

Advance Software Project Management

Assignment 1

Group members:

Name	Mail id	Personal num	contribution
Chandrabhas Raju Rachavelupula	chra16@student.bth.se	940302-3774	33.3
Maheshwar Kota	mako16@student.bth.se	921219-9070	33.3
Sai Priyatham Dongoor	sado16@student.bth.se	940617-3337	33.3

1. Introduction:

Project Management Plan for a mobile payment application is given, which is developed with Scrum software development methodology. This mobile payment application proposed is a Software Product line model i.e. feature based model of "swish application", i.e. core functionality of an already existing system 'Swish', is reused to produce a new software product along with few new functionalities in the family of similar digital payment applications [1] [2].

System Description:

The core functionality for this proposed system is from 'Swish' mobile payment application, which is used by majority population of Sweden. Swish is a mobile payment solution where transactions are between individuals, which is possible by connecting personal phone numbers to their bank accounts. This application is linked with 6 major banks in Sweden allowing it to be accessed by 90% of the Swedish population [2]. Sweden's transmission to a new cashless society is the reason for developing and improving the field of mobile payments. Swish application is secure and supports fast payment transfer, both transaction and message which acknowledge transaction happen simultaneously within a second or two [3]. Authentication of transaction is done through Bankid where details of payee can also be verified. Swish payment is limited between two individuals only, but due to continuous improvements in day to day life everything around us is evolving to great extent to reduce our efforts, this motivated us to take mobile payment domain to next level to ensure simple payment procedures with reduced effort and time [4], this motivation led to improving or extending swish by adding few more features to it, which are stated in next section

Scope and Objectives:

The need for evolving mobile payment application has motivated us to add few functionalities to already existing person to person mobile payment application, proposed functionalities are:

- Mobile ticketing i.e. buying tickets in busses, trains, trams with mobile payment instead of card or cash payment.
- Transaction with vending machines.
- Transaction between customers and vendors/retails such as Willy's, ICA etc.
- Paying government bills, OCR's along with reminder which reminds due payments.

Interface and security aspects of swish application are adopted in this application, making this application simple to use, saving customer from selecting different options for different types of transactions. reminder option is added newly in settings, where options for reminder feature can be adjusted.

Mobile ticketing

Use of mobile ticketing can be an alternative for smart cards and payment through cards in busses, trains etc. especially if we forget the smart card or forget to top-up monthly pass or if we had to travel in public transport suddenly then mobile ticketing will be of great use because of its mobility. It was adopted by government of Finland in its capital, Helsinki in 2001. From the survey conducted by Finland government to know the response of their citizens on mobile ticketing, it showed that maximum of population used mobile ticketing only when they forget cash or forget their smart cards etc. by the senior citizens, whereas children and middle aged people began to use only mobile ticketing only. In Finland, Cost of buying ticket through mobile payment is a bit cheaper than buying ticket through cash, this also motivated people to adapt to mobile ticketing [5].

Transaction with vending machines

Vending machines are found in many places like train stations, universities and places where there is maximum population density, these vending machines offer different types of goods like beverages, chocolates etc. Usually coins/cash payment is the traditional payment procedures followed for vending machines, as the environment around is shifting to a cashless society, payment option for vending machines is evolved to credit card and mobile payments [6]. More over people observe vending machines as an opportunity to losing some coins, in this aspect, this application will be helpful when we don't have enough change with us nor our credit card [7]. Mobile payment in vending machines can be done via a SMS where product serial number along with its price is sent to a number which is registered for that vending machine, then the purchase is shown on a screen on vending machine for verification, if at all the purchase is wrong then the transaction/purchase can be cancelled and new purchase can be done, this method is followed by WY wallet application and selecta application which is specifically introduced for mobile payment for vending machines of selecta company, the problem with the WY wallet applications is, due to switching between windows of WY wallet leads to decrease in consistency of the system [6].

Transaction between customers and vendors i.e. retail stores.

With increase in development of mobile payment domain due to its ease of use and quick transactions, many organisations such as Accumulate, iZettle, Seamless and 4T Sweden are adopting mobile payment services, few such services are SEQR, Bart, Payair [8]. Research on mobile payment in retail stores is adequately proceeding because of its increasing popularity [10] [9] [The value of mobile marketing for consumers and retailers: a literature review]. In the proposed study/application, mobile payment is done by sms, where cost of purchased goods is sent to a phone number assigned to that store then the transfer of money and a message which acknowledges it happen simultaneously.

Paying government bills, OCR's/ fines along with remainder which reminds due payments.

E-governance applications were developed by most of the countries for the convenience of public for Paying fines, taxes, government bills such as water, current bills etc. People forget things and late payment or not paying these bills might lead to fines or some other punishments [11][12]. As further improvement in E-governance, mobile payment should be introduced in this domain, allowing people to pay their bills sitting on the couch. This proposed application allows payment of fines (OCR's), government bills, taxes through 'sms'. A number which is linked to government banks should be given in the OCR which can be used as a phone number to send sms, amount to be paid is sent via sms, authentication will be verified and transaction will be completed. Moreover, to avoid

forgetting bills payment a remainder is installed which reminds us about the deadline for paying that bill. Options for selecting time to adjust reminder is possible in settings.

Objectives of Project Management Plan:

- Needs of stakeholders concerning usability, reliability, efficiency, security should be identified, to make sure that features in our application satisfies all the criteria's.
- Effort to develop each feature should be estimated with the help of planning poker and total effort should be calculated.
- Features should be broken into small executable tasks to reduce complexity while developing.
- These tasks should be allotted to 2 sprints backlogs by considering the estimated effort, avoiding much effort.
- Project plan should be formulated and gnat chart should be created to extract steps to execute sprints.
- As a part of scrum methodology, quality criteria should be recognized to determine the quality of the product.
- Identified risks, their impact, severity should be assessed along with their mitigation strategies.

2. Stakeholders:

Stakeholders are the group of people who are affected by the proposed application (Nutt and Backoff 1992: 439). Stakeholders identified are: banks, government, organisations who install vending machines, retail merchants, customers, project management team which comprise of scrum master, requirement analysts, designer, developers, testers. Attention to stakeholders is very crucial for success of any project, as their satisfaction determines the success or failure of the project [13]. The needs and influence of stakeholders on our project are discussed as follows:

Banks: banks are responsible to ensure security and reliability in transactions to gain customer loyalty [14]. Phone number linked to bank accounts are assigned to retail stores, vending machines, ticketing system in public transportation and for bills are authorized by banks itself. The mobile payment through sms service is the forward step towards cash less society ensuring public comfort because of its ease of use and mobility [4].

Government: it is the key stakeholder of this proposed project, with increase in mobile communications access to the internet, lead the way to modernization of public administration through mobile-government and electronic-government, which are 24 hours/7 days per week services [12]. As this project is the forward step towards a cashless society, which helps in avoiding petty corruption, allows public to pay bills without much strain and with the remainder option to ensures prompt payments of bills, taxes, fines etc. [11]

Vending machine companies: cash less transaction reduces organisations effort of collecting the coins/cash in vending machines regularly, moreover these are the places where cash transfer happens all the time and managing these vending machines with credit cards and mobile payments is a forward step for country towards a cashless society [6].

Retail Merchants: paying through mobile payment application maintains clear record of transactions, as this application is linked with their bank account, all the details are stored in transaction history of our bank account, ensuring fair business. Using mobile payment system

reduces cost by avoiding fraud loss and by reducing payment processing fees', which is the next major cost after labour costs is the main reason for retailers to opt mobile payment systems [8].

Customers: customers are the people who uses this application, this technology of mobile payment allows easy transfer of money to personals, bill payments, to buy tickets in public transportation, it is easy to carry a mobile phone that to carry a bus pass (smart card), credit card and cash. As this application is secure and authentication is maintained, it is very safe to use this application, there won't be any trust issues [6][15].

Project management team: is the main key stakeholder who is responsible for the development of this application, the role of this team to gather requirements from the stake holders, analyse the requirements, design the system, develop it, test it and deploy it. Security of the system is also developed by them. Project should be planned with the given budget and care should be taken to make sure that budget is not exceed during the development process, at the same time maintaining quality and not compromising in security aspects as everyone will be a bit more worried about 'money'.

3. Planning Scrum Project:

Scrum software methodology is an iterative model which was developed to avoid the difficult and irritating traditional models, where occurrence of changes during project is minimized to great extent by vigorous requirements gathering, analysis and design to obtain high quality, but in Scrum methodology this limitation of plan- driven approach is surpassed by allowing/assuming changes in the requirements as inexorable but also mandatory to acquire/develop product which best suits the present environment or market [15]. To ensure it, in scrum customers attend scrum meetings frequently during the project and assess whether the project is proceeding as planned or deviating.

Scrum methodology signifies short iterations where project requirements are divided into short executable tasks and these tasks are scheduled in iterations called sprints, as per their priorities, feature which gives maximum customer satisfaction is executed first in the sprint and so on. Only few tasks are executed/developed in a single iteration/sprint. Each sprint lasts up to 6 weeks and after the end of each sprint a working deliverable is produced. Scrum meetings are held after the end of each sprint where want went well and what did not are discussed and documented for future use, changes required are discussed and those tasks are redeveloped as per the customer needs [16].

Features/requirements:

Scope of the project, i.e., 'what needs to be done' is finalised in a sprint meeting, in the next sprint meeting after scope is identified, features for this project are formulated by discussing with the customer [17]. Features from this mobile payment application are:

S no.	Features:

1.	Person to person(P2P) transactions.
2.	Mobile ticketing i.e., paying public transport tickets from this application.
3.	Mobile payment at vending machines, where payment can be done with a sms.
4	Customer to merchant transactions i.e., paying at retail stores with this application.
5.	M-government payments i.e., paying government bills such as fines, OCR's, taxes etc. via this application.
6.	Remainder, which reminds us about our pending bills and their deadlines.

Table 1: Features/ Requirements of this Mobile payment application.

Product backlog:

After formulating features by discussing with customers, they are divided into small executable tasks, which are known as product backlog, is formulated in this sprint meeting. Effort estimation for these tasks is done with planning poker.

Sno.	tasks	User stories
1.	Analysing swish application functionality and reusing its P2P transaction functionality.	As a feature based model, this application opted its core functionality from the swish mobile payment application which is used by most of the population of Sweden [2]
2.	Develop the application to support transactions with public transportation of the country	for this feature, transportation department should install new ticketing system which accepts mobile payment services.
3.	Develop this application to support transactions with vending machines	For this feature, bank should allot a unique number to every vending machine and vending machine company should built machines which accept such sms based payment.
4.	Develop this application to support transaction at retail stores	For this feature, banks should allot a phone number which is linked to its bank account to every retail stores, and retail merchants should also accept this application.
5.	Develop this application to support m- government	Government should support this application by sending a number on every OCR so that payment can be

		done by sending a sms to that number and transaction is completed.
6.	Develop reminder application, which reminds about pending bills and their dead lines	Here application must be linked to database of m-government where details of our bills can be viewed.
7.	Develop settings page for reminder option where time to remind due dates can be adjusted.	Here application must be linked to calendar and alarm option, so that date and time for reminder can be adjusted.

Table 2: Product backlog

Effort Estimation:

Effort estimation is done by using planning poker method, where individual estimation for the tasks are written on some paper by every team member. Those estimates are not shown to other teammates as it might influence their opinion, after estimation is done by every team member, those estimations are discussed among team members and variance between their estimates is discussed among themselves, estimates can be reformulated after discussions and again discussions to justify their estimates is done, this is repeated until final estimates are formulated by team member's justification. Product owner and customer's value of the product is also stated in the scale of 1 to 5 [18].

Feature	Product owner value	Customer need	Effort estimation in story points
Feature 1	4	5	8
Feature 2	3	4	6
Feature 3	3	5	7
Feature 4	4	4	4
Feature 5	5	5	7
Feature 6	3	5	5
Feature 7	2	5	5

Table 3: Effort estimation

List of Activities:

Product backlog is prioritized into 2 sprints and each sprint is of 3 weeks based on product owner and customer's priority. Feature 1, feature 4, feature 6 and feature 7 are developed in sprint 1 as these features from the proposed application gives maximum customer satisfaction and effort required to develop these applications is also considered while prioritizing them. Where as in sprint 2, remaining features (feature – 2,3 and 5) are developed. After the end of each sprint, sprint retrospective meetings are conducted where aspects which caused difficulties were discussed among team members and are documented [15]. The working deliverable produced in each sprint is evaluated by customer in these meetings and assess whether developed tasks are working as expected or not. If they are not working as expected, that task is redeveloped depending on the customer requirements [16].

Resource allocation for Sprints:

- 2 designers, 5 developers, 2 testers and a scrum master are required to execute first sprint.
- 1 designer, 4 developers, 2 testers and a scrum master are required for second sprint.

Activities in project plan	Resource allocated	Effort estimation In days
Product backlog Scope, objectives are identified and features are formulated and are subdivided into tasks and are prioritized in to sprints. 1.	3 Requirement analysts, 2 designers, customer, 2 developers.	15
2. Sprint backlog 2.1. Sprint 1 2.1.1 daily scrum meetings 2.1.2 Sprint planning 2.1.3 Development phase 2.1.3.1 Feature 1 2.1.3.2 Feature 4 2.1.3.3 Feature 6 2.1.3.4 Feature 7	2 designers, 5 developers, 2 testers and a scrum master are allotted for sprint 1.	30
2.1.4 Sprint review meeting 2.1.5 Sprint retrospective meeting		
2.2. Sprint 2 2.2.1 Daily Scrum meetings 2.2.2 Sprint Planning 2.2.3 Development phase 2.2.3.1 Feature 2 2.2.3.2 Feature 3 2.2.3.3 Feature 5 2.2.4 Sprint review meeting 2.2.5 Sprint retrospective meeting	1 designer, 4 developers, 2 testers and a scrum master are required for second sprint	30
3. Testing the Product 3.1 Integration testing Ensure that no regressions are present after integrating developed tasks from both sprints.	3 testers are allotted for integration testing	5
4. Documenting development process 5. Review the project 6. Deploy the application to customer		5

Table 4: List of activities

Risk management plan

Need of risk management plan plays a vital role in project development to identify, analyse, control and management possible risks that occur during the project development life cycle. Care should be taken such that risks which occur frequently are avoided during the project development as finding and mitigating the risk takes a lot of effort and time, so potential risks which might occur during the project and their mitigation strategies are identified before the start of the project [20].

We defined the probability of risk occurrence and impact of risks with ordinal scale as low, medium and high where impact is based on the number of stake holders influenced by risks.

risk	impact	probability	Mitigation strategy
Misunderstanding user requirements	low	medium	Product backlog should be defined properly involving all stake holders and the product owner with clear understanding of requirements.
Sprint delays or delays in completing user stories	medium	high	Resource allocation including manpower should be estimated using planning poker
Inaccurate effort estimation	low	medium	Proper effort estimation to allocate time for the unexpected workload and complete project in time.
Cost overruns	medium	medium	Budget of the project should be kept in mind while preparing architecture for project development.
Ineffective communication	medium	low	Regular scrum meetings should be conducted and all the team mates along with customer should actively participate in discussions about project development for the success of the project.
Lack of knowledge on scrum methodology and lack of development skills	high	medium	Training should be given to the technicians before the start of the project.
Development team not working together	high	low	This is a serious issue, team members should work with unity with team spirit, moreover a good project manager can motivate team members to work with integrity.
Developed product fails to meet customers' requirements.	high	low	Scrum methodology supports changes in requirements even during the development of the project, tasks which could not reach customers' expectations were assessed by customer during sprint retrospective meetings and that task can be

			re-developed depending on the customer requirements.
--	--	--	--

Quality Criteria:

Evaluating the developed application to meet customers' requirements according to ISO 9126 quality standards to ensure success of the product in the market [19]. Quality criteria for the developed mobile payment application is as follows:

features	Quality criteria	metric	description
Feature 1	adaptability Re-usability	Ability to adapt	Ability to adapt and reuse of the swish application is measured here.
Feature 2	efficiency	Time behaviour	Time taken to complete the transaction is measured.
Feature 3	reliability	consistency	Measures regular working of the application
Feature 4	Maintainability	legibility	Measures system performance of handling multiple transactions at a time.
Feature 5	Usability security	authentication	Measures security aspects of a transactions.
Feature 6	Functionality usability	Operability	Measures ease of use of the feature
Feature 7	Performance efficiency	Execution efficiency	Measures degree of usability

Reference:

- [1] S. Kumar and Rajkumar, "Test case prioritization techniques for software product line: A survey," in *2016 International Conference on Computing, Communication and Automation (ICCCA)*, 2016, pp. 884–889.
- [2] E. Kazan and J. Damsgaard, "Towards a Market Entry Framework for Digital Payment Platforms," *Communications of the Association for Information Systems (cais)*, 2016.
- [3] M. L. Bech, Y. Shimizu, and P. Wong, "The quest for speed in payments," 2017.
- [4] L. Andersson, *Challenges of introducing and implementing mobile payments: A Qualitative study of the Swedish mobile payment application WyWallet*. 2016.

- [5] N. Mallat, M. Rossi, V. K. Tuunainen, and A. Öörni, "An empirical investigation of mobile ticketing service adoption in public transportation," *Personal and Ubiquitous Computing*, vol. 12, no. 1, pp. 57–65, 2008.
- [6] Y. Chen, *Exploring Consumers' Payment Behaviours at Completing Micro-Transactions with Vending Machines in Sweden*. 2015.
- [7] R. C. Whigham, *Vending machine purchase via cellular telephone*. Google Patents, 2003.
- [8] T. Apanasevic, "Mobile payments: Main trends in the retail industry," 2014.
- [9] T. Apanasevic and J. Markendahl, "Stakeholder's expectations: Mobile payments in retail in Sweden," in *13th International Conference on Mobile Business, 2014 (ICMB 2014), London, June 4-5, 2014*, 2014.
- [10] T. Apanasevic, "Factors Influencing the Slow Rate of Penetration of NFC Mobile Payment in Western Europe.," in *ICMB*, 2013, p. 8.
- [11] R. Schware and A. Deane, "Deploying e-government programs: The strategic importance of 'I' before 'E,'" *info*, vol. 5, no. 4, pp. 10–19, 2003.
- [12] I. Tozsa and B. Budai, "M-government in Hungary," *Mobile Government Consortium International*, pp. 414–424, 2005.
- [13] J. M. Bryson, "What to do when stakeholders matter: stakeholder identification and analysis techniques," *Public management review*, vol. 6, no. 1, pp. 21–53, 2004.
- [14] U. Varshney, "Mobile payments," *Computer*, vol. 35, no. 12, pp. 120–121, 2002.
- [15] S. Jalali and C. Wohlin, "Agile practices in global software engineering-A systematic map," in *Global Software Engineering (ICGSE), 2010 5th IEEE International Conference on*, 2010, pp. 45–54.
- [16] V. Vinekar, C. W. Slinkman, and S. Nerur, "Can agile and traditional systems development approaches coexist? An ambidextrous view," *Information systems management*, vol. 23, no. 3, pp. 31–42, 2006.
- [17] M. A. Awad, "A comparison between agile and traditional software development methodologies," *University of Western Australia*, 2005.
- [18] N. C. Haugen, "An empirical study of using planning poker for user story estimation," in *Agile Conference, 2006*, 2006, p. 9–pp.
- [19] B. Zeiss, D. Vega, I. Schieferdecker, H. Neukirchen, and J. Grabowski, "Applying the iso 9126 quality model to test specifications," *Software Engineering*, vol. 15, no. 6, pp. 231–242, 2007.
- [20] M. Concha, M. Visconti, and H. Astudillo, "Agile Commitments: Enhancing Business Risk Management in Agile Development Projects," in *SpringerLink*, 2007, pp. 149–152.

Task Name	Starting Date	No. of Days
1. Product backlog	08.Mai	15
2. sprint backlog	29.Mai	60
2.1. Sprint 1	29.Mai	30
2.1.1. daily sprint meetings	29.Mai	2
2.1.2. sprint planning	31.Mai	3
2.1.3. development phase	05.Jun	20
2.1.3.1 Feature 1	05.Jun	6
2.1.3.2 Feature 4	13.Jun	5
2.1.3.3 Feature 6	20.Jun	5
2.1.3.4 Feature 7	26.Jun	4
2.1.4. Sprint review meeting	30.Jun	2
2.1.5. Sprint retrospective meeting	04.Jul	3
2.2. sprint 2	08.Jul	30
2.2.1. Daily sprint meetings	08.Jul	2
2.2.2. sprint planning	10.Jul	3
2.2.3 development phase	15.Jul	18
2.2.3.1. Feature 2	15.Jul	6
2.2.3.2. Feature 3	22.Jul	4
2.2.3.3. Feature 5	25.Jul	8
2.2.4. sprint review meeting	04.Aug	2
2.2.5. sprint retrospective meeting	08.Aug	5
3. Testing	15.Aug	5
3.1. integration testing	15.Aug	5
4. Documenting the project	22.Aug	2
5. review the project	24.Aug	1

2.
2.1.5. Sp
2.
2.2.5. sp
2.



