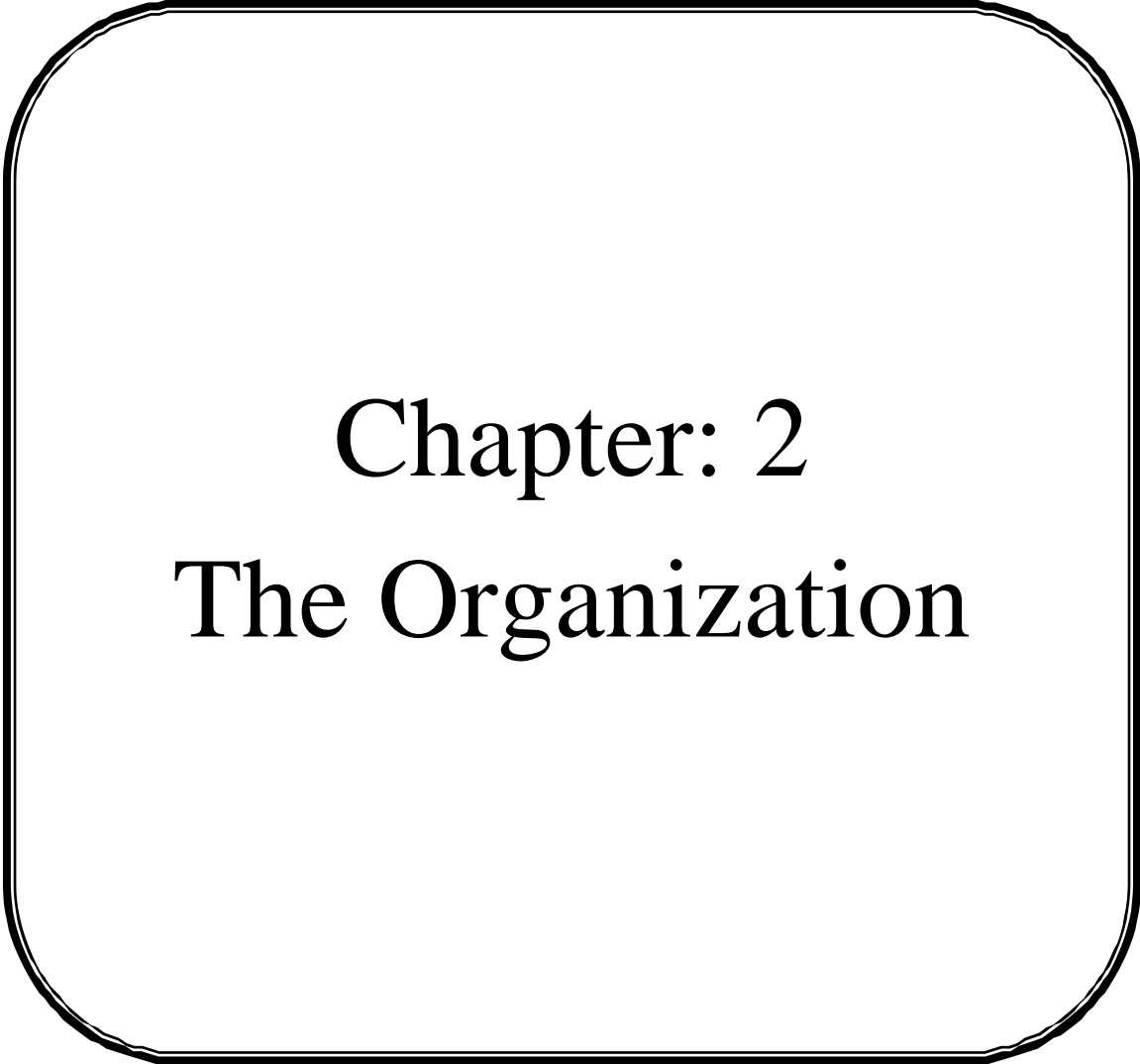
1.4.2 Secondary Sources:

To understand CMMI Level, software quality assurance, Agile method, Scrum data has been gathered from the internet and different articles and the sources have been given in the references part.

1.5 Limitations of the Report

While gathering information, analyzing and representing them I have faced some limitations. However, despite the limitations I have tried hard to prepare a comprehensive and rather interesting report. The overall limitations of the report are mentioned below:

- Some statistical and qualitative data that were needed were not fully obtained. The Finance and Accounts officials, along with the Supply Chain officials were part of core team development. Because they were very busy, we had difficulties in meeting and gathering information from them.
- Because of organizational confidentiality, I could not put or disclose some information in the report.

Chapter: 2
The Organization

2.1 An Overview of Technohaven Company Limited

Technohaven Company Limited is a CMMI Level - 3 & ISO 9001:2008 certified leading software company in Bangladesh. Founded in 1986.Technohaven has successful track records for delivering most innovative and cost-effective technical services to customers in both commercial and Government sectors. Since its inception back in 1986, stepped into the core field of ICT to cater to the needs of enterprise, governance and economy. Strengthened by a strong team of experienced professionals Technohaven has a unique approach towards continuous training and development of human resources to adapt to the market demands for the national and international venues. Technohaven is incorporating new technology to further expand client base and continue to serve clients with a little more than utmost satisfaction.

2.2 Vision, Values and Mission

2.2.1 Vision:

Powered by innovation, guided by integrity, deliver quality solutions to build The Digital Delta.

2.2.2 Values:

- Customer Satisfaction is permanent to business successso they strive to exceed customer expectations.
- Technohaven is result oriented so they seek continuous improvement through aggressive, attainable goals.
- They are committed to innovation because innovations can transform the way our customers do business.
- Great teams build great companies so they seek to attract, develop and retain leading talent.
- Technohaven aspires to lead by setting the standards that others emulate.
- They are honest and fair in their dealings with customer, partners, shareholders and each other

2.2.3 Mission:

- To maintain the leading software solution provider ensuring benefit of customers, shareholders and employees
- Developing, disseminating and exploiting the remarkable experience, expertise and knowledge of all of our people
- Developing a distinctive competence in process development and project management

2.3 Quality Management Framework (QMF)

Technohaven Quality Management focuses on following process areas:

1. Requirement Development
2. Technical Solution
3. Product Integration
4. Verification

5. Validation
6. Organizational Process Focus
7. Organizational Process Definition
8. Organizational Training
9. Integrated Project Management
10. Risk Management
11. Decision Analysis and Resolution

2.4 Quality Achievement

2.4.1 Technohaven's Achievement: CMMI Level 3 & ISO 9001

Technohaven Company Limited achieved CMMI Level 3 since 2009.The Software Engineering Institute's (SEI) Capability Maturity Model Integration (CMMI) is a respected industry yardstick used to measure the maturity of software development processes."Achievement of CMMI Level 3 rating" is a prestigious recognition of Technohaven's software engineering capabilities and a testament in its quality management system and software applications.

The SEI-CMMI Level 3 certification signifies an important milestone in the company's quality journey. Based on our belief in continual improvement, the company will focus on certification for CMMI Level 5 further. Conformance to the 17 process areas prescribed by the SEI CMMI Capability Level 3 was appraised using the Standard CMMI Appraisal Method for Process Improvement approach. The method involves the examination of many types of evidence, as well as interviews with program leaders, quality assurance and configuration management personnel, and organization and project practitioners to demonstrate standard processes are being followed. The evaluation was conducted by an independent team authorized by SEI.

Technohaven's history of process improvement includes its achievement of the ISO 9001 certification. The implementation of an effective quality management system (QMS) certified to ISO 9001 offers a clearly structured, systematic approach to improving the customer experience, help Technohaven streamline internal processes, become more efficient and ultimately meet business goals and objectives.

2.5 Who We Serve

Technohaven has nearly thirteen years' experience developing, implementing customized solutions for organizations around the world, in more than 20 industries, in public and private sectors, from startups to multinational companies.

Technohaven customers include health care, engineering / construction firms & owner / operators, manufactures, utility & communication companies, military & intelligence agencies, electricity production and distribution, sea port, finance & banking, government agencies, development agencies and many more. Through their work in many countries, Technohaven customers make the world safer and more prosperous.

2.6 Business Area

- Healthcare
- Supply Chain Management
- Finance & Banking
- Collaboration & Messaging
- Business Consulting
- E-Commerce
- Software Development
- Security
- Chemical Industry
- Electricity Production & Distribution
- Wireless & Mobile
- Telecommunication
- Information Management
- Internet Service Provider
- Portals
- Microelectronics & Technology
- Solution for Entertainment
- Entertainment

2.7 Functional Domains

2.7.1 Mobile Application Development

MobioApp is the mobile application development powerhouse. Technohaven is planning to revolutionize the mobile industry with Continuous innovation. They have students, experienced developers, members from software programming, from communications, from creative arts & crafts and from a ton of other disciplines. They are trying to brand Bangladesh as the Global Leader in Mobile Development.

They develop mobile apps for Android, iOS, Windows phone and Blackberry. They have expertise for any kind of mobile application development. Their apps are on the following markets:

2.7.2 Microfinance

The Microfin360 is a Micro-Finance Management Software specially developed for the Microfinance Institutes, NGO's and Cooperative Societies to automate their work-flow. It is Mirofinance Regulatory Authority (MRA) & domestics apex financing organization for Microfinance- Palli Karma-Sahayak Foundation (PKSF) compliance solution having rich set of features, hundreds of parameterized reports, management statistical dashboard and centralized operation facility. This software features integrated Management Information System (MIS), Accounting Information System (AIS) & Human Resource (HR) modules.

Microfin360 can be called as Credit Bureau for MFIs that serves

- Unique borrower identification.
- Product risk management
- Overlapping identification
- Platform independent operation to feed multiple data source from the MFIs

2.7.3 Simulation

Technohaven designs and develops a wide range of sophisticated modeling and simulation tools, consulting and services. Technohaven is the foremost simulator developer in Bangladesh. They have successfully developed Air Defense Artillery Fire Control Simulation System (ADAFCSS) for Bangladesh Army. This simulation includes technologies and software tools to better understand, analyze and optimize the dynamics and behavior of complex, physical, biological or geographic systems. In general, simulation is used if system behavior is too complex to be understood analytically.

Computer simulations can represent real or imaginary situations. They allow users to study or try things that would be difficult or impossible to do in real life. Simulations are particularly useful when a real-life process:

- Is too dangerous,
- Takes too long,
- Is too quick to study,
- Is too expensive to create.

2.7.4 Banking Software

As the banking services industry grapples with the challenges of the economic boom in Bangladesh, companies need to reevaluate strategies and develop more efficient business models to be in the competition of both local and international competitors.

Technohaven is the Sales & Implementation Partner of (Switzerland); World's No. 01 Banking Solutions. With experience in serving some of the largest financial services companies, Technohaven Banking Team helps clients gain a competitive advantage. Our domain expertise coupled with a willingness to take accountability for business results makes us a partner of choice for our clients.

Technohaven Banking Services offerings span the following core areas:

- Local & International Implementation
    - TEMENOS T24 (T24)
    - TEMENOS COREBANKING (TCB)
    - TEMENOS T-Risk (T-Risk)
    - TEMENOS Financial Reporting (TFR)
    - Local Enhancement
    - Customized Banking Solution Development

2.8 Products and Services

Banking IT Services: Technohaven has been providing software solutions and IT services to the banking industry for more than two decades. Our in-depth expertise entails IT and software enabled services for cash management, check management, corporate banking and business process optimization.

Business Process Automation: Technohaven provides complete suite of business process automation products and services catering to a number of verticals.

Business Process Outsourcing: Our deep roots in business process reengineering and managed services for a diverse range of clients allow us to help clients save costs and optimize service delivery.

Consultancy Service: Technohaven is the premier ICT Consultancy service provider in Bangladesh serving many large public organizations as ICT consultants for project management, ICT strategy formulation and business process automation.

Custom Software Development: Technohaven provides bespoke custom software development services for complex applications that are impossible to procure as a commercially off the shelf software.

Facilities Management: Technohaven's expertises in managing both hardware and software IT resources bring great cost savings for large organizations.

Project Management: Technohaven has a pool of highly experienced project managers who have under their belt many large IT projects at home and abroad.

System Integration: Working on large and complex IT systems has allowed us to become experts in system integration involving software systems, network systems, data centers and operational support services.

Software Testing and QA: Technohaven has a dedicated team for software testing experienced in using both custom templates for testing as well as open source testing tools.

B2B e-commerce platform – Technohaven has built a robust B2B platform which has hundreds of merchants already registered. We plan to bring a million merchants on our B2B platform within two years. The total wholesale market is 30 billion US Dollars a year. At least 10% of that market is expected to come online within 2-3 years. Technohaven's e-commerce strategy to help make that happen by overcoming the cultural and operational challenges that deter these merchants from doing online business.

Online Payment Service – Technohaven has set up a cutting edge e-wallet platform. The challenges for the online payment market are even steeper than those for e-commerce itself. Only 7-8% of all online transactions are paid online. Technohaven's strategy here is to make the payment service seamless with bank transactions and easier to operate with little or no knowledge of digital opetation.

Tax compliance service – Technohaven has built a comprehensive electronic tax accounts platform that has been launched to complement NBR's online VAT administration system. Our solution helps businesses of any size to comply with tax obligations without making any changes to their internal processes and IT systems.

ICT Knowledge Services – Technohaven is the premier ICT knowledge service provider in Bangladesh serving many large public organizations as ICT consultants for project management, ICT strategy formulation and business process automation.

E-commerce Solution

Technohaven provide customized E-Commerce solutions for local and international clients. Today e- commerce has revolutionized the system of communication and commerce. It has brought dramatic transformation in the way the consumers purchase and consume the goods and services at the online auction sites. Technohaven has earned the reputation of being the best provider of internet and e-commerce solutions to a wide range of industries. Technohaven designs, develops and manage its client's website and all these are done in a productive environment to ensure its client's success.

The client's at Technohaven gets the personal attention they deserve and because of which the relationship with our clients are maintained even after the work is done. The customer's at Technohaven gets immense satisfaction when they get the results that far exceed their expectations. Technohaven provide a wide range of e-commerce solutions to our clients and the positive feedback which we receive from them is a vital ingredient for company success. On the other hand the positive feedback that our clients receive motivates them to establish stronger relationship with us. We make your business grow. Our team of professional designer, web developers and internet market has the capability to deliver easy to use and in expensive solutions that can help bring in excellent profits to our valuable clients company. Some of the services which we provide are:

- Net Banking
- Online Transactions
- Money transfer
- Online Payments

MIS Solution

Solutions can guide you to choose and implement the right technology for your business. Technohaven's MIS solutions integrate disparate business processes and improve productivity and efficiency within enterprises. Customized MIS solutions may include HR & Payroll Management, Customer Relationship Management, Sales Tracking System, Operations Management, Accounting Management, Asset Management, Projects Management and Admin portal etc. For many of our clients, selecting one of our MIS packages is becoming a 'relationship for life'.

Some of Technohaven's MIS Solutions are given bellow:

No	Assignment Name	Name of Client & Location
1.	Automation of Construction Permit (CP) Processes of RAJUK funded by International Finance Corporation (IFC)	RAJUK, Dhaka
2.	Automation of Export Import Registration Certificate Issue Process of Office of the Chief Controller of Imports & Exports (CCI&E), Bangladesh	Chief Controller of Imports & Exports (CCI&E) funded by IFC
3.	Integrated Food Procurement, Storage and Distribution System for DG Food	Directorate General of Food
4.	Development of Food Grain Movement Manual, Least Cost Route, Stock in Transit, Movement Programming Software and Reviewing of Godown and Transit Loss	Directorate General of Food
5.	Development of customised web enabled software with all necessary features for Bangladesh Television	Bangladesh Television
6.	Project Management Services & Technical Assistance for Implementation of Strategy & Action Plan to Enhance LGED IT-ICT-MIS Resources & Capacity	Local Government Engineering Department (LGED)
7.	Consultancy for Central MIS of RAJUK, Consultancy Services for specification for Information and Knowledge Management Systems for Department of Inspection for Factories & Establishments, Department of Labour, Fire Service and Civil Defence and RAJUK	ILO RMG Project Office
8.	Design, Development and Implementation **of ERP Solution for Wage Earner's** Welfare Board	Director (Admin & Development) Wage Earners' Welfare Board Ministry of Expatriates' Welfare & Overseas Employment
9.	Computerizing the Intercity Train Seat Reservation and Ticketing Operation of Bangladesh Railway	Bangladesh Railway Ministry of Communication, Rail Bhaban, Dhaka
10.	Computerization of automated trading system of Chittagong Stock Exchange (CSE)	Chittagong Stock Exchange (CSE) CSE Bhaban, Agrabad, Chittagong

No	Assignment Name	Name of Client & Location
11.	Online networking for BASIC Bank Ltd.	BASIC Bank Ltd.
12.	Advanced SCO UNIX Training	Technohaven Institute of Business & Information Technology
13.	Customization & implementation of Technohaven Leasing & Investment System (TeLIS)	Uttara Finance & Investment Ltd.
14.	Software for Gas Supply & Demand Database	Cairn Energy Sangu Field Limited
15.	Implementation of TACPS and TEFTN Software	BASIC Bank Limited
16.	Implementation of TACPS and TEFTN Software	Bangladesh Development Bank LimiteD,
17.	Supplied, Customized and Commissioned of IGM/EGM Reporting Application (Technohaven Import Export General Manifest -TEIGEM)	APL (Bangladesh) Ltd.
18.	Turnkey Supply, installation, Testing and Commissioning of Computer Hardware, Software and LAN for Domestic Gas Customers Ledger Keeping System including 3 years maintenance.	Titas Gas Transmission & Distribution Company Ltd
19.	Feasibility study for automation of EPZs and their enterprises in terms of computer software and hardware solution in EPZs under BEPZA.	Bangladesh Export Processing Zones Authority (BEPZA)
20.	Technical & Consultancy Services for Software Projects	Novartis (Bangladesh) Limited
21.	OASIS – Workflow Automation Software	Novartis (Bangladesh) Limited
22.	Development of Rana Plaza Claim processing Application and Providing IT Support Services	Executive Commissioner of Rana Plaza Coordination Committee
23.	Design and development of Petroleum Database Management System (PDMS) for Bangladesh Petroleum Corporation (BPC) under consulting contract with HCU	Hydrocarbon Unit, Ministry of Power, Energy and Mineral Resources

No	Assignment Name	Name of Client & Location
24.	Software Development Including Mobile Application For Integrated Agriculture Productivity Program	Project Management Unit Integrated Agriculture Productivity Project (IAPP),
25.	Development of Online Case Database	Justice Sector Facility Project United Nations Development Programme

Web Development

In today's market website development plays a vital role for an organization. It is a onetime investment with huge returns. Web development solutions find its way in the implementation of business policies on the web by the use of data services. If you are looking for software consultant to develop your web application or website then Technohaven is the stoppage for you as it provides practical and reliable advises for your business. Technohaven is an expert in web development solutions. It provides services across the globe which is within the budget and is customer centric.

Technohaven web development focusing areas are:

- Web Application Development
- Web and Enterprise Portal Development
- Web Design and Development

Web Application Development:

Technohaven's expert team has taken part in hundreds of web application development projects. Technohaven is experienced in developing advanced systems with complex business logic dealing with large amounts of data and transactions. We are able to supply the clients with innovative, trustworthy web application solutions to complement your most complicated business ideas.

Key Features of Website Development:

- Appealing and professional style
- Consistent overall layout
- Consistent corporate identity
- Colors compatibility
- Rational space usage
- User-friendly interface
- Intuitive navigational schemes
- AJAX-powered interactivity
- Task-oriented workflow
- Accessibility standards

2.8.1 IT Consultancy

Technohaven is a company designed to meet the needs of today's fast growing business firms that require experienced IT consultancy support. Technohaven aims to provide companies with experienced and motivated IT consultants. They also provide support to the small to medium businesses that currently do not have support contracts.

Technohaven can provide everything from initial design and draft requirements, help with the specifications needed to satisfy business needs, advice on testing, installation, and systems integration, right through to support of clients IT infrastructure. Technohaven holds the industry best IT consultant in distinctive field such as:

- Simulation
- Port & Logistics
- Software Technology Park (STP)
- Customs Operations etc.

2.8.2 Offshore Development

Technohaven is a fast growing Offshore Software Development Company in Bangladesh. Offshore software development lets you concentrate on your competencies rather than struggling to overcome the learning curve and manage the ever-increasing resource requirements. Being a talent mine, Bangladesh is a hot destination to outsource for many companies from all across globe.Technohaven helps client optimize resource utilization, minimize risks and enhance long term profitability.

Technohaven is a leading provider of Offshore Software Development services to Solutions Software Development services such as:

- Software development
- Application development
- Database integration
- System integration
- Client server technology
- QA / Testing

Benefits of Offshore Development:

- Cost effectiveness - Salaries of IT professionals are significantly lower in Bangladesh than those in the west.
- Best Practices – offshore outsourcing companies are focused heavily on quality and continuous process improvement, offshore development centers operate at high levels of efficiency, predictability, and reliability.
- Risk minimization- High process maturity greatly reduces the risk of project failures and provides significant advantage when managing service level agreements.
- 24x7 operations - There is a time differential between onshore and offshore destinations which translates into a virtual 24/7 kind of operation for your projects.

2.8.3 QA/Testing Services

Dynamic business needs mandate superior performance of your IT systems. Your applications need to be secured and user-friendly, while also responding faster and complying with

prevailing regulations. Quality assurance (QA) and testing are extremely crucial in the software development cycle and should be introduced at the earliest stage of the project. Technohaven holds industry best dedicated Quality Assurance Resources and a wide range of comprehensive testing methods and tools to deliver only the highest quality solutions. Technohaven QA specialists are SEI CMMI certified expert in multiple technologies, platforms and standards. Technohaven Quality Assurance and Testing services focused areas are:
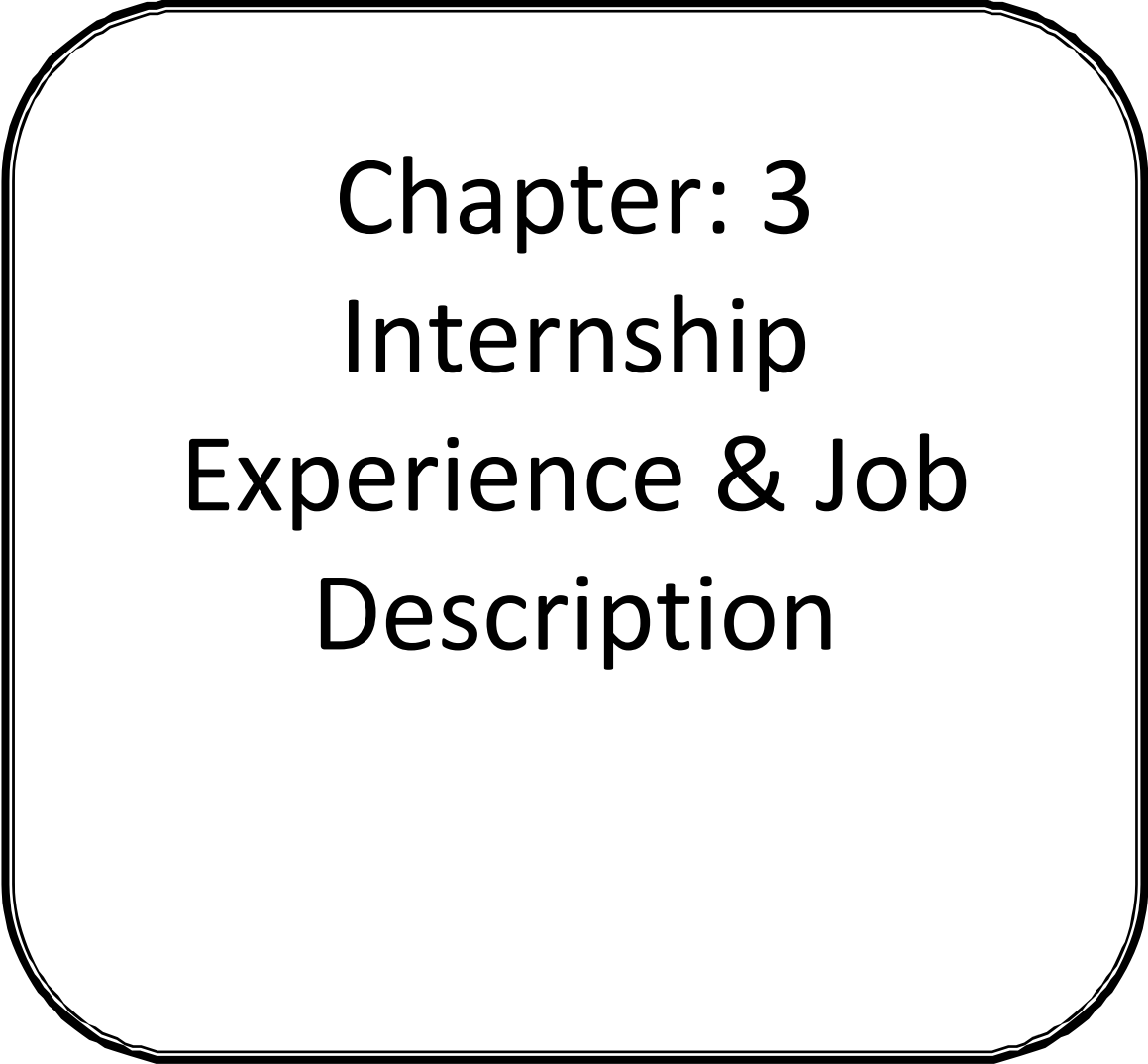
- Functional and Regression Testing
- GUI and Usability Testing
- Accessibility Testing
- Compatibility Testing
- Performance Testing
- Installation/Configuration Testing
- System/Integration Testing
- Security Testing
- Internationalization/Localization Testing
- User Acceptance Testing (UAT)

2.8.4 QA / Testing Consultancy
- Full Lifecycle Process Improvement
- QA Process Consulting
- Test Strategy Elaboration and Management

2.9 Life at Technohaven
Technohaven looks for the right talents to meet business needs and to create homely as well as a professional environment that allows them to work at their best. Technohaven believes to be an employee driven company who are innovative, free-thinking, diverse, proactive, and in need of a challenge.

Chapter: 3
Internship Experience & Job Description

3.1 Software development process of Technohaven

A software development process, also known as a software development life-cycle (SDLC), is a structure imposed on the development of a software product. Similar terms include software life cycle and software process. It is often considered a subset of systems development life cycle. There are several models for such processes, each describing approaches to a variety of tasks or activities that take place during the process. Some people consider a life-cycle model a more general term and a software development process a more specific term. For example, there are many specific software development processes that 'fit' the spiral life-cycle model. ISO/IEC 12207 is an international standard for software life-cycle processes. It aims to be the standard that defines all the tasks required for developing and maintaining software.

The international standard for describing the method of selecting, implementing and monitoring the life cycle for software is ISO/IEC 12207.

3.2 Software development activities:

3.2.1 Planning:

Planning is an objective of each and every activity, where we want to discover things that belong to the project. An important task in creating a software program is extracting the requirements or requirements analysis. Customers typically have an abstract idea of what they want as an end result, but do not know what software should do. Skilled and experienced software engineers recognize incomplete, ambiguous, or even contradictory requirements at this point. Frequently demonstrating live code may help reduce the risk that the requirements are incorrect.

Once the general requirements are gathered from the client, an analysis of the scope of the development should be determined and clearly stated.

Implementation, testing and documenting:

Implementation is the part of the process where software engineers actually program the code for the project. Software testing is an integral and important phase of the software development process. This part of the process ensures that defects are recognized as soon as possible.

Documenting the internal design of software for the purpose of future maintenance and enhancement is done throughout development. This may also include the writing of an API, be it external or internal. The software engineering process chosen by the developing team will determine how much internal documentation (if any) is necessary. Plan-driven models (e.g. Waterfall) generally produce more documentation than agile models.

3.2.2 Deployment and maintenance:

Deployment starts directly after the code is appropriately tested, approved for release, and sold or otherwise distributed into a production environment. This may involve installation, customization (such as by setting parameters to the customer's values), testing, and possibly an extended period of evaluation. Software training and support is important, as software is only effective if it is used correctly Maintaining and enhancing software to cope with newly discovered faults or requirements can take substantial time and effort, as missed requirements may force redesign of the software.

3.3 Software development models:

Several models exist to streamline the development process. Each one has its pros and cons, and it is up to the development team to adopt the most appropriate one for the project. Sometimes a combination of the models may be more suitable.

3.3.1 Waterfall model:

The activities of the software development process represented in the waterfall model. There are several other models to represent this process.
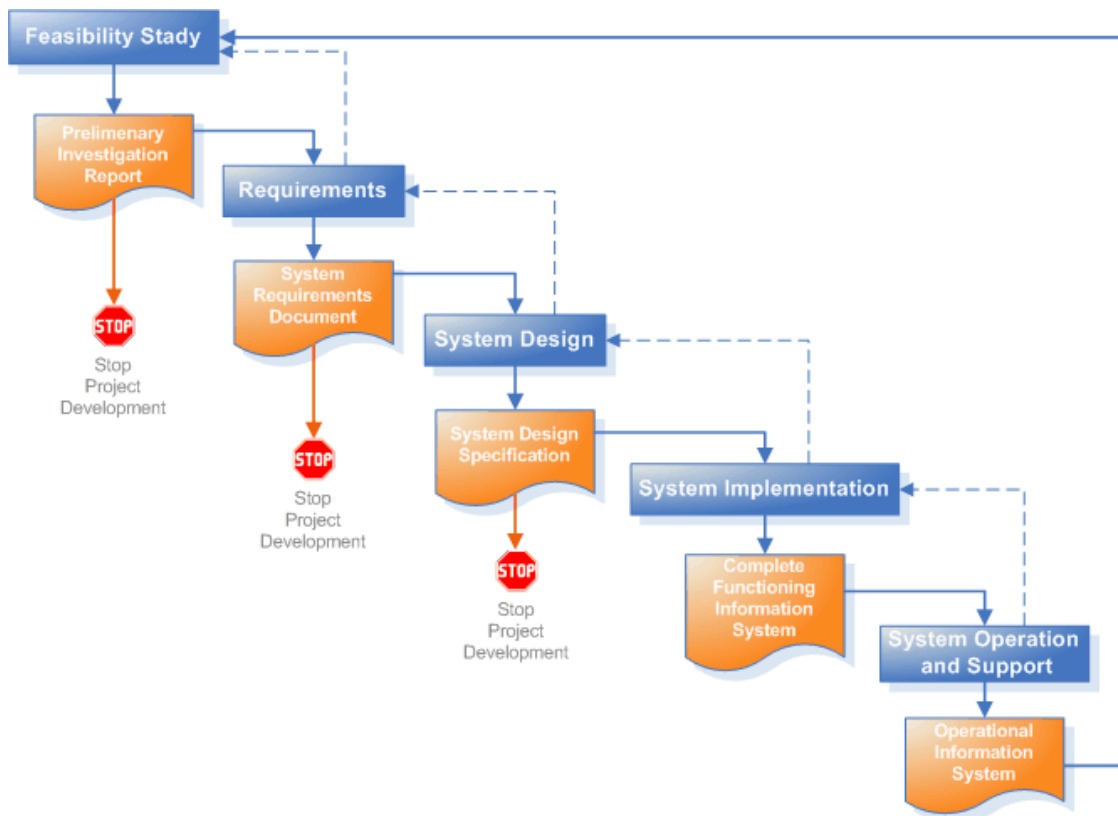

Figure: Waterfall method

The waterfall model shows a process, where developers are to follow these phases in order:
1. Requirements specification (Requirements analysis)
2. Software design
3. Implementation and Integration
4. Testing (or Validation)
5. Deployment (or Installation)
6. Maintenance

In a strict Waterfall model, after each phase is finished, it proceeds to the next one. Reviews may occur before moving to the next phase which allows for the possibility of changes (which may involve a formal change control process).

Reviews may also be employed to ensure that the phase is indeed complete; the phase completion criteria are often referred to as a "gate" that the project must pass through to move to the next phase. Waterfall discourages revisiting and revising any prior phase once it's complete. This "inflexibility" in a pure Waterfall model has been a source of criticism by supporters of other more "flexible" models.

3.3.2 Code and fix

"Code and fix" development is not so much a deliberate strategy as an artifact of naïveté and schedule pressure on software developers. Without much of a design in the way, programmers immediately begin producing code. At some point, testing begins (often late in the development cycle), and the unavoidable bugs must then be fixed before the product can be shipped. See also: Continuous integration and Cowboy coding.

3.4 Process improvement models:

3.4.1 Capability Maturity Model Integration

The Capability Maturity Model Integration (CMMI) is one of the leading models and based on best practice. Independent assessments grade organizations on how well they follow their defined processes, not on the quality of those processes or the software produced. CMMI has replaced CMM.

3.4.2 ISO 9000

ISO 9000 describes standards for a formally organized process to manufacture a product and the methods of managing and monitoring progress. Although the standard was originally created for the manufacturing sector, ISO 9000 standards have been applied to software development as well. Like CMMI, certification with ISO 9000 does not guarantee the quality of the end result, only that formalized business processes have been followed.

3.5 Formal methods:

Formal methods are mathematical approaches to solving software (and hardware) problems at the requirements, specification, and design levels. Formal methods are most likely to be applied to safety-critical or security-critical software and systems, such as avionics software. Software safety assurance standards, such as DO-178B, DO-178C, and Criteria demand formal methods at the highest levels of categorization.

3.5.1 Types of Team in a Software Firm
1. Requirement analysis team
2. Planning team

3. Designing team
4. Coders team
5. Database team
6. Testing team

3.5.2 Hierarchy of a Software Development Firm

▪ level 4 - Associate / assistant Software Engineer (basically a trainee) duration to go to next tier (1 to 1.5Yrs)

▪ Software engineer - next to ASE (1.5 Yrs.)

▪ Level 3 - Senior Software Engineer (1.5 Yrs.)

▪ Level 2 -Team lead, Technical lead (2-3 Yrs.)

▪ Level 1 - Project Manager (3-5 Yrs.)

▪ level 0 – Senior Project Manager , location manager, account manager, resource manager, delivery manager

3.5.3 Overview of Scrum:

Scrum is a lightweight agile method for software development. Scrum is named after the Scrum in rugby, which is a way to restart the game after an accidental infringement. This entry describes the software development part of Scrum.

Scrum was first applied in 1993 at Easel Corporation by Jeff Sutherland, John Scumniotales and Jeff McKenna when building an object-oriented design and analysis (OOAD) tool incorporating Round-trip engineering. At that time they needed a development method that had rapid application development and where product requirements could easily be translated into working code. These principles later became some of the basics of Scrum.

Characteristics:

Scrum assumes that the software development process is complicated and unpredictable and treats it as a controlled black box instead of a theoretical, fully-defined process. This is one of the biggest differences between Scrum and the Waterfall and Spiral methodologies, which view the software development process as a fully defined process. Most problems encountered when using these older, formal types of methodologies are:

▪ Requirements are not fully understood at the beginning of the process.

▪ Requirements change during the process.

▪ The process becomes unpredictable when new tools and technologies are used.

To manage these processes with flexibility, Scrum supplies techniques and controls to manage this unpredictable process.

Development Phase Techniques:

Team creation

Scrum believes that a development team should perform as a sport team, every team member

working independently but towards the same goal. Scrum suggests that a team has a maximum of 6 - 7 members. The team facilitator is called the Scrum master. His/her job is to implement and manage the Scrum process in the project. The Scrum team as a whole defines the practices, meetings, artifact and terminology of SCRUM for the team and the Scrum Master ensures adherence to these "norms" identified. Scrum masters serve a facilitator role and their authority is mostly indirect. Scrum masters focus most of their time in managing outside interference for the Scrum team and solving outside impediments or 'Blockers' that cannot be solved by the Scrum team. The master also focuses on ensuring transparency into the development process by maintaining the multiple Scrum artifacts defined elsewhere in this article.

Backlog creation

There are 3 types of backlogs:

- Product - Acts as a repository for requirements targeted for release at some point. These are typically high level requirements with high level estimates provided by the product stakeholders.
- Release - Requirements pulled from the product backlog and identified and prioritized for an upcoming release. The release backlog contains more details about the requirement and low level estimate which are usually estimated by the team performing the work.
- Sprint - At the beginning of each sprint, the team has sprint planning with an end result being a backlog of requirements/sub-requirements that the team anticipates completing at the end of the sprint. By completing, that means fully coded, tested and documented. These are the items that the team will "Burndown" against throughout the duration of the sprint.

Project segmentation

The whole project gets divided into periods of time with a maximum duration of 4 weeks. One period is called a Sprint and every team gets a backlog to execute within the given Sprint.

Scrum meetings

- During the sprint, the team conducts daily scrum meetings.
- The meetings are held in the same place at the same time every work day.
- The meetings don't last for more than 30 minutes.
- A scrum master is appointed.

The scrum master is responsible for asking every team member the following three questions:

1. What have you done since the last scrum meeting?
2. What has impeded your work?
3. What do you plan on doing between now and the next scrum meeting?

3.5.6 The Agile

Along with the rest of the software industry Technohaven uses agile method for the development cycle. Here a detail of agile is described.

Overview

The literal meaning of the word agile, an adjective, is "Characterized by quickness, lightness, and ease of movement." So this indicates that Agile Software development is about fast

delivery of software with more ease of development. Classically, "Agile software development is a style of software development that emphasizes customer satisfaction through continuous delivery of functional software".

Key Features of Agile Software Development:

- Iterative: Entire application is distributed in incremental units called as iteration. Development time of each iteration is small (couple of weeks), fixed and strictly adhered to.
- Active Customer involvement: There is lot of client involvement and face-to-face interaction. Every iteration is tested and approved by client. The feedback obtained is implemented in subsequent iterations; thus minimizing risk and ensuring higher client satisfaction.
- Feature driven: More emphasis is on providing the required features in the application.
- Fixed Time: Each iteration has a fixed time span in which it is delivered.
- Priority based delivery: Features are prioritized depending on customer need, development risk etc. High priority features are developed first.
- Adaptive: The methodology in general is very adaptive, so that the application that is developed can cater to inflow of new requirements throughout its development.
- Empowered Teams: The project teams are generally small and have lot of interaction and communication.
- People Centric: More emphasis is on using the adequately skilled people to do the development than on following the processes.
- Rapid development: Generally the development is done rapidly using light weight development technologies.
- More disciplined: Being rapid, everything has to be delivered correctly first time.
- Simplicity: Emphasis is on keeping things as simple as possible and being open to change.

Why Agile:

Benefits to the Customer
1. Customer is more actively involved, and gets higher priority
2. He gets to know regular and frequent status of the application
3. Requirements are accepted after each iteration
4. Since the methodology emphasizes rapid delivery, time-to-market is less. So the key functionalities can be available to use sooner.
5. Delivery is defined by fixed timescale. So customer is assured of receiving some functionality by a fixed time period.
6. More Testing is done, so better software quality is delivered

Benefits to the Project Teams
1. Project teams are involved more actively in all the stages, have to ask right question. The teams collaboratively take the decisions and are more empowered.

2. Since the development is Incremental, teams can focus on the specific requirements at any given point of time.
3. More emphasis is on developing the application only, and not on documentation. Simple and minimal documents are used to exchange the views
4. The teams receive frequent feedback as the testing is integrated; so the rework is reduced
5. Less time is spent in gathering requirements as all the requirements are not gathered upfront and are implemented as and when they arise.
6. So less time is required for planning.
7. Less cost of development as rework, management, documentation and other non-development work related cost is reduced.
8. Teams develop applications collaboratively and in cooperative environment.

Challenges involved in Agile Software development:
Agile is difficult as it requires more TESTING & active CUSTOMERS involvement. It impacts Management more than Developers. Management had to be more open, be actively involved in development process and more importantly allow the teams to take decisions.
**When to (not!) use Agile:**
Before going Agile; Ask
1. Is functionality split-able
2. Is customer available
3. Are requirements flexible
4. Is it really time -constrained
5. Is team skilled enough

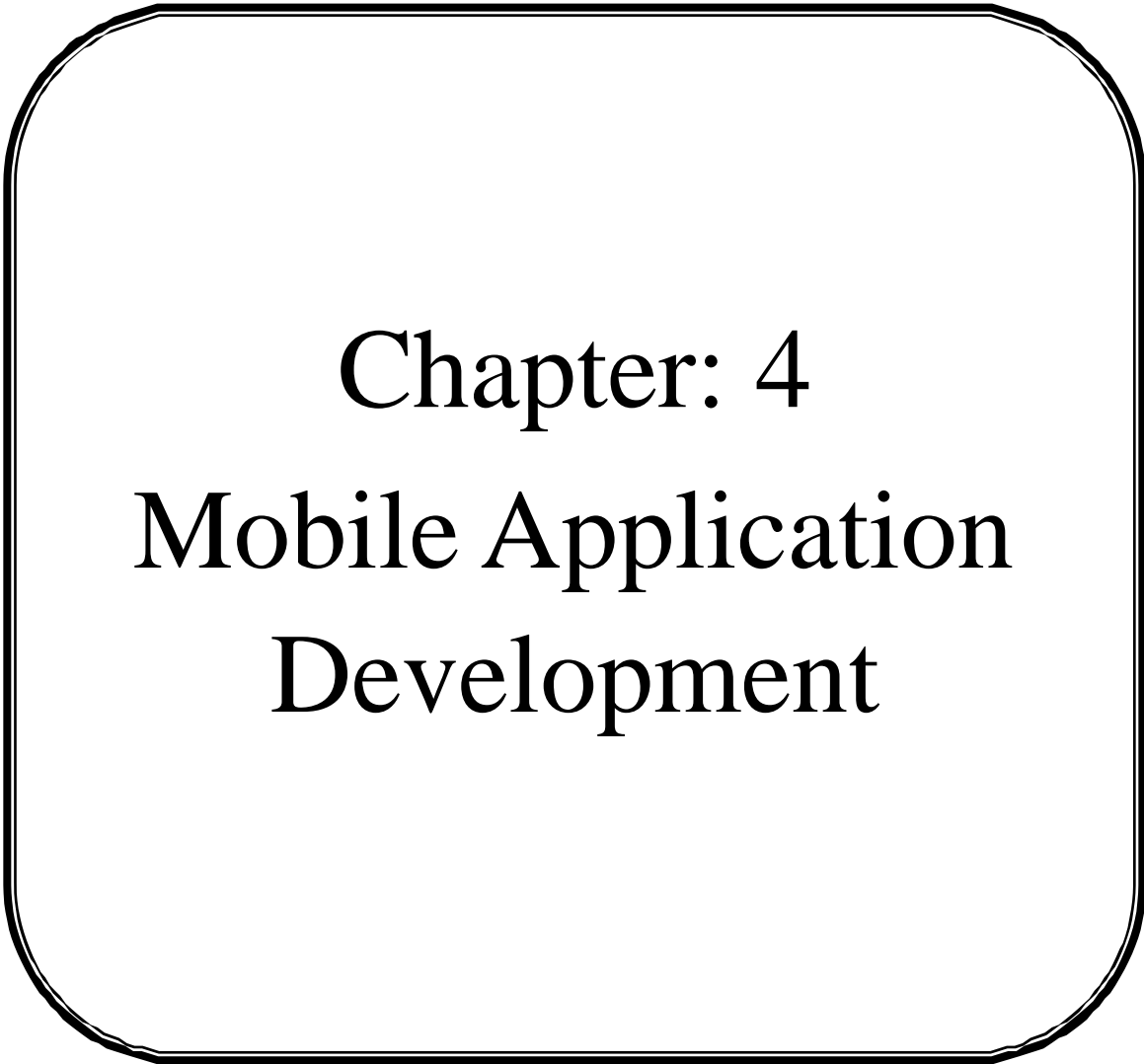**The Process of Agile Software Development involves the following:**
1. Starts with a kick-off meeting
2. The known requirements are understood and prioritized. The development is plan is drawn accordingly.
3. Relative complexity of each requirement is estimated
4. Sufficient design using simple diagrams is done
5. Test Driven Development (TDD) approach may be used. TDD emphases on "writing test first and then writing code to pass the test". It can help in avoiding over-coding.
6. Development is done, sometimes in pairs, with lot of team interaction. Ownership of code is shared when pair programming is done.
7. The code is tested more frequently. Sometime a dedicated "Continuous Integration" Server/Software may be used to ease the integration testing of the code.
8. Depending on the feedback received, the code is refractor. Refactoring does not impact the external behavior of the application but the internal structure may be changed to provide better design, maintainability. Some ways of refactoring may be add interface, use super class, move the class etc.
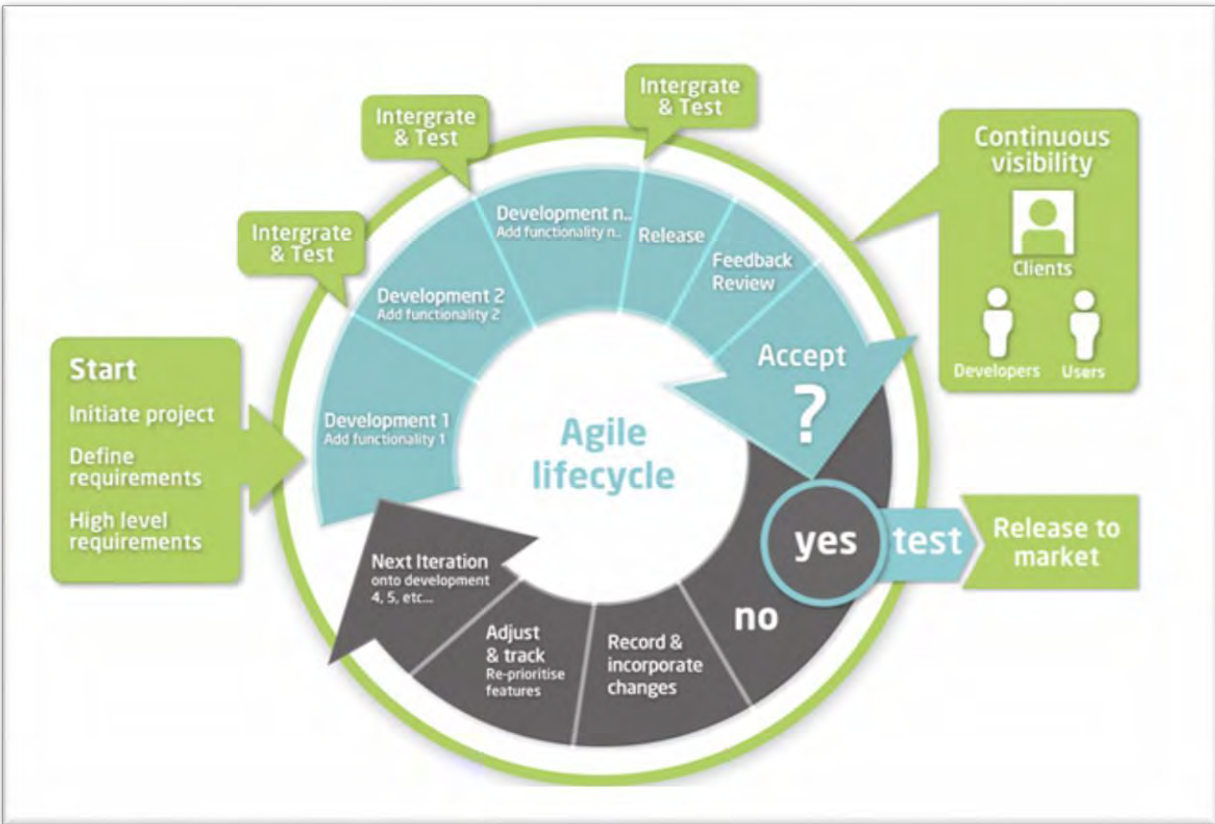
Figure: Agile development cycle

3.5.5 How Technohaven supports agile software development:

The fast-paced development and cross-silo coordination necessary for a successful agile project require organizations to visualize the scope of the project and the project schedule, orchestrate the integration and testing process, and enforce adherence to agile processes. Visualization helps development organizations to understand the project schedule and see the scope both of the entire project and of each iteration within the project. Technohaven management helps teams visualize the available resources to make sure they have the time, money, and personnel to complete the project. Additionally, Mariner helps teams organize iteration or sprint plans to manage and schedule software releases. Technohaven Team also helps teams stay aware of the scope of an agile project by keeping track of user stories within XP, managing project and sprint backlogs within Scrum, or tracking tasks for other methodologies.

Chapter: 4
Mobile Application Development

4.1 Overview

Mobile application development is the process by which application software is developed for low-power handheld devices, such as personal digital assistants, enterprise digital assistants or mobile phones. These applications can be pre-installed on phones during manufacturing, downloaded by customers from various mobile software distribution platforms, or delivered as web applications using server-side or client-side processing (e.g. JavaScript) to provide an "application-like" experience within a Web browser. Application software developers also have to consider a lengthy array of screen sizes, hardware specifications and configurations because of intense competition in mobile software and changes within each of the platforms. Mobile app development has been steadily growing, both in terms of revenues and jobs created. A 2013 analyst report estimates there are 529,000 direct App Economy jobs within the EU 28 members, 60% of which are mobile app developers.

4.2 Steps of development

1. Select an exclusive niche for your app. Decide exactly what you want your app to do and how you should present it before your future audience. See to it that your chosen niche is popular, but not too saturated.

2. Check out all similar apps in other app stores. Look up their popularity quotient by studying their download statistics, or by looking into their ratings and reviews. Also try to find out how they manage to strike that special chord with users.
   a. 5 of the Best Third-Party Mobile Cloud Sync Providers

3. If possible, try downloading similar apps, to know about their pros and cons and also to see what makes them tick, from an end-user perspective. Though you may have to spend on some of these apps, it will give you a fair idea about the competition.

4. See that your app offers something that extra something special to your users. This will let your app stand out from the rest.
   b. How to Engage the User with Your Mobile App

5. Be minimalistic with the app's features initially. Try not to cram too many things into your first release – more advanced features can be added onto your future releases.

6. Initially, develop mobile software for only one mobile platform. Do not rush to deliver the same to multiple mobile platforms unless you are absolutely sure where you are going with your app. Make sure to plan ahead and choose the right mobile platform for your app.
   c. How to Choose the Right Mobile Platform for App Development

7. If possible, make detailed UI sketches of all app screens, instead of merely writing them down. This will make it easier for you and also give the app a better finish.

8. Develop your app in-house if you can. This saves you a lot of time and money. Else, be very particular about the person or company you hire to develop your app for you. Be actively involved in every stage of the app development and test it thoroughly before submitting it to the marketplace.
   d. Hire a Professional Developer to Create Apple iPhone Apps
9. Look into the nitty-gritty's of the mobile app market you would like to target. Understand the app market's specifications and stipulations, so that you minimize the chances of rejection to that extent.
10. Set the right keyword and description for your app. This is an important aspect of app submission and may also help minimize your own app promotion efforts in the app store.
11. It is also important that you set the right price for your app. Study the pricing of similar apps in the market and price your app competitively, at par with them. Ideally, offer users a free trial edition of your app. This will let you gauge the public response to your app, without immediately inviting criticism from end-users.
    e. How to Price Your Mobile Application
12. Take your customers seriously. Listen closely to what they have to say via their feedback and app ratings. This will give you pointers on how to proceed with later versions of your app as well.

4.3 Tips:
1. Talk to your friends about the app you have in mind. They will be able to give you a third-person perspective on the same.
2. Setup a clear schedule and deadline for the release of your app. Stick to that schedule, so that you do not delay the whole process by procrastinating.
3. Ask friends to test your app before actually submitting to the marketplace. After app submission, ask them to rate and review the software – that will make it look like you already have customers.
4. Take time out for app marketing and promotion. Create a website for your app and upload photos and videos of the same online. In short, try to give your app the maximum possible exposure.
5. Keep your entire focus on the end-user. Remember, they are the reason why you are developing the mobile software in the first place!

Popular Mobile Application Platforms:
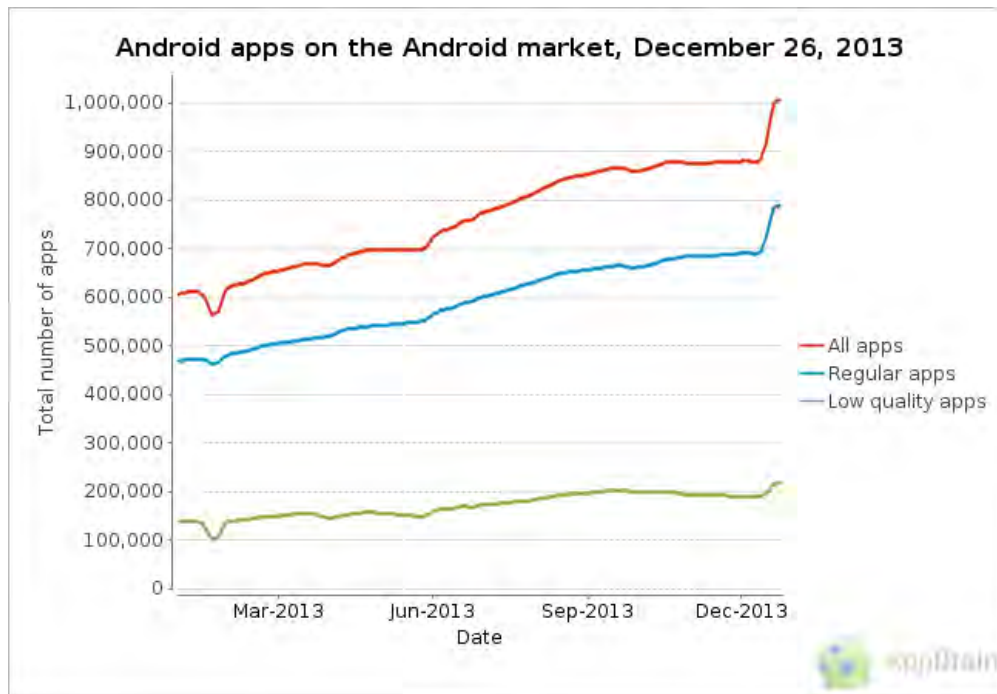- Android
- Windows Phone
- Java Featured Phone

4.4 Motivation for Android

Android, the world's most popular mobile platform

Android powers hundreds of millions of mobile devices in more than 190 countries around the world. It's the largest installed base of any mobile platform and growing fast—every day another million users power up their Android devices for the first time and start looking for apps, games, and other digital content.

Android gives you a world-class platform for creating apps and games for Android users everywhere, as well as an open marketplace for distributing to them instantly.

- Every day more than 1 million new Android devices are activated worldwide.
- Android users download more than 1.5 billion apps and games from Google Play each month.
- For developers, Android innovation lets you build powerful, differentiated applications that use the latest mobile technologies.
- Powerful development framework
- Open marketplace for distributing your apps

Graph: Number of new regular and low-quality apps that were added per month

4.5 Android Application Development

Applications are usually developed in the Java programming language using the Android Software Development Kit, but other development tools are available. As of October 2012, more than 700,000 applications have been developed for Android, with over 25 billion downloads. A June 2011 research indicated that over 67% of mobile developers used the platform, at the time of publication. In Q2 2012; around 105 million units of Android smartphones were shipped which acquires a total share of 68% in overall smartphones sale till 2012.

Chapter: 5

Overall Findings

5.1 Future of the firm in Bangladesh:

They have come a long way since then and learned a lot about making software. The Waterfall Model is now considered a flawed method because it is so rigid and unrealistic. In the real world, software projects have ill-defined and constantly evolving requirements, making it impossible to think everything through at once. Instead, the best software today is created and evolved using agile methods. These techniques allow engineers to continuously re-align software with business and customer needs.

With the advent of modern programming languages (Java, PHP, Python, .NET and Ruby), rich libraries, and unprecedented infrastructure services, we are arriving at yet another evolutionary step. To build software today all you need is a few good men (or women!). In this post we trace how we got here and where we are heading next.

They have some future plans. They are as follow: To make the country dynamic they have many projects for which they will work in the future. And they have also future plans for their firm. Such as:

Advanced Collaboration Environments and Scientific Workplaces of the Future:
Suggested productivity gains:

- 2x-10x depending on task
- Higher quality output
- Fewer changes overtime
- Better and faster decisions

Radical Collection Recently used to:

- Annotate new genome data at the firm
- Design various mission in the world
- Evaluate fusion reactor designs.

5.2 Current position and Prospective future of Technohaven in Bangladesh:

Technohaven wants to take our country a long way through development of new software and technologies. They are always up to date with the new technology emerging every day. We have seen their Mobio App team is very enthusiastic concentrating on developing mobile apps. Their plan are:

- Generating new ideas
- Developing user friendly apps
- Building their own app market

5.3 Recommendation:

There is a lot of possibility in the software industry for Bangladesh. A lot of fresh graduate are joining and the industry is becoming very powerful day by day. The talented young generation can take the industry a long way. We are already developing the software for us and exporting abroad. Through outsourcing and freelancing a lot of young people are getting their own wages. The new firms can be formed to improve the industry. But there are many obstacles too. As a developing third world country we face a lot of unwanted conditions in the way. We have to overcome those and have to make the software industry one of most powerful in the world. Our suggestions are:

- The government should proper steps to make the way for new start up.
- Young people should form their own firm.
- Business magnets should invest more in this sector.
- The ICT act should be more flexible for the developers.
- The business rules should be easier for software industry.

5.4 Conclusion:

The total period while I worked Technohaven Company was very pleasant. It will help me a lot in future life. Without the practical knowledge it is quite impossible to deal with real problem. This industrial tour has paved the way to look into the development environment and marketplace. The market does not depend on only developing quality application. It is a lot more things than those. First I had to specify what we have to develop, for whom, why and how. Understanding the user's mind and their requirements a software engineer has to think about new software.

The age is totally dependent on modern information technologies. Nobody can escape away from it. Our one step to invent new technology can take the whole world a step forward.

References:

Technohaven Company Limited
http://www.technohaven.com