Business Process Intelligence: A Case Study of Request a Ride

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Abstract: *Within this great expansion in the use of technology in all fields and the competition of service providers, there is need to use various technologies such as business intelligence to present, analyze the data and improve the current systems to meet the new technologies, increase the efficiency of systems and attract new users. In this paper the request a ride process will be improved using Business intelligence (BI) enhancement technology. Business intelligence (BI) aims to improve the analysis of Business Process Models (BPMs). The request a ride process is a process that allows the customers to request a ride by sending a ride request via mobile phones. Using Business intelligence (BI) will improve the BP of request a ride process and enhance the services provided by this system. The primal objective is Reengineering the business process to enhance the services using three steps to produce the To-Be business process: eliminate and compose some notifications, add rating feature and optimize the looking for driver activity and finally automation of discount calculation process. Therefore, it will increase the quality of this services and makes the customers more satisfied.*

Keywords: Business process (BP), Business process models (BPMs), Business process management (BPM), Business intelligence (BI), Request a ride (RR)

1. Introduction

Business process is a set of related, structured operations that produce a service or product that meets a customer's needs. Also, the business processes are vital to any enterprise. Business process management (BPM) use to manage and improve business process and it provides a broad range of facilities for organizations to design, implement, control, and analyze their business processes [4].

Business intelligence (BI) enhance business performance by making actionable information available and visualize for the managers to help in decision making [1]. The term business intelligence can also be defined as a set of information that has been filtered, processed, analyzed and transformed into knowledge and insight. forth more, intelligence is value-added information that can be relied on and used in decision making. Business intelligence has the ability to enhance information usage by improving the capacity to organize, analyze and process huge volumes of data [2].

2. Literature Review

In this section, recent studies in the field of business intelligence will highlighted, in addition issue related to process of delivery organizations

2.1 Recent Studies

The ability to design business processes quickly and effectively is one of the success factors for companies, due to their contribution to increasing dynamism and improving order processing. Therefore, a study facilitates the monitoring of the risks in the business with regard to performance. In the practice, the monitoring of the performance in a business process through indicators is tailored in the Business Intelligence context. The result of

the study explains how bi can support methods for integrated management of process-risk [3].

In another way, researchers developed a process mining demonstrator which is a type of business intelligence. It is aimed to process requests for employees through an interactive experience. As the processing of requests at the same time often requires high manual efforts. This development process has introduced modern end-to-end processing of orders, where the interactive experience depends on the perception of the relationship between the physical process and the creation and operation of physical processes and their digital images based on the level of the end-to-end process in the learning factory environment, and this tool may contribute to clarifying the optimization of end-to-end order processing [5]

Another study revealed the results of using the business intelligence in specifically mining processes in modeling production planning processes with the aim of enhancing the use of mining in commercial operations. A case study was made of a company operating in the manufacturing industry that had implemented ERP systems. The study used event logs from the company's database for the analysis process, and the process model was discovered through Heuristic Miner. The results of the study show that the process model helped to illustrate many of the activities and possible paths of the production planning process well [6]

Similarly, another study revealed the potential for mining use in operations, by conducting a case study for an agricultural chemicals company supported by ERP systems. The case study focused on analyzing the procurement process, as the procurement process includes many activities related to the purchase requisition creation and approval, the purchase order, quality inspection and good receipt. Interviews were conducted with the procurement department staff in order to obtain the standard procurement process. Then, data was extracted and organized event logs

with Disco to discover the process model. The analysis phase detects the natural and non-normal routes in the purchase process. The results indicate that this model is expected to lead to increased efficiency during the procurement process in terms of reducing the cycle time, but at the time there are some problems related to uncontrolled activities, data migration, cultural issues, in addition to some bottlenecks related to technical issues. Finally, the company must address these problems in order to realize the benefit of operational efficiency and thus the long-term strategic benefit in implementing ERP [7].

2.2 Delivery Organization Process

Shao et al, in 2014 they conducted a study that focused on focused on the service decisions of express delivery companies and the impact of learning effect on the express delivery industry. They suggested a two-period model, this model aims to analyze how learning affects the quality of service in the delivery industry, as the quality of services plays an important role in the development of industry. the model relied on studying the best decisions of a fast monopoly company in two different scenarios myopia and farsightedness respectively, and The best decisions were highlighted for each scenario. In addition to studying the effect of learning on them, After that, the model was expanded to include two competing companies, with the aim of devising institutional balance decisions and studying the effects of learning under competition. In addition, they discussed the impact of the price war on the development of the industry the results obtained from the two scenarios were compared, which showed that the level of service quality is positively related to the learning effect process. In addition, the learning rate increases with the efforts made by companies to improve the quality of their services [8].

In another study was also conducted that aims to describe and analyze the performance of online food delivery companies. In addition to analyze the content of these companies' websites for the purpose of using them as a site for conducting commercial transactions. The study was based on the qualitative exploratory approach and data was collected and analyzed from 30 samples of companies operating in the online delivery sector. Reviews of their websites were also conducted through several main aspects including content, ease of use and functionality, the results of the review led to the content obtaining the highest good percentage, followed by functionality and usability, which indicates the importance of clarity and objectivity of the site and striving to make it easy for the customer to understand in order to obtain the expected results. The results of the study found that the online delivery service is growing rapidly, and innovation and attention to customer comfort have contributed to an increase in the number of new users of this platform as well as easy access to mobile phones (smart phones) and the Internet network, which in turn contributed to the emergence of a large number of platforms that provide Delivery Services. The results of the study will contribute to the development or improvement of strategies for companies that provide online delivery services, and despite the significant growth of this new business model, it needs to be further refined in terms of creating and operating sites [9].

In 2019, a comprehensive literature review was conducted, which aims to develop a model to link the effectiveness and efficiency of administrative processes with the quality of service delivery and customer retention. The review discussed the mediation of automation in supply chain management and its relationship to the model. The review proved that the continuous progress in developing the infrastructure for e-commerce enhances the relationship between good management and customer retention. The review has contributed to highlighted on the problems related to e-commerce and its management along with the effects of contemporary technologies in the automation of modeling processes in the work of fast companies, especially for those responsible for corporate performance. Moreover, the review indicated that the current model needs to conduct experimental research in order to test this model [10]

There are five factors that directly affect customer satisfaction (availability, responsiveness, reliability, completeness and professionalism of service) in An experimental study that was intended to provide a comparison of customer satisfaction between the two largest American companies (FedEx and UPS) that work in the field of parcel delivery. The study was conducted on university customers, and the questionnaires were distributed among several departments / units of the university, in order to be used for comparison analysis, and a T-test was used for independent samples to compare the customer satisfaction rates for both FedEx and UPS. The results indicate that there are no statistically significant differences in the service quality assessments provided by the two subsidiary companies in the delivery of parcels, because these companies offer the same level of customer satisfaction. Finally, the study may contribute to finding clear insights about the quality of services in the field of parcel services industry and satisfaction Customers, in addition to assisting customers in making the appropriate selection among the transportation companies that meet their specific needs [11].

3. The As-Is Ride Request Process Model

The As-Is Request a Ride process was built by Bizagi studio. Bizagi studio allows building a business process, data model and forms. It also allows writing an expression to control the processes. In this section a business process model, data model and forms of the Ride Request process will be discussed.

3.1 Business process model of Request a Ride:

The BPM model of current Ride Request presented in Figure 1.The model has three roles, they are:

3.1.1 Request Ride (RR) Process
This role represents the RR process which will be at the middle between the customer and the driver to manage the following functions:
- Receive the customer requests which include (number – location).
- Track all RR vehicles locations.

- Find the nearest available vehicle one to the customer location.
- Send requests to the nearest available vehicles include the location of the customer.
- Count estimated time and price then send to the customer for approval.
- If the customer cancels the trip the system will calculate cancellation fees and add it to the customer wallet to be counted in the next trip.
- Calculate the actual trip price then send to the customer and driver.
- Save all of this information in the Database.

3.1.2 Request Ride process

This role represents the customer who has a smart phone application and needs a ride in which he can ask for the nearest available vehicle and get a reply that the RR driver will come in a specific amount of time. The following are the available functions included in the RR smart phone application (customer interfaces):

- Open and log into the RR app on your device
- Type your destination into the "Where to?" section
- Select the type of vehicle you would like X or XL.
- Get reply of the estimated price and estimated time of arrival.
- Tap request and then confirm the pickup location
- Wait for your request to be accepted by a driver
- Just wait for your driver to arrive.
- Check the driver location on the map and notified when the driver is close to the pickup location
- The customer chooses the method of payment (cash or credit card)
- Evaluate the RR driver.

3.1.3 RR Driver process

This role represents the RR driver who has a smart phone application in which he can receive the customer request .The following are the available functions included in the RR smart phone application (RR driver interfaces) :

- Receive customer request from the system.
- Accept the tripe.
- Track the location of the customer.
- Show map and the point to the target (the customer).
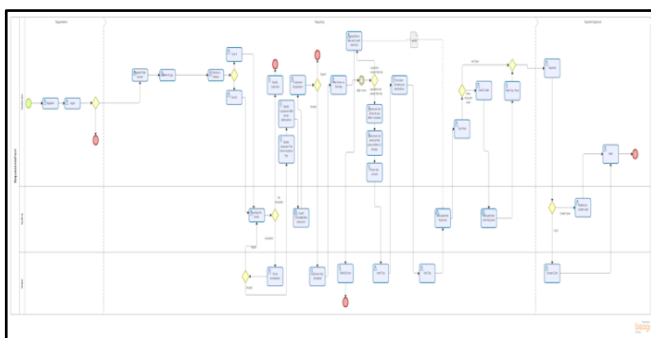- End the trip and send it back to the RR system for verification.

Figure 1: As-Is Ride Request Process Model

Table 1 shows the value added analysis for Request a Ride system.

Table 1: Value added

Process (step)	performer	Step label (VA,NVA,BVA)
Download the app	customer	BVA
Open the app	customer	BVA
Create an account	customer	BVA
Login to account	customer	BVA
Select the service (Eat, Ride)	customer	VA
Set the pickup location	customer	VA
Select ride mode (X,XL)	customer	VA
Calculate estimated price	system	VA
Confirm request of the car	customer	BVA
Looking for nearest car	System	BVA
Send the request to the driver	system	BVA
Accept or reject the request	driver	VA
notify the customer the driver accept trip	system	NVA
notify the customer with driver information	system	VA
notify the customer the driver will arrive in 5minuts	system	NVA
notify the customer the driver will arrive in 1minuts	system	NVA
notify the customer the driver arrived	system	VA
Start trip	driver	VA
End trip	driver	VA
Calculate the total price	system	BVA
Select payment method	customer	VA
Complete payment	customer	VA
Calculate the balance	system	VA
Rate the trip	customer	BVA

3.2 Data Model of Request a Ride

The data model contains three masters entities (customer entity, driver entity and request a ride entity). Also contain on two parameters entities (payment entity and vehicle type entity);

1) Requests for a ride entity contain relations with customer entity, driver entity, destination entity and vehicle type entity.
2) Driver entity contains relations with vehicle type entity and location entity.
3) Customer entity contains relations with payment entity and location entity.
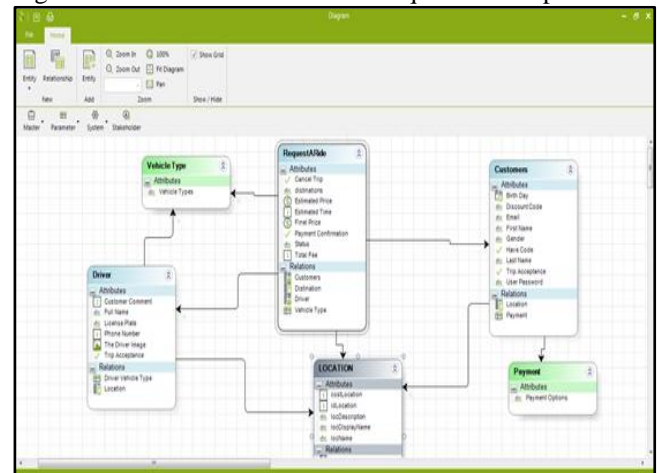
Figure 2 shows the data model of Request a Ride process.

Figure 2: Request a Ride Data Model

3.3 Define Forms

One of the most important advantages of using Bizagi studio is to define forms. In this section the forms will be discussed.

Figure 3 shows the first form, which is the Register form, where the customer can fill the required personal information.

Figure 4 shows the Login form, where the customer can login the system.

Figure 5 shows Where to Go form, where the customer is able to choose the destination from the presented map.

Figure 6 shows Vehicle type form, where the customer is able to choose the vehicle type (size X or size XL).

Figure 7 shows Acceptance Trip form to enable the driver to accept a trip.

Figure 8 shows Driver Information form, it shows the driver information to the customer.

Figure 9 shows Cancellation form, where the customer is able to cancel the trip.

Figure 10 shows Discount code form to enable the customer to enter the discount code.

Figure 11 shows a trip price.

Figure 12 shows Payment Method form, in this form the customer is able to choose the method of payment (Cash or credit card).

Figure 13 shows Payment Confirmation form, it enables the driver to confirm the payment.

Figure 14 shows Rate form, where the customer can rate your trip from 1 to 5 , 1:low satisfaction, 5:high satisfaction.
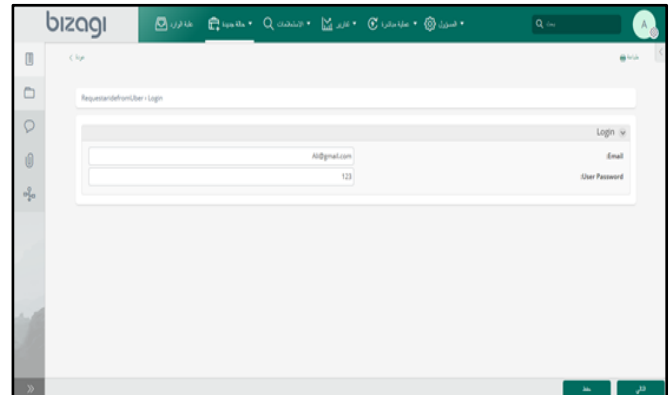
Figure 4: Login Form
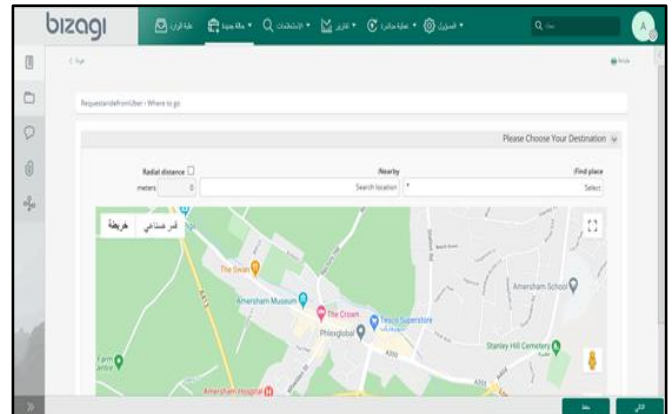
Figure 5: Choosing Where to Go Form
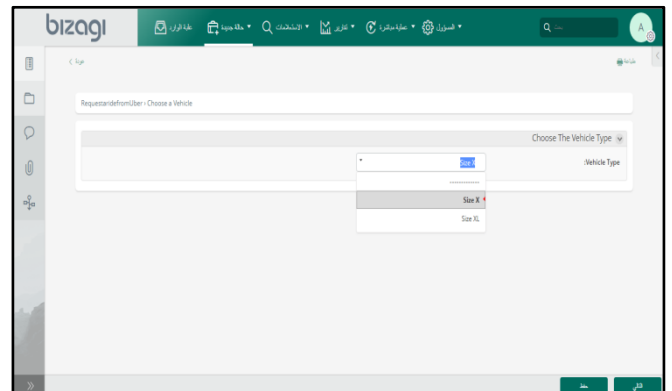
Figure 6: Vehicle Type Form
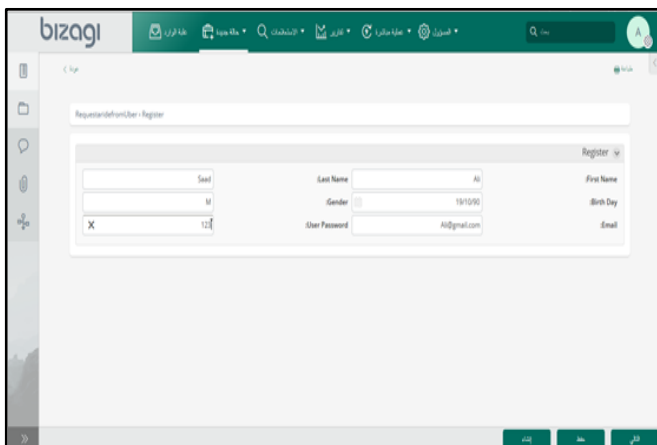
Figure 3: Register Form
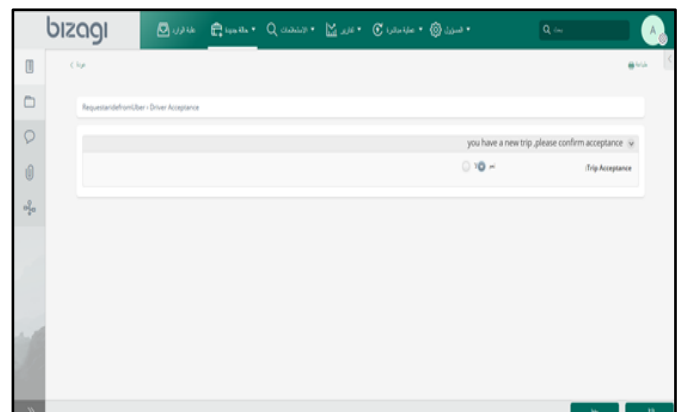
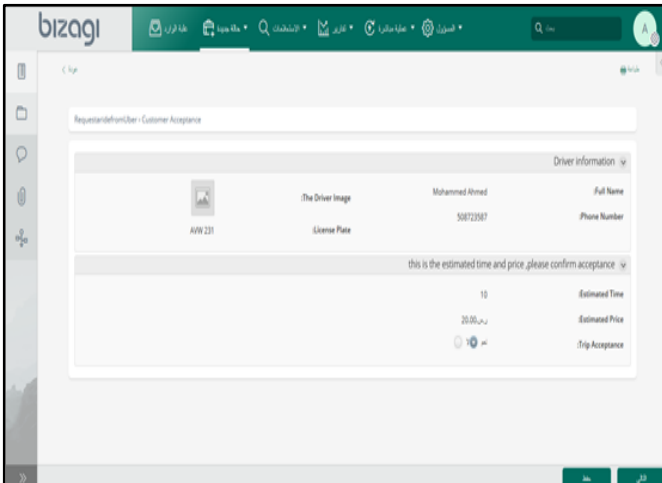**Figure 7:** Acceptance Trip Form (for Driver only)

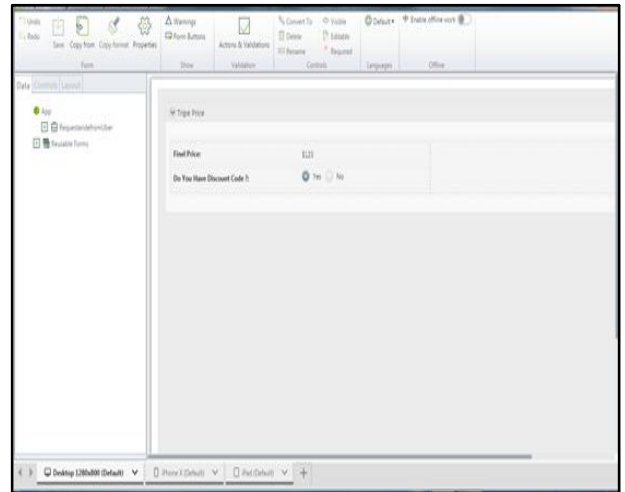**Figure 8:** Driver Information Form
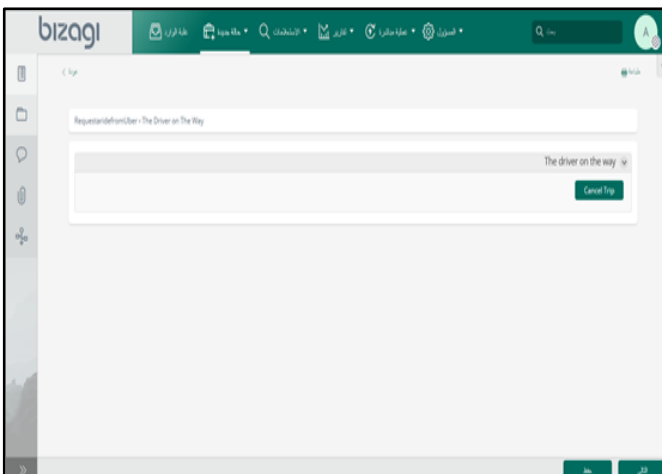

Figure 11: Trip Price Form
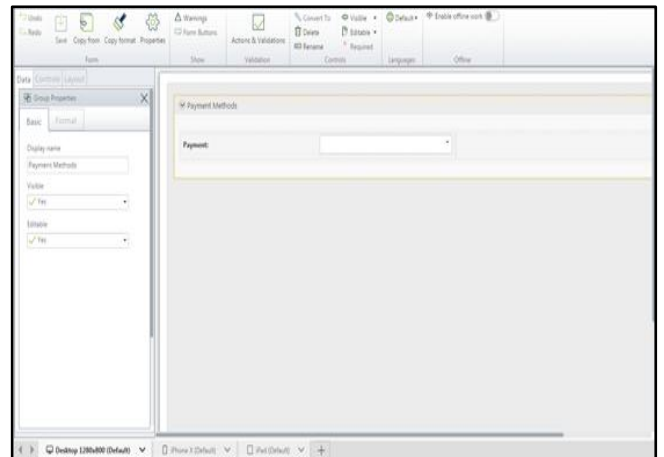

Figure 9: Cancellation Form

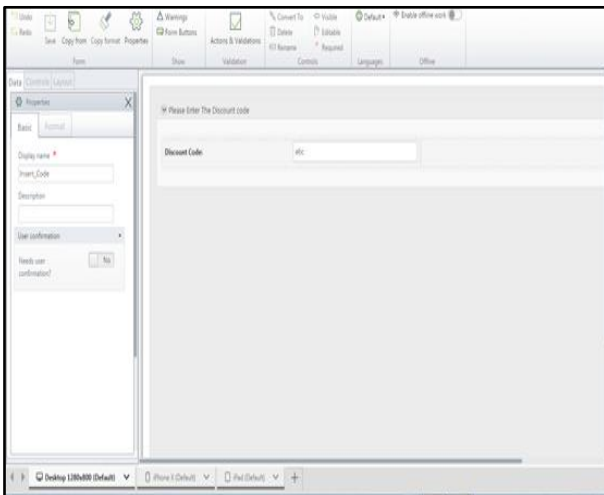**Figure 12:** Payment Method Form

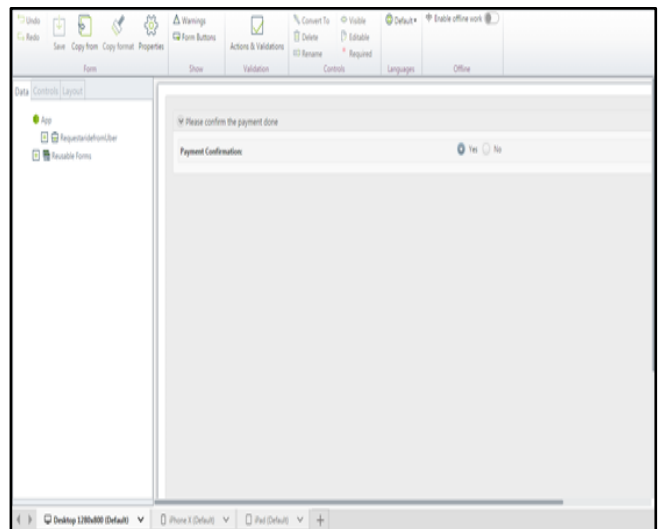**Figure 10:** Discount Code Form

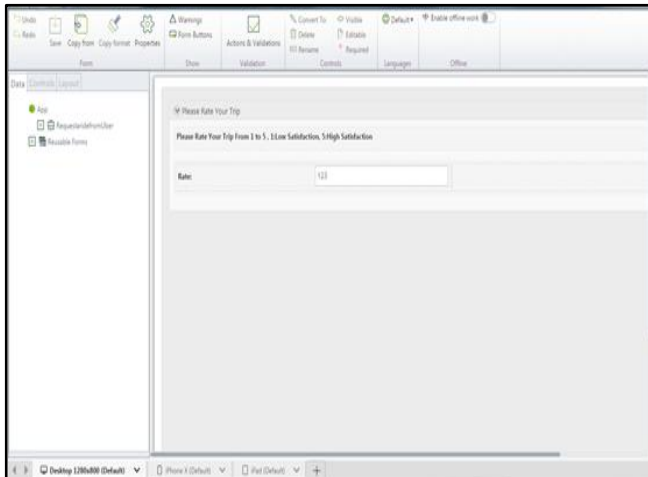**Figure 13:** Payment Confirmation Form

Figure 14: Rate Form

4. Process Analysis

In order to reengineer a business process, first collecting and analyzing the data using statistical techniques and process intelligence is an essential step to enlighten the points that cause slow-downs and define the main issues within the business process. Figure 15 represents the flow to reengineer the process
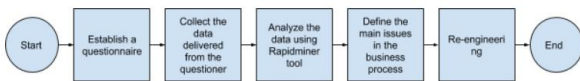

Figure 15: Reengineering process flow diagram

4.1 Data collection

Questionnaire is a method of collecting data and to get feedback and opinions of the RR application users. Also, to find problems that annoy the user, waste their time and reduce the efficiency of the apps. Then try to solve that problem, and increase the apps quality.
Questionnaire questions:
1) Do you use delivery apps such as Uber, Jeney and so on?
2) How much sending a lot of notifications is bothering you?
3) How would you rate the waiting time?
4) What are the things that you don't like while using these apps?
5) What are the suggested benefits that can be added to these apps?

4.2 Data analysis

Business intelligence tools and platforms streamline the analysis process. This makes it easier for the organizations to see and understand their data without the technical know-how to dig into the data themselves. There are many BI platforms available for reporting, data visualization and creating dashboards. RapidMiner is a software package that facilitates predictive analytics, data visualization, text mining and data mining. The software requires the user to enter raw data, including databases and text, which is then analyzed on a wide scale automatically and intelligently [12].

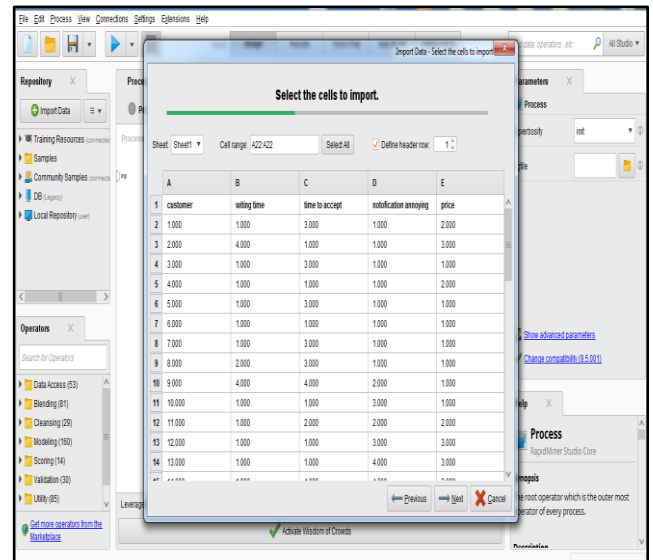Figure 16 shows the data log used for business intelligence.

Figure 16: Request a Ride data log

By inserting the data log in RapidMiner tool, the data analyzed on a wide scale automatically then resulting in data visualization to insight the issues area. Figure 17 represents the customer tolerance of the waiting Time, where No 1 represents less satisfaction and increasing the number represents more satisfaction. In this figure a large number of users were annoyed from the long waiting time.
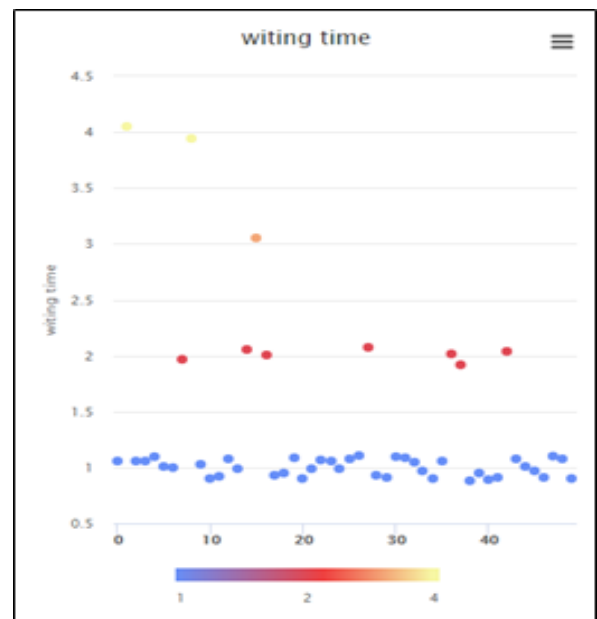

Figure 17: Customer tolerance of the waiting time

Figure 18 represents the customer tolerance of the time to trip acceptance, where No 1 represents less satisfaction and increasing the number represents more satisfaction. In this figure a large number of users were annoyed from the long time to trip acceptance.
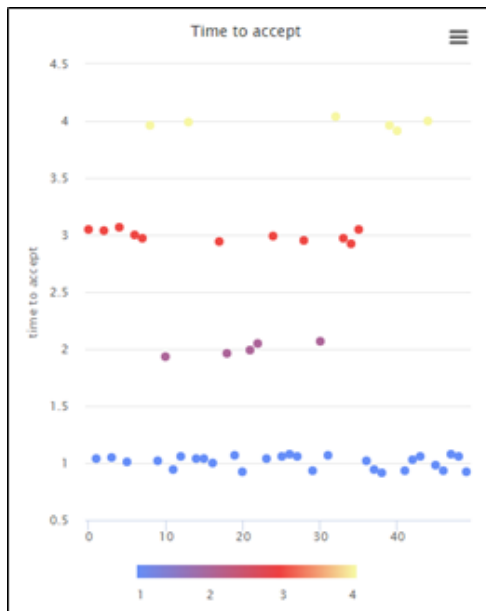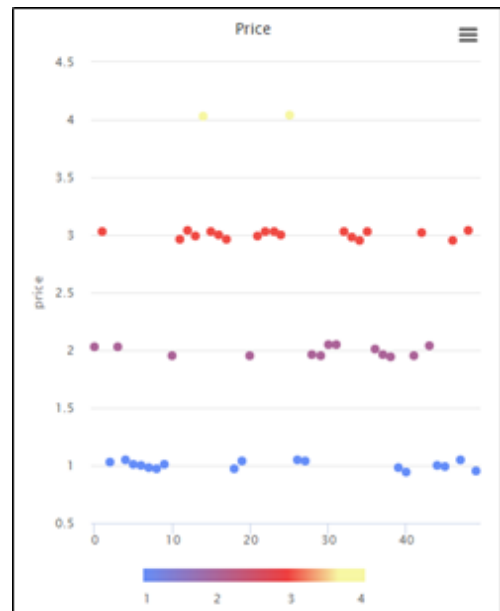
Figure18: Time to Accept

Figure 20: Price

Figure 19 represents the customer tolerance of receiving a lot of notifications, where No 1 represents less satisfaction and increasing the number represents more satisfaction. In this figure, a large number of users were annoyed from receiving a lot of notifications.
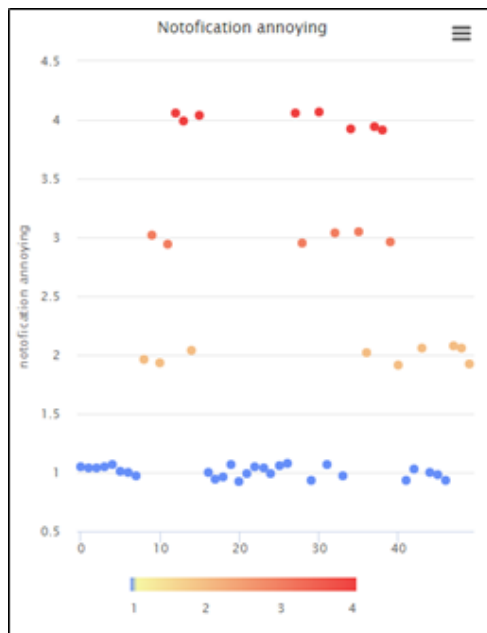

Figure 19: Notification Annoying

Figure 20 represents the customer opinion about the price, where No 1 represents less satisfaction and increasing the number represents more satisfaction. In this figure, number of users were either not satisfied or half-satisfied.

5. To-Be Ride Request Process Model

Based on the results of analyzing the data using RapidMiner, the results show that there are some concerns from the customers regarding the provided service in term of time, cost and quality, which calls for an improvement of the business process. In this paper The primal objective is Reengineering the business process to improve the service for the customers using three steps to produce the To-Be business process: eliminate and compose some notifications, add rating feature and optimize the looking for driver activity and automation of discount calculation process.

5.1 Eliminate and Compose Some Notifications

The Customer mentioned that the large number of notifications while using the delivery application annoyed them and consumed their time.so that lead to need improving the quality and efficiency of delivering business processes. From this point, the solution will be eliminating some notifications that not add value or give rich information for customer. The eliminated notifications were (the driver will arrive at you after 5 minutes, the driver will arrive the place within a 1 minute, you have arrived your destination). moreover, other notifications merge to make it one notification at the end. Notifications that merge are (notify customer the driver accepts a trip and notify customer with driver information)to be one notification is (notify customer with driver information) as shown in figure 21.so that will enhance the quality, reduce the time and make the customer more satisfied.
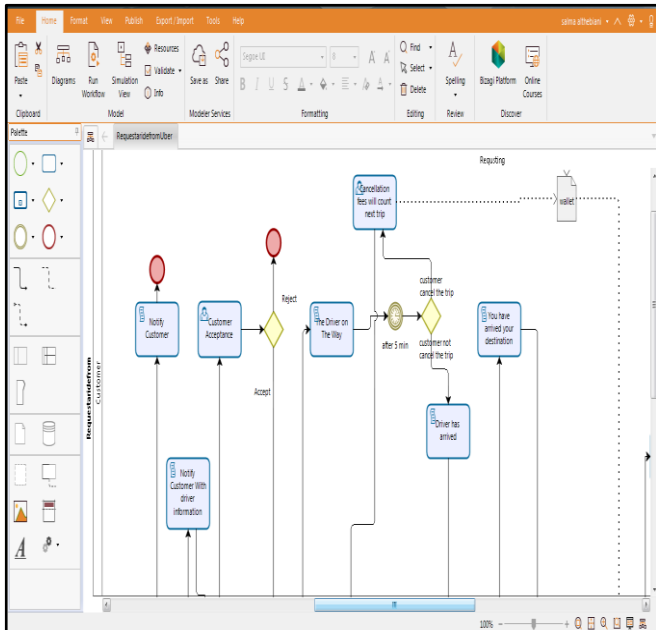
Figure 21: After delete non value added notifications

5.2 Add Rating Feature AndOptimize The Looking For Driver Activity

In this step we will add rating features. After each trip, the customer has the opportunity to rate the driver. The most value of the rating feature is to take into account the driver rate while the system looks for a driver. As the system looking for a driver, the priority is for the closest drivers then for the driver with the highest rating. This feature will provide the highest rating drivers and the best drivers for the customers to increase the quality of the provided service and to increase the customers satisfaction. The rating feature is designed to be an important measure of quality on the platform and considered as a business intelligence technique which help in business decisions to keep the customer experience safe and comfortable. As shown in figure 22 Looking For Driver Activity will take into account the driver rate.
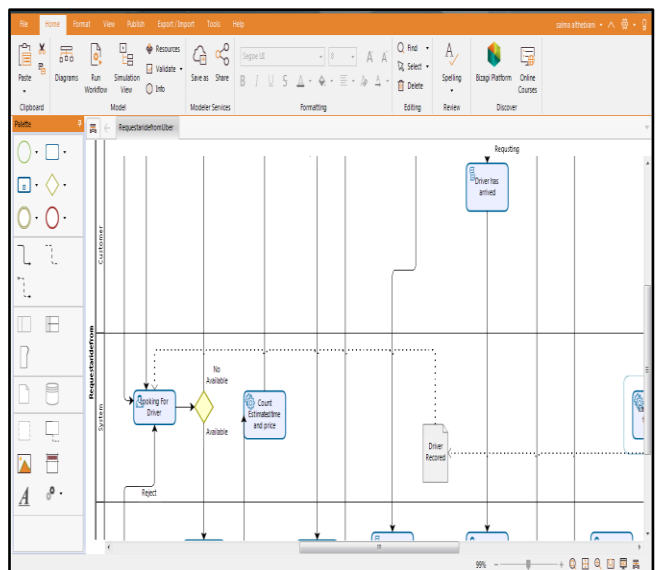

Figure 22: Improve Looking For Driver Activity

5.3 Automation of Discount Calculation Process

In the current RR process, the customer manually enters the discount code that he gets from the application and sometimes may forget to use it or not notice it. but after this reengineering step the application will calculate a balance of points for the customer. This balance of points increases for the customer who uses the application frequently or requests a ride for long distances, such as travel between cities and after calculating these points, they will be applied automatically to make discount for the price of the next trip as shown in figure 23. For each specific number of points there is a specific discount rate is may applied. The benefits of this reengineering step is to reduce the cost and increase the customer satisfaction.
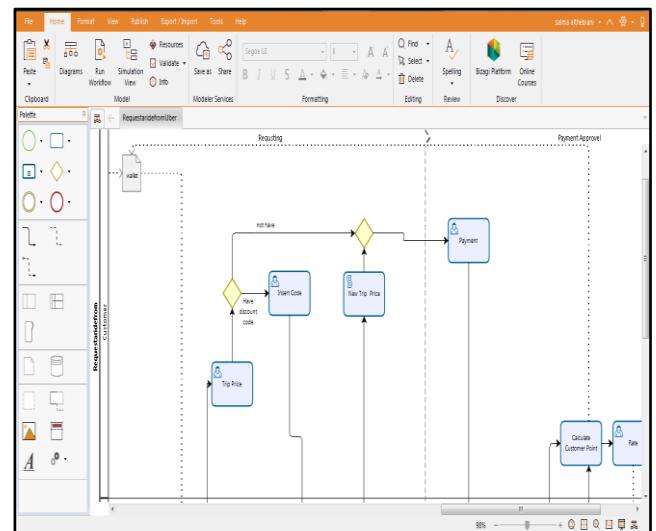

Figure 23: After automation of discount calculation process

As a result of combining all the previous reengineering steps, the To Be model is finalized as shown in Figure 24.
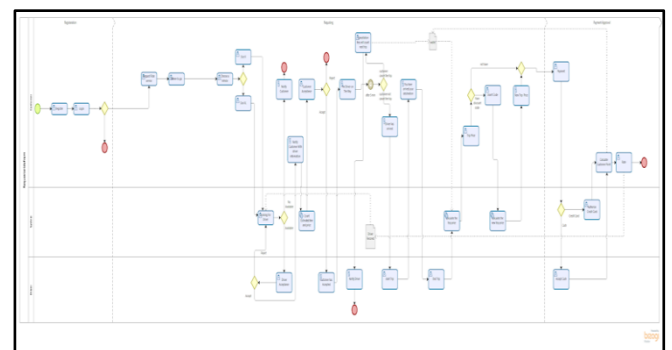

Figure 24: To-Be Ride Request Process

6. Conclusion

In conclusion, this paper proposed Request a Ride business process through Bizagistudio, then analyzing the collected data to improve and enhance request a ride business process using business intelligence technology . Therefore, business intelligence can go a long way in facilitating identifying new opportunities for business and decision-making for improve and reengineer the business process.The main proposed reengineering steps are1.add driving rating to looking for driver process to enhance the service

quality,2.delete non value notification to reduce the time and 3.automat discount process to reduce the cos.These feature can applied on any RR company to enhance the quality of service, customers satisfaction and reduce the cost and time.

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