

Adapting SCRUM in Data Analytics Solution Development for Telecom Operators in Bangladesh

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Abstract—As usage of internet varies time to time depending on the modes, minds of users, Telecom services need to understand the tastes or requirements of users and develop a dynamic data analytics solution to sustain in the competitive market. In this paper, we have proposed an approach to data analytics or BI (Business Intelligence) solution taking into account the influence of Bangladeshi people's user experience of mobile data. We have shown the proper separation of analytical reporting and extract-transform-loading (ETL) part to easily adopt Scrum method for business intelligence report development of telco operators. Scrum doesn't mean that always the service delivery will be faster with high accuracy. But, for telco operators service development and delivery should be accurate and faster. Our proposed model is very much capable of obtaining high accuracy and agility at the same time where the same requirement rarely come back to product backlog for having an error in the previous development cycle.

Keywords— *Scrum; Agile; BI; Data Analytics; ETL; Data Warehouse, Business Intelligence; Developing Country; Telecom Operator; Bangladesh*

I. INTRODUCTION

The word "Internet using is a luxury" is just a myth now for Bangladeshi people of every level. In the past, they didn't have a clear concept about the use of digital services. At present, a child of two years old is also using digital services through the smart mobile phone which was an imaginary thing in Bangladesh. So, we can easily feel the digital growth of Bangladesh and an increasing number of customers or users of different digital services. Now internet service has become a basic need for every people and there is no dependency of this with elite or poor society. This becomes true for the active presence of some competitive telecom operators. Due to the changing economy of Bangladesh, the maximum number of persons is now capable of having a smartphone and 4G mobile connection to their phone. Just a few days ago Bangladeshi mobile operators have successfully completed the deployment of 4G from 3G mobile communication. And this has opened the door of better internet user the experience to a customer of a remote place where broadband service is not possible in near future. This country is now heading towards the developing country. It is expected that this largest least developed country (LDC) considering its population and economic volume may leave the LDC stage by 2024 by enhancing better health and

education, lower vulnerability and significant economic growth [1].

Customer's mode and mind of using digital services are getting variation every day due to high-speed data connection in a small mobile device. There populating different service users like; facebook application user, youtube application user, twitter application user etc. every day where their data-usage requirements are also different. Some users use mostly facebook, some users use mostly youtube and some use any from other applications. Even many users from Bangladesh don't know about internet services but, use facebook application all the time. They know facebook as internet actually and they mostly purchase facebook internet packages. So, data package could be designed as 4GB internet package, youtube package, facebook package etc. We can see that mobile operators are providing internet service by package system to the users. And to design these packages, they need to analyze user's data usage statistics. Every data user will not purchase a fixed data package; if other operators provide better package plan they can even change their existing operator and switch to a better one. So, the telecom industry should work properly behind the user usage statistics to offer the best plan for each user depending on their demand. Otherwise, in a competitive market, other operators can win many users from their existing operators. And a less competitive mobile operator may lose a valuable user from both voice and data service which is not expected. For sake of the own existence of telecom operators in the competitive market telecom operators have to collect internet using statistics and store collected data to a data warehouse. So, telecom operator should design proper analysis model with different prediction approaches or mathematical tools depending on the collected user-usage historical statistics of customers. Analyzing user mind is a really tough task which could be changed by time so, there should develop a business intelligence solution with proper analysis and forecasting.

The word business intelligence (BI) or data analytics refers to a collection of techniques to get a better insight into the business. And there are different sequential actions to achieve this such as identifying, extracting, and analyzing business data to support decision making. Business Intelligence applications have better analysis capabilities where prime analysis is done with On Line Analytical Processing (OLAP) and data mining

tools. Generally, business data used by analytics applications come from different heterogeneous and distributed operational sources which are integrated into a data warehouse (DW). And data integration is really very task in the data warehousing process which needs right extraction of the data from different sources. After data extraction, there needs to transform these data of different sources into a common format and then load these transformed data into DW doing proper data cleansing task. This data extraction, transforming and loading operations are popularly known as ETL (Extract-Transform-Loading) task. ETL tasks are too complex, error-prone, and time-consuming [2, 3]. Now business looks for fresh and uniform data for their data analytics or BI solution with new challenges. And to achieve this ETL task of data warehousing needs to be real-time [4]. To make this real-time or right-time data warehousing there needs to develop agile and flexible ETL tools [5] which can rapidly generate and modify/update executable code based on the changing requirements.

We know that need may vary from user to user and needs are changing very rapidly. More importantly, the recent economic condition of Bangladesh is completely different from the last era and also changing rapidly towards betterment. And to adapt to this changing condition BI solution development process should follow a flexible and agile approach. This paper is designed with the following sections. Section II describes the proposed scrum (agile approach) method for BI solution development. Section III describes the better BI solution following scrum and section IV analyzes the feasibility of the following scrum. Finally, some concluding words are focused in the conclusion given in Section V.

II. SCRUM METHOD FOR DATA ANALYTICS/BI DEVELOPMENT

Agile Analytics implementing scrum is a development choice, which may not prescribe the methodology of what to do for solution development. A proper team culture should be developed within the development company to practice scrum. Now scrum [6] (Fig. 1) has become the most popular agile framework and many developers use the words scrum and agile alternatively.

Scrum maintains some simple sequence of straightforward actions where all the solution requirements are gathered into in a product backlog. From available solution requirements in product backlog there designed some sprint backlog. Each sprint's duration is normally 2-4 weeks depending on workload where each sprint could be viewed as a solution or service development release. Depending on the volume and priority of available requirements in the product backlog, sprint number may vary. Most important part of this scrum practice is designing a sprint backlog and to do this there held a sprint planning meeting of half-day long or day-long duration. Normally different stakeholders of the solution sit together to observe the whole workload and divide the workload into daily activities (D1, D2, D3, D4, D5) considering 5 working days in a week. And there stakeholders are from the role Product Owner, Scrum Master, and Scrum Team. Rapid modifications or changes in DW and BI solution could be adapted easily with this scrum approach. There are also many other development models like; waterfall follows many rules, regulation and documentation to release a simple requirement. And these types of models spent more than 50% time in unproductive tasks where scrum is straightforward, flexible and production friendly doesn't waste time to maintain predefined strict rules and regulations. Telecom operator normally needs to release a BI development requirement very shortly as they are more customer-centric and needs to reach customer within shortest possible time to compete with other telecom operators available in the market. And a short release is done with the bellow sequence of actions.

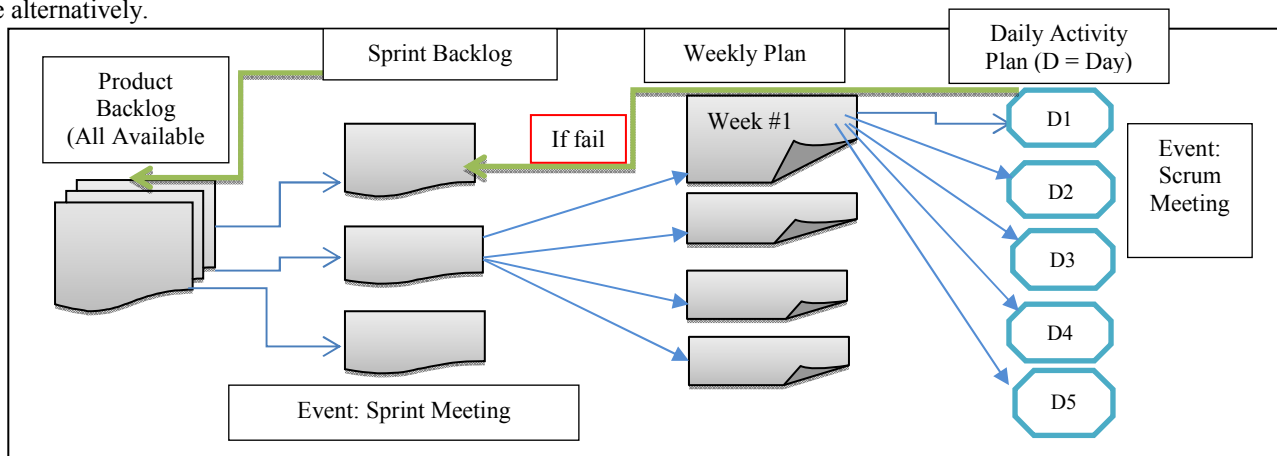


Fig. 1: Scrum framework, an agile approach.

Fig. 2 shows the input conditions of a sprint planning meeting and the outcome where product owner, scrum team, scrum master and other stakeholders sit together to define the sprint goal and create sprint backlog.

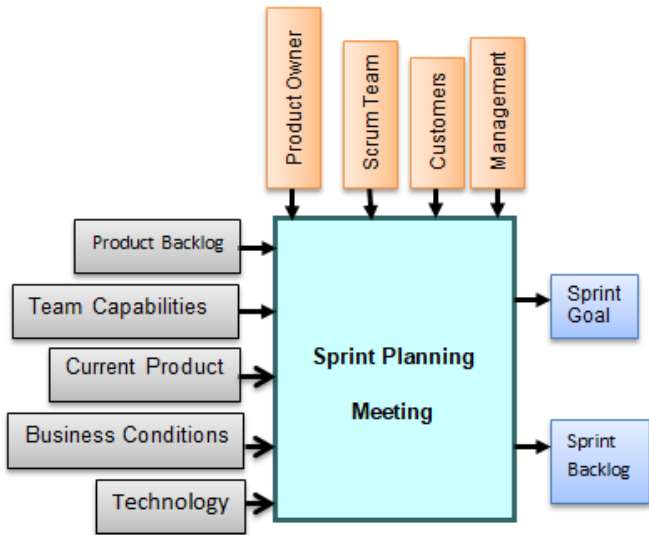


Fig. 2: Sprint planning meeting input and outcomes.

III. BI SOLUTION FOR TELECOM OPERATOR

Basically, the scrum approach could be reached by making every step of DW/BI process agile. Following this scrum BI solution can be considered as an integration of two layers:

- An agile (scrum) information collection layer (ETL, DW)
- An agile (scrum) business analysis (BA) layer

Information collection and storing procedure deals with the different data source, data model and data integration. If there is a change in the data source or in data integration then scrum will ensure that the required change will be done rapidly with minimal effort. Different internal and external data sources consisting of relational, semi-structured, multidimensional data are extracted and integrated into a DW following an agile approach. In scrum framework development scope of work doesn't lock and any small development requirement could be placed into the product backlog. Depending on the current requirements in product backlog several sprints could be planned where the developer can quickly deploy the new development without any massive procedure or set of rules, regulation, and documentation. If any development requirement comes into information collection layer, then scrum quickly handles the requirements without hampering the analysis layer. Accordingly also handle the development requirements of the analysis layer. Data collection or integration processes are done through data access interface that hides the technical aspects of data stores, such as location, storage structure, access language, API and storage technology [6]. So this data processing related OLTP

(Online Transaction Processing) activities are done into a virtual layer and this virtualization helps to do changes without any side-effect to other layers. According to [7, 8] “data virtualization is the technology that offers data consumers a unified, abstracted, and encapsulated view for querying and manipulating data stored in a heterogeneous set of data stores. Data virtualization means on-demand data transformation, on-demand data integration, and on-demand data cleansing”. Data virtualization separates the ETL processing from analysis business logic which facilitates the scrum framework.

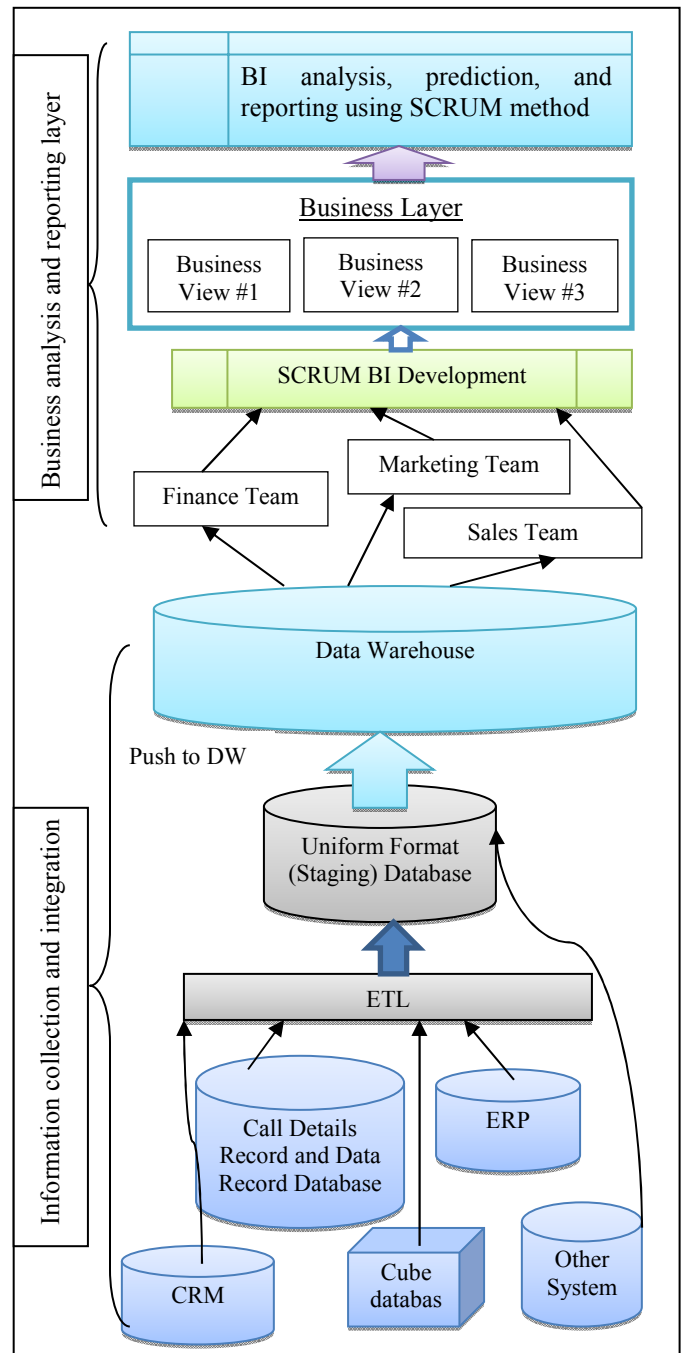


Fig. 3: Layered BI solution model following the scrum framework.

Fig. 3 illustrates a two-layer data analytics or BI solution development approach adapting scum framework. In our proposed model there is a clear separation of ETL processing tasks (OLTP) and business analysis (OLAP) for intelligent reporting. Telecom operator runs their business with the help of many transactional databases where billions of transactions are happening every hour. Among these transactional systems call record details and data (internet) usage keeping databases are a heavy weighted database. Because there occur many transactions and they are happening most frequently. Real-time user statistics of these databases are fed into a common format keeping database several related ETL processes which later push this relevant informaiton to central DW. Now, if there need any new development in data collection layer then it could be achieved easily without knowing about other layers as shown in Fig. 3. And scrum development easily handles the development requirements. Scrum team also work on the specific business logic if required to define the next package plan for a customer analyzing his/her usage history. Before start analysis scrum DW/BI development team design star schema using telecom operators dimension and the fact table. Fig. 4 describes the organization of the star schema of telecom operators in Bangladesh where we can see some vital dimensions (like; package service) which really matters a lot to the customers.

of internet usage of the customers. And these customers should be offered with various feasible data packages within shortest possible time. And to achieve this, instead of using the traditional approach of using a sequence of action to achieve a business intelligence task we will follow the agile approach minimizing the sequence of many unnecessary steps.

For any development requirement, development task in a traditional approach, we may follow sequential steps like; business analyst > DW Architect > DW Modeler > ETL Developer > BI Developer > Data Quality Analyst > Customer which follows a sequential approach and really a lengthy process. Following these steps for a simple development may delay the release time which is very infeasible for a mobile operator as they have to reach the customer in shortest possible time. Many steps might be unnecessary for the intended development task [9]. Our scrum model follows the bellow simple agile workflow where irrelevant steps are skipped to achieve a release. Suppose, there needs a development in ETL process then, responsible ETL developer will do development skipping unnecessary steps. As mobile operator need real-time and very accurate analysis to treat with a customer, any requirement; big or small is very important. Our proposed DW/BI solution development approach following scrum (agile method) framework and

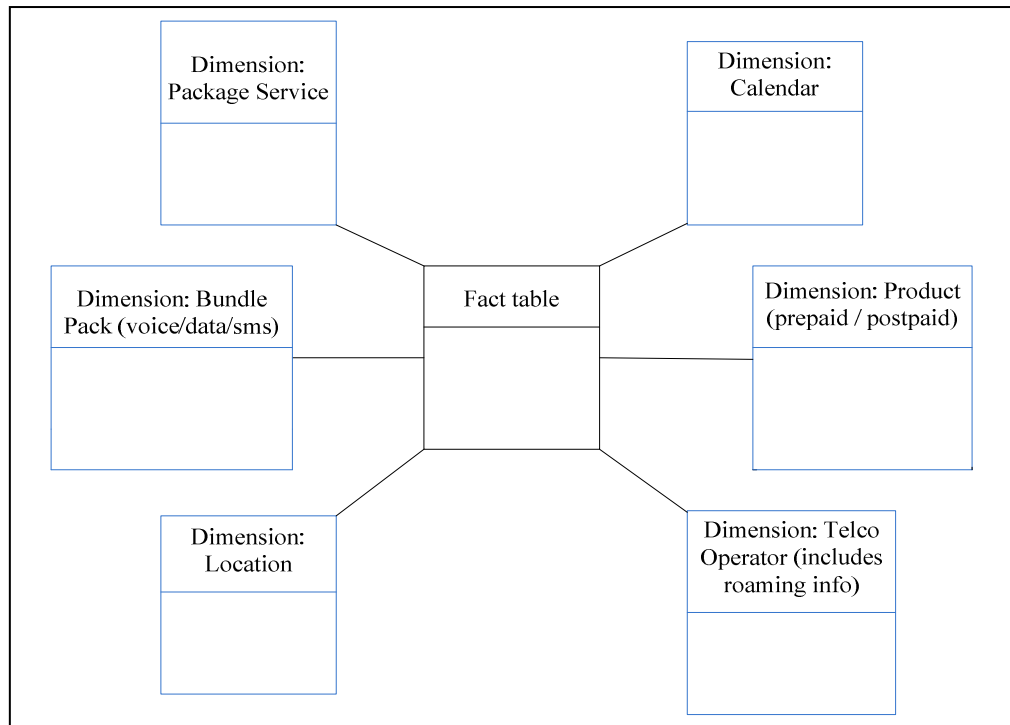


Fig. 4: A typical star schema of a BI solution for telecom operators.

We know fact table works with some numeric values like; sales values, unit values etc. And the designing process of a bundle package and other relevant packages is very customer-centric and real-time. Business logic for these customer-focused dimensions depends on the previous nature

development model depicted in Fig. 3 can make the development process flexible and economic which is very helpful for providing better service in a country like Bangladesh. Requirements should be handled quickly by engaging more developers as they can work parallel in scrum model. Sprint release follows a simple sequence like Fig. 5.

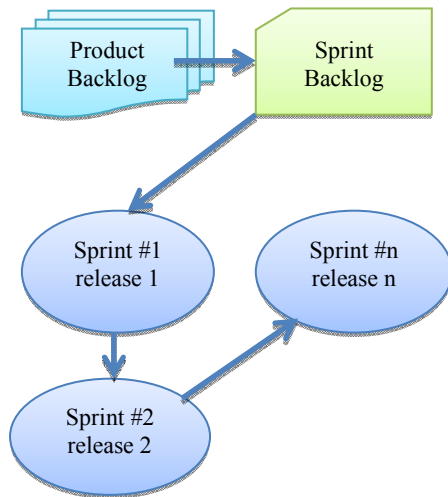


Fig. 5: DW/BI solution release in scrum framework.

IV. FEASIBILITY ANALYSIS OF SCRUM FRAMEWORK FOR BI DEVELOPMENT OF TELCO OPERATOR IN BANGLADESH

We are considering the recent economic perspective of Bangladesh and digital demand of customers for designing data analytics or BI solution. We already discussed that with the changing economy customer's digital demand also become so dynamic. The Bangladesh economy is charging towards record growth figure for the second consecutive year, driven by double-digit growth in the manufacturing and construction sectors. Gross Domestic Product (GDP) growth in fiscal 2017-18 is likely to be 7.65 percent, up from 7.28 percent a year earlier, as per the estimate of the Bangladesh Bureau of Statistics [10]. Fig. 6 shows the GDP Growth Trend of Bangladesh.

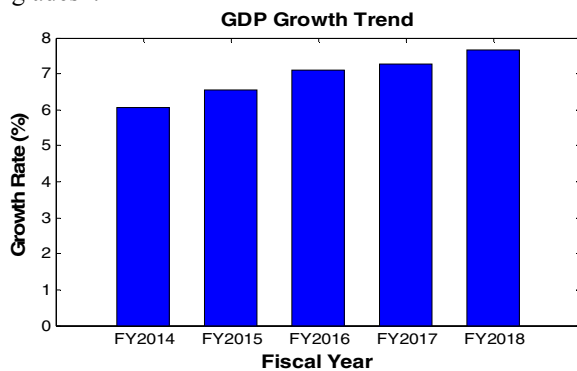


Fig. 6: GDP Growth of Bangladesh [10].

We are discussing the economy of this country because the economic situation has a huge impact on customer's mode, mind, and usability. Fig. 7 shows per capita income trend which is really quite impressive.

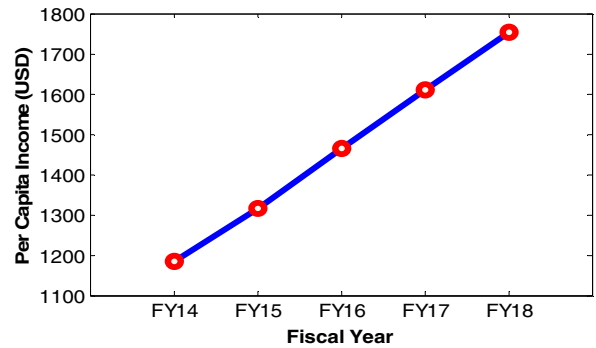


Fig. 7: Per capita income of Bangladesh [10].

V. CONCLUSION

A limited number of researches have done focusing on the telecom industries faster BI solution development focusing the customer mind and current economic growth of Bangladesh. To compete and sustain in the market telecom operator must analyze the user mind within shortest possible time following the prescribed agile method. It is not technically feasible to follow other software development model like; waterfall to meet user requirement with short duration of a release. We think our agile BI solution model (Fig. 3) and agile work-flow is able to minimize unnecessary communication, documentation inside the development team and will able to provide faster service to customers.

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