Master of Science in Engineering Management

Master Thesis

Data Automation in Small Companies

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Introduction
The topic that I would like to discuss within this dissertation is about data automation in small companies. The level of complexity of data automation, in my opinion is related to the data flows entering, being processed and exiting through a company. Basically, the implementation of data automation would benefit a firm in many ways such as enhancing the acceleration and accuracy of data processing within each departments of a company, as well as increasing the volume of inputs and leveraging the real capacity of resources and functions in a company. Moreover, cost reduction and profit enhancement would benefit the company. Data process accuracy is critical when the smallest error may change the results and causes distraction away from firm’s goals and strategies. Creating data automation platforms, it is necessary to maintain its functionality utilizing latest technology and science to maximize efficiency of data flows, prohibiting unwanted errors that create queues and delay the process. When it comes to digitalization, physical barriers are gone, meaning that a firm can activate its virtual capacity to handle different tasks, which is much faster and accurate than traditional way. Take a sales office as an example, a traditional salesperson using old paperwork for information and time-consuming conservations with clients about the points he or she may not be interested. On other hand, consider a salesperson completely trained and equipped with latest IT solutions and methods. He or she would use statistical analysis to perceive a client’s points of interest, offering best alternatives accordingly to customers digitally.

Now that the growth rate of science and technology has led all the industries in the world to be digitalized, the need to manage and optimize the sectors affected by this digitalized trend is more than ever. Massive volumes of basic data flows collected by the machines, operators, sensors, computer programs, questioners and simple observations, need to be collected, ordinated, filtered and analyzed. Managers at every level in an organization hierarchy need to be working with clues and tips extracted by the results of these analysis to lead the organization according to its goals and strategies. Numerous analysis can be extracted from these databases, helping managers to make an informed decision. The definition of analysis based on their perceived functionality is what makes a company position itself ahead of its competitors. Today’s trend of digitalization and artificial intelligence challenges all firms to extracted data and translated those to perform more efficient tasks (optimized chain value).

Company Introduction
MS Automobili is a car dealership with more than 300 used vehicles available for sell and is the third biggest dealer in Turin. The company was founded in 2012 utilizing two locations. One, which is nearer to city center, would act as a showroom for the customers with more than 150 car spots. In the other
venue, which is bigger, would take place the preparation part including washing, technical check of vehicles, taking photos and videos for digital marketing purposes. The aim of the company is to satisfy customers helping them to choose a proper alternative by giving consultancies based on their needs and after-sale services. Apart from sales, they offer warranty service for 12, 24 or 48 months with cooperation of another company named Mapfre to ensure customer’s satisfaction. They also offer financing plan based on customer’s requested duration and budget. They would also act as a potential buyer in the area, proposing substitutions in exchange for the estimated value of cars.

When it comes to used car dealership business, several important questions will raise that the answers to each of them would optimize the whole process easier. Questions like: What cars to buy to bring the most profit? How to do the quality, storage and logistics control in the most proper way? How to do digital marketing? How to keep track of cars? How to manage internal transportation between showroom and storage? How to do proper CRM? Brand reputation plays an important role here since the market is full of other competitors offering same products and services (RED OCEAN). Innovative strategies are limited to the services offer by the company.

The problem the company had encountered was lack of data consistency since they were not doing any sort of data repository. As I started working at MS Automobili as the process optimizer, I tried gathering as much as information about the market, company’s position in the market, suppliers and the internal process of the company. For each part I started defining simple but useful projects. I found an idle competitor on London Stock Exchange Market named MotorPoint, targeting all their activities as clues. To run the projects as soon as possible I started using spreadsheets as a start point and gradually add control, monitor and presentational and analytical features to these spreadsheets. I also turned them into a reference used for digital marketing. These spreadsheets will be updated within different parts of the company by users helping each department to cooperate smoothly and accurately through the process. Different interfaces and tools were provided for the staff to develop and update the very first form of data base in the company as there were no such records before.

Industry Overview
As a car manufacturer, it seems the effort of selling a car should be focused on a new one, which has a higher price and profit, rather than a used car (targeting richer customers). On the other hand, OEMs (original equipment manufacturers) by offering wide range of spare parts for a car, have significantly changed the desire of purchasing a used car which is reliable and has good quality. As a result, car manufacturer started their own used car market after understanding the residual value a customer is willing to pay.

In today’s world, customers have an upper hand when buying a used car. Thanks to the internet and correspondent platforms, buyers are fully aware of what they are buying, its quality, abundant, residual value, reliability. The methodology a customer would use to buy a car has changed. They rather to have all information available, including photos and videos indicating current conditions of the car and
relative correspondent description online, instead of passing by a car dealership browsing through their collection. Now, a customer knows exactly what to look and where to look.

To answer those needs, new platforms have been introduced to market accelerating the search speed and facilitating digital marketing in a sense that a dealer would absorb as much attention as possible from a customer looking for a car online (utilizing authorized cookies by clients, advertisements, multi-publisher platforms, social media announcements, etc.). These platforms publish announcements online on numerous websites to save time and increase sales as much as possible.

The answer to become successful in this market is transparency and symmetry of information. As all information related to products are online, customers have a clear access. Therefore, new strategy acquired by used car dealers should benefit firm’s reputation based on trust and respect. Such a symmetrical relationship confirms product’s quality and ensures the lock-in effect.

Unfortunately, MS Automobili’s top level management was not pursuing this trend, causing major conflicts for the company. Lack of data consistency led to customer’s unsatisfaction. As explained in Industry Overview, to continue remaining in such market, customer’s satisfaction is important. Considering full access of customers to technical information (thanks to the internet), managing a car dealership in traditional way (false advertising, neglecting customer’s satisfaction) would lead to failure.

In such competitive market, where buyer’s power is high and there are so many competitors, innovation would happen in services. It is recommended for MS Automobili to offer services that other competitors
do not offer, to increase its market share and improve its reputation. Services that would confirm customer’s satisfaction (full and accurate information about offered cars, future potential expenses, repairing facilities to guaranty the cars sold, more differentiated financing plans).

Digitalizing MS
This chapter would define the strategic relevance of two major projects being done in MS Automobili. The objectives of these projects is to bring data automation and market share growth to the company.

Cloud Solution
By creating a standard database as spreadsheet on cloud, MS would utilize digitalization in several aspects. This database would record, update and illustrate information about accounting, product’s technical detail, dates, administration and documentation of the cars. Then, it would use several interfaces to maintain and improve itself as new cars enter to system and sold cars exit.

The strategy is to accelerate data flow and create synchronization between each part of the organization. Data synchronization would widely eliminate queues behind each activity, enabling the flow to move at its maximum efficiency and feed other system inputs. It would prohibit mistakes made by each part of value chain since data inputs are updated real-time. It also gives the chance to salespersons to provide better experience for a customer using specific interfaces.

Multi-publisher Platform
MS would improve its market share utilizing a third-party platform as multi-publisher to create announcements for online markets at a same time. This project would significantly improve sales as MS used to upload announcements manually on each website in a long process.

The format chosen as the first type of database is a typical Excel spreadsheet which can enable different macros for web-developing purposes using VBA. These macros can be useful for accounting and web announcing activities. As every company must propose accounting and financial statements on governmental platforms, these macros can automatically send reports by filling out web forms periodically.

Another macro can be about digital marketing. As it is required an operator to insert information manually on multi-publisher platform, this macro can export required information for the data entry part of platform. In this way, the queue behind uploading an announcement online would be eliminated.

To build interfaces, a third-party server would download the spreadsheet from cloud, formulates the functionality and usage of interface by defining its inputs, outputs and interactions with other interfaces. In case the server was not able to read the formula written in excel, one can create a function using these expressions. Technical data of how this platform works would be explained in technical part of implementation.
The problems

How to optimize the process flow chart to decrease TTM?

The flow chart used by the company was based on repetitive paper works that delayed the whole process. Recognizing critical points throughout the main flow chart that were creating time-consuming queues, a simple Time-Motion study was introduced the main problems within flow chart.

Results of this study is as followed:

In first observation, considering which tasks are misplaced or causing queue, the following problems are noticeable:

Acquisition
As there are many other car dealerships in town, the supplier’s power low, but the main challenge is to find out which car to buy and from which car dealership? Are there any other ways to do it? What are the methods to optimize and develop this process?

Even though MS Automobili was not using any type of data repository of sales, within 7 years of their activity, through experimental learning, they perceived the behavior of different market segments when it comes to buying a used car. Although, this was never based on results from statistical analysis, in fact there was always a sort of ambiguity of different choices available as suppliers. More than 40 Brands of car with more than 8 models in average for each brand, more than 10 big suppliers in town. Simple calculation shows the difficulty of choosing among all these alternatives.

Another undeniable problem in the acquisition part was the fact that most of the purchases were made through verbal agreements with no immediate purchase proposal or invoice. This created major problems in the process flow chart, but it was hardly noticeable by the managers. This type of acquisitions delayed the legal registration done by the administration office. Because not only there was no proof of transaction, the required documents were missing as well. Long time-consuming
tracking was taking place just to close a contract. Following this type of acquisitions, later will happen other problems regarding the flow chart that we will cover in future steps.

**Car Arrival**
As the ordered lot size increases, it will be difficult to keep track of all arrival and their agreed conditions on purchase proposal. A major reference was missing to control and check arrival list and their conditions. A mistake made a by a supplier could bring about hidden costs for the company (labor, repetitive transportation, etc.).

**Technical check and preparation**
How to do the preparation part and technical check in the most optimized way targeting TTM reduction and customers satisfactory strategies?

According to a customer’s view, the only important point about a used car is that it should work properly, all the consumable parts should be renewed, so the car would be in its best conditions. As a car arrives in the company’s inventory, lack of technical checks cause entering not acceptable cars in the process. This was a major problem, since it was creating repetitive tasks of transportation and communications with repair centers. There were times that a technical problem didn’t exist until the time that customer wanted to take out the car (Bad reputation).

**Major transportations between showroom and main inventory**
Following the process flow chart, most critical task for the company is to sell a car as soon as possible. The more a car stays through the process, the less is the profit from it. The dedicated post for photography was in showroom, therefore all the new arrivals eventually had to be transported to the showroom. This was an issue since the current capacity of showroom was limited. A proper management system was needed to correctly keep the balance within, as showroom was divided into three different categories (Car classification).

**Photography**
Making Photos and videos is the start point of digital marketing section. Almost the most important task within the company’s flow chart, which was significantly limited by its position in showroom since it used to be done in an open. Specific conditions were required start the process such as the angle of sunlight, whether it’s rainy, dark or foggy. The most critical process which would truly reduce TTM, was being delayed. Well of course, when we mention photography, the whole process of photo modification and getting them ready for cloud upload, should be considered.

Not all the new arrivals were able to be transported to photography post because of showroom’s limited space. It was impossible to balance this trade-off between showroom and main inventory causing delay in TTM.

**Routine Maintenance**
The company was truly suffering from the cost caused by mal maintenance. Basically, car maintenance consists of several simple checks and activities that almost all of us who own a car should know them. Not doing them can damage some other major parts of the car that can be extremely expensive to repair. A simple maintenance routine was required to resolve this problem. At that moment, random
maintenance was taken place in showroom whenever a transportation was going to be done and there were no maintenance actions being done in the main inventory. Considering that almost 60% of all the cars were not being checked at all, causing extra costs for the company.

Digital Marketing
How to develop and accelerate marketing? What are the methods to increase market share using digital marketing? How to scope and enter to new markets (What competencies are required and how to overcome entering obstacles)?

Following photography part, now it was time to put the cars online, making them available to the market as soon as possible. Lack of knowledge of upper level management about today’s virtual infrastructure technology was causing tremendous costs of labor. For creating an announcement on a website, they were repeating a same long task. Since there are more than 15 active online markets available in this field, one can figure how long it would take for them to put all information available to the customers on each of these websites. Approximately each car for each website would take 15 minutes to be uploaded. Considering 7 cars in average a day, almost 27 manhour were required which is beyond the current labor capacity of the firm.

On the other hand, the firm was completely behind the trend of its top competitors inside and outside of the country. Regarding digital marketing tools, MS Automobili was not utilizing other aspect of this field like platforms available as social media (Facebook, Instagram, LinkedIn, Google Review, etc.). Brand reputation was not being improved.

Sales and Aftersales Administration
How to digitalize data administration? How to implement data consistency of accounting reports with respect to storage control (reports required for commercialists)?

The legal registration of car’s ownership is a time-consuming process requiring all the documents. Since car acquisitions was based on verbal contracts, after closing a contract, the documents required for registration were still missing. Tracking these documents to finalize a contract was taking a lot of time including controlling the payments to suppliers, the final change of ownership registration and settling the rest of payments with customers. The problems arise from this delay was going further, up to even settling the traffic fines made by customers while they took a car out on street after acquisition (legal ownership of the car still belonged to dealership).

The administration part itself was being done manually inserting repetitive information on two separate platforms for registration. The whole accounting process and sales administration respectively were being affected by issuing invoices and final contract in delay. The queue created behind this activity caused customer’s dissatisfaction.

Tracking System
More than 300 cars in a month entering and exiting between suppliers, Showroom, Inventory, Repairing Centers, Carwash, Bodyshop throughout different cities and regions. A comprehensive updated tracking system was missing to simply look for cars. Basically, all the departments within the value chain
needed this kind of tracking system to schedule for their everyday routines (Preparation, Maintenance, Transportation, Sales Office, Customer Appointments and Top-level Management).

Solutions theories and projects

I planned to tackle the problem proposing three projects: 1- Flow Chart project 2- GO project 3- PCloud-DealerK project. All these projects will be explained completely during future parts.

Optimized Flow Chart

The results of time-motion study clearly point out the critical points of current process flow chart. A new project of creating photography post was proposed to the management board. Considering the problems mentioned in the photography part and transportation limits between showroom and main inventory, Having a new post for photos immediately after the preparation part wiped out two main queues of the process: 1- There were no limits of making photos and videos because of weather conditions since it would be done indoor the main inventory (This project was constructed by a third-party firm). 2-Transport limitation to showroom was eliminated thanks to strategic change in photography post.

Time to Market is significantly reduced thanks to this project. Balanced data flows within new flow chart ensures smoothest interaction through each activity. The new flow chart is demonstrated in the figure below.

GO

Basically, what I proposed in this project is to create a spreadsheet of data flows within each activity including quantity, location, date, etc. and an interface to expand and update it. This interface is the main tool to build and develop the database and ensure the utility of using current spreadsheet by other interfaces of different activities. The interaction of spreadsheets is the key element which is undefinable unless we know exactly how the new data process flow chart works.

The title GO (La Giacenza Ottimizzata) is what from now on we refer to as the main database feeding all other interfaces. As the figure below shows, this database is most critical element of data automation in the company, allowing all other parts collaborating smoothly and synchronized. Interfaces proposed by this project are available on smartphones and PCs of staff, utilizing and feeding GO, making it available for next activity to be planned and carried out. The relation graph of how GO and its interfaces
interact is shown in the figure below. Later, a technical instruction of how each interface works and communicates would be explained in detail.

**pCloud and DealerK**
pCloud is the cloud solution which one can find in almost all the companies, utilizing backup of data. Moreover, pCloud offers an application for smartphones enabling its users to extract required categorized data using keywords. The best way to assign id to information uploaded on cloud is the plate number (It’s not repeatable and the format used in a plate number is standard). The categories consist of scanned documents, images, videos, analytical reports, financial reports, proposals of purchase, etc.

DealerK is of the most critical tool used for digital marketing. Existence of DealerK has change and affect almost all the activities and processes. DealerK is an online platform offered by a third-party to publish an announcement on numerous online marketplaces in a same time. It can import information used to create an announcement from standard categorized spreadsheet (GO project) as Excel macros. DealerK has several useful features including different platforms for CRM and Sales Management, possibility to export all sorts of statistical information required for market share and digital marketing analysis in xls format. The Sales Management panel available for salespersons, includes all features required to contact a client and close a contract. The sales statistics are exportable in xls format as well. What DealerK does for the company, is feeding major parts of GO as inputs and help it to update interfaces fed by GO.

Now we would discuss the solutions offered by these three projects to carefully observe their contribution to system and how they collaborate through flow chart.

**Data Entry of GO**
The first step of creating a case in system. The data entry clerk starts with receiving proposals arrived from other car dealerships (as suppliers) or after evaluation part offered by MS, creating the very first step of building GO. The platform offered for GO is in Excel because of its commodity and flexibility and more importantly its standardized format of import and export. Thanks to standard combinations of information required to enter to system, we were able to define regulations for data entry using VBA as a development tool for Excel. Consider the plate number as an example which consists of 7 digits or Chassis number which is 17 digits etc. Moreover, there are cells that can be selected from a range of choices (drop-down list) and another cell based on what we have chosen from previous cell (dependent drop-down list). The structure of an interface is different based on their functionality. Following this chapter, we would explain the mechanism of each interface interacting with GO, DealerK and other interfaces.

**The interfaces**
Different interfaces are designed for different parts of the process including: Arrival check, Maintenance, Transportation, Repair Center Tracking System and Sales Info Panel. These interfaces are specific ad have limited access for each staff regarding their activity.
**Arrival Check System**

Based on purchase proposal contracts, GO is enabled to export technical and status information of a car arriving at MS, like mileage, physical condition, service booklet etc., on related application, for the control team. The responsible team would control and confirm the information extracted from GO on the application. Moreover, they would update the preparation and technical check status. In this way two other platforms would be activated if need: 1- Transportation Schedule 2- Repair Center Tracking System.

**Transportation Schedule**

Before explaining this part, I would introduce a Ranking System used for prioritizing the cars located in showroom. Basically, the showroom is divided into three parts, main part is for expensive cars, the remaining two parts is categorized based on brand and market share (this priority is based on statistical data from sales management). The transport interface would identify cars with higher priority according to showroom divisions capacity. There is a second schedule for cars need to be transported to repair center or carwash etc. So, an accurate list of all transportations is being updated daily.

Internal transportations would be updated as well, using this interface. This activity utilizes a part of Sales Info Panel related to car localization.

**Maintenance and Audit**

From the moment a car is arrived, the audit schedule begins to record all the activities regarding changing batteries, tires, oils and basically all other consumable parts of a car which throughout time need to be maintained or replaced. Based on the standard instruction defined for each element, the schedule would update itself, notifying the users about future procedure. Implying different filters of these elements, creates useful lists of day to day activities.

One other activity regarding maintenance is updating Price Tag of each car, which is basically a laminated A4 page consist of all technical information useful for customers when they walk into showroom for a closer look. Price Tag is printable automatically through a separated spreadsheet extracted from GO, entering plate number.

**RCTS (Repair Center Tracking System)**

After technical check, cars need to be transported to repair center would be updated on transportation interface. A ballpark figure would be presented by a professional about the parts required to be purchased (whether they would prepare it or else) and duration of repair process. The information would be updated on RCTS which is utilized with an alarm system developed with VBA on Excel.

**SIP (Sales Info Panel)**

Practically, SIP is the most important platform extracted from GO. Not only it works as complete illustrator of technical data required for a salesperson, but it has additional features including car localization, customer contact list, photos and videos of the car with ability to share on social media, current status of car (utilized by maintenance) and financial information (price target and leasing plan offered). It helps salespersons to provide accurate consultancy and make the best offer which would increase the chance of closing a contract, making a good experience for customers to buy a car at MS Automobili.
Accounting
MS uses an online interface interacting with an assigned commercialist named BPointSaas, which is a common application used for accounting activities like preparing balance sheet, income statement, EPS and cashflow statement. The project being done about BPointSaas is that, before they used to enter required data manually for each car which is a long process, but now thanks to GO, a standard framework of required fields for BPointSaas is ready as excel macro developed in VBA (developing macro in VBA did not proceed further because of lacking a programmer in the team).

Documentation
MS used to do paperwork written by hand at some points about documentation. There were no records of purchase proposals, transport documents, original documents, changing property documents etc. virtually available. Thanks to GO, I was able to define several forms filled out automatically by just inserting the plate number.

Technical structure of projects

As explained before, GO is a series of spreadsheets containing useful information related to different parts of company. Basically, it updates itself by other interfaces available for employees on PCs and smartphones. It also creates excel macros for digital marketing and accounting parts as a standard export file. So, GO works as the joint of structure helping the process to accelerate data flows. As GO being standardize before, the excel clerk would start a new case: For entering the plate there is a standard form developed in VBA, in case making mistakes the spreadsheet would give an error.
As you enter the right format the row will be unlocked and ready to fill.

For entering the brand and model we used dependent drop-down lists. “BRAND” is a name range that we defined in Excel in another spreadsheet called database. The second data validation for formatting the model uses “INDIRECT” formula to create a dependent drop-down list. So, as we choose the brand, the list of models would change accordingly.
Using “INDIRECT” function, I had to create name range for all possible inputs of the first list (All the brands and their dependent models). This is where I created other spreadsheets for all possible inputs.
To open a new there should be a purchase proposal. The excel clerk continues entering the rest of data available on proposal making GO ready for first part of arrival section.

Apps
As the car is arrived, the arrival check and audit team continue the flow of completing and utilizing GO. This is the part where I used Appsheet as a platform to develop required applications according to firm’s needs. Appsheet is a platform for creating apps with no code using spreadsheets instead of other complicated and expensive approaches. I started by connecting GO from PCLoud (the cloud I used to build the virtual database) to Appsheet.

Since almost half of employees’ time is spent outside of office in open area and storages etc., having a mobile application updating GO as main data source of company, can save valuable time and enhance accuracy of data flow. Queues behind each activity was wiped-out after usage of these interfaces.

Creation
The Appsheet server would download GO spreadsheet from cloud. A simple synchronization is required for the first time when we create the app:
Columns
Next step is to define the functionality of each column’s type. We can assign a formula or an initial value. One can also decide which columns to show depending on the user accessibility. We can make it an editable or mandatory column to fill. Appsheet does not import all the formulas written in excel environment, so may as well use internal expressions for the formula part.
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**EXPRESSION ASSISTANT**

Initial Value formula for column DESCRIPTION_73 (LongText)

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\text{AND}([\text{IVA}] \geq 1.12, [\$\text{BUY}] < 19.99)
\]

**ALL these statements are true:**

1. The value of column 'IVA' is greater than or equal to 1.12
2. The value of column '$BUY' is less than 19.99

<table>
<thead>
<tr>
<th>Pattern</th>
<th>Result</th>
<th>Example</th>
<th>Insert</th>
</tr>
</thead>
<tbody>
<tr>
<td>(constant)</td>
<td>Yes/No</td>
<td>true</td>
<td>Insert</td>
</tr>
<tr>
<td>(constant)</td>
<td>Yes/No</td>
<td>false</td>
<td>Insert</td>
</tr>
<tr>
<td>(value_1) = (value_2)</td>
<td>Yes/No</td>
<td>([\text{DESCRIPTION}_6] = \text{&quot;text value&quot;})</td>
<td>Insert</td>
</tr>
<tr>
<td>(value_1) &lt;&gt; (value_2)</td>
<td>Yes/No</td>
<td>([\text{DESCRIPTION}_6] &lt;&gt; \text{&quot;text value&quot;})</td>
<td>Insert</td>
</tr>
<tr>
<td>(value_1) &gt; (value_2)</td>
<td>Yes/No</td>
<td>([\text{SELL DATE}] &gt; '04/22/1970')</td>
<td>Insert</td>
</tr>
<tr>
<td>(value_1) &gt;= (value_2)</td>
<td>Yes/No</td>
<td>([\text{IVA}] \geq 1.12)</td>
<td>Insert</td>
</tr>
<tr>
<td>(value_1) &lt;= (value_2)</td>
<td>Yes/No</td>
<td>([$\text{BUY}] &lt; 19.99)</td>
<td>Insert</td>
</tr>
<tr>
<td>(value_1) = (value_2)</td>
<td>Yes/No</td>
<td>([\text{DATE}] = '04/22/1970')</td>
<td>Insert</td>
</tr>
<tr>
<td>AND([cond_1]…[cond_n])</td>
<td>Yes/No</td>
<td>(\text{AND}([\text{IVA}] \geq 1.12, [$\text{BUY}] &lt; 19.99))</td>
<td>Insert</td>
</tr>
<tr>
<td>OR([cond_1]…[cond_n])</td>
<td>Yes/No</td>
<td>(\text{OR}([\text{IVA}] &gt;= 1.12, [$\text{BUY}] &lt; 19.99))</td>
<td>Insert</td>
</tr>
</tbody>
</table>
Slice
Slice is a filtered part of a column as we define for specific functionality. Apart from excel formulas, again in case of conflict we can use internal expressions. Basically, application illustrate what we define as UX panel.

UX panel
Here is the main part of creating application. By referencing the predefined slice, data are available to the interface. UX panel is also used for design part as well. The layout of application and the positions of sub-applications are done here. One upload company or application logo from here and assign certain structure to an application.
Arrival App

The arrival team would start by entering to their interface to update the case. In this way GO can utilize next steps in the process. By changing the status of arrival cars, new lists would be available on GO as we have already defined filtered columns for that part. Other circumstances are being check as well like mileage or service booklet.
Audit App

The audit team is there, ready to control all technical aspects of arrival cars according to purchase proposal. This process would activate the control panel for sales department.
Sales Control Panel
The results are uploaded directly on GO utilizing the control panel for all, specifically the salespersons. By entering the plate number, this interface would extract data and illustrate them with conditional colors and notification system. Other than that, Audit app would update the special-order list in case needed, utilizing procurement team.

Sales App
Extracting valuable information of cars in showroom while talking to a customer without going back to office to check the paper folders, was almost a dream for salespersons at MS Automobili. Using Sales app, not only they do not waste time with a customer, they directly update and close a contract next to the car that customer is willing to buy.
Not only they can check required information, Sales app utilizes links to photos, videos, car documents (libretto, service booklet, bollo receipt etc.) uploaded on pcloud.
Arrival Transport Schedule App (ATSA)

As the status of arrival cars is registered, the transportation schedule would automatically choose the cars needed to be transported to other places like carwash, repair center, showroom, etc. On the other hand, there is a limit of parking spots available. The algorithm written for GO utilizing the new transportation list would be explained step by step: The three possible destination of arrival cars have limited capacity. As regular transports made by transportation team (moving cars for several reasons is a routine of a car dealership) updates the location column in GO, ATSA would compare the list of existing posts (whether occupied or vacant) to location column, using SUMPRODUCT formula. To complete the comparison, I needed a name range representing the occupied list.

So, TRUE means the spot number 1 is occupied. What ATSA does is that it would filter only the FALSE value rows (considering the current vacancy status is being update real-time using cloud solution). In this way, the transportation team would have an updated list of vacant choices on their application.
The new transportation list would be updated accordingly.
Now all the folders are printed through GO, documents are scanned and uploaded on pcloud and are available from MS application.

Price Tag
DealerK

As mentioned before, DealerK is a multi-publication interface utilizing numerous online markets to create an announcement. Basically, for creating the main announcement, one must fill out a web form to upload required information on DealerK.

Since I found this opportunity to use such platform, I figured it is worth mentioning it.

Macros developed in VBA can fill and submit web forms from excel data. Unfortunately, this project (creating excel macro fed by GO) wasn’t accomplished lacking a programmer onboard. So far so good,
the process of creating an announcement was being done much faster thanks to simultaneous announcement publish and GO database (there were no missing data anymore).

Leads

Leads are clues of customers clicking on an announcement. DealerK would record their email address, phone number, website visited etc. (with their authorization of cookies) exporting them as an excel file. Digital marketing analytical reports would be available based on the exported file.

There will be an operator working with DealerK to distribute leads between salespersons, sending them required information to contact customers.
From the time a car is sold, the CRM spreadsheet is updated with a 30-day alarm to track the car’s condition after sales, making a good impression of the company. Based on the technical checks on arrival cars, there must be no surprise after selling the car.
The share of each website of total arrived leads:
Daily reports indicating number of users visiting announcements and do a click.

Analysis
As I started in MS January 2019, there was no such records of data like GO, what I did was creating tables including required information for analytical reports. This process required entering data manually from more than 1200 cases of sales for 2018. To implement those analysis that I had in mind, I chose the hard way of some may mention it as excel slave, but it was worth it. These results were by far more accurate and informative than what the top-level management had in mind. This spreadsheet later formed the very basic idea of GO as I got to know Excel features and abilities. I started analysis by entering financial, brand, suppliers, enter/exit dates etc. data in a spreadsheet.
To implement the analysis that I had in mind (since I was an amateur Excel user), I chose the hard way of creating super big tables extracting specific data with IF function (simplest way existed). A long shot of how big the tables were, is show below.
The results are shown in the graphs below.

**Brands**

Number of cars sold based on brand division. Since MS Automobili was offering wide variety of choices, this graph shows a clear tendency of used car choices in Turin. Since the technical features of products (Year of production, KM etc.) offered were the same, this graph can clarify focus of future purchases according to market's tendency.
Quantity vs Quality

Fiat vs. Mercedes. Whether to sell more for less profitable products or to sell less for more profitable? Interesting trade off situation where top level management must decide whether to buy more Fiat at low price or less Mercedes at high price. Other comparisons are available as well, like for BMW vs. Mercedes: 146 < 158 sold cases with respect to 212k€ <253k€ net profit. This graph combine with previous graph shows for example in average for each BMW we make a profit of 1,400 € while for a Mercedes we have 1,600 €. The average profit for Fiat would be 1.200 €. Considering customers’ desire, these graphs help make better choices from suppliers.
So many observations are there. Average profit of Jaguar for example which is 2.500 €. This would also question whether it is better to offer this wide range of choices or it would be better to focus on one or two brands only.

To answer this question, I searched the market for monopolists of each brand. I understood there are big players dealing specifically focusing on a unique brand. Companies like GINO or biAuto group etc. After a meeting with directors, I suggested focusing on services and becoming a trustworthy base for car dealing rather than becoming well known for a certain brand of car, since we did not have the credits and more importantly communication channels required. Focusing on lock-in customers, GO project was born.
Clear strategy of developing further cooperation with suppliers is achieved from this graph. Another point in this graph is when a customer wants to buy a car and he/she is willing to exchange the car as well. As we can see this graph, private suppliers are ranked second within most profitable suppliers.
One of the most critical points of managing a dealership, is liquidation. How long will it take to sell a car? Should I wait more to sell the car at its price, or should I lower the price to get the money back and buy one more?

Normally, a Fiat would take 77 days in average to be sold, but a Mercedes takes 97 days (almost 21% more than Fiat). Again, this would bring the old question of “Should MS buy Mercedes or Fiat?”.
Conclusions

Achievements

DealerK project

The speed rate of creating announcement for online markets increased to almost 10 times faster. Moreover, advertisement started as new marketing tool (Facebook ad, Instagram ad) thanks to this platform. The sales procedure is now being monitored through sales platform of DealerK with the ability to export statistics data for further decision-making problems. A salesperson can now close a contract directly from web utilizing SIP. CRM has been implementing effective strategies since using DealerK.

GO

GO brought data automation to the company utilizing different interfaces to eliminate queues before each activity. The efficiency of each part of the process has enhanced greatly thanks to synchronization of data flow within each department. Take the transportation list or maintenance schedule for examples. MS Automobili now is ready to offer services that the greater competitors in the market cannot offer thanks to SIP. A customer will feel safer than before while buying a car. The reputation of MS will increase gradually as they expand and increase their market share thanks to great reputation. Brand reputation in a red ocean is important. Turning a car dealership into a trustworthy place is impossible if we do not consider customers’ expectations. What MS now offers is by far better than other car dealers.

As a customer, when buying a car, apart from the good price offered, it is important to be aware of future possible expenses. MS Automobili maybe the first car dealer offering control panel for its salespersons informing the clients about further expenses. This brought great brand reputation to MS considering only word of mouth.
Process Flow Chart
Moving the photography post to arrival part in main inventory was a critical change. Not only we eliminate the queue for cars waiting to be transported to showroom, we started the IN ARRIVO section online for those who were seeking specific models. In this way we don’t lose the potential customers of cars not uploaded yet. The documentation part of arrival now is being done before arrival. This flow chart modification greatly changes to speed of closing a contract in case of short periods (Shorter liquidation periods).

Financial Contributions
Investment
The cost of goods sold in 2018 was about 5.489 M€ while in 2019 this amount increased to 5.963 M€. Almost 500 K€ increase in procurement budget says a lot.

Sales
The value of cars sold in 2018 was about 8.852 M€ while in 2019 this amount reached out to 9.580 M€.

Profit
Gross profit of 2018 is about 3.363 M€, while in 2019 this amount increased to 3.620 M€. It means 257 K€ difference with respect to last year.

Further Projects
Macro Development
As the company expands, interactions of IT sections start to get more complicated. As a primary project it is recommended to hire a programmer to finish the macro project to fully utilize DealerK platform from GO and make a great contribution to accounting platforms (BPointSaas) to accomplish tasks automatically from GO. Further development of MS requires creating super complicated IT projects that would lead the company to other sectors of management.

Franchising
It is recommended to open several showrooms in other cities to follow the new implemented customer-oriented strategies of MS. Brand reputation in a red ocean is very important. As the company expands, GO project can be upgraded to more complicated projects to serve the synchronization of MS branches.