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на тему: Field forces market disruption

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PROJECT STARTING POINT

I am a technical leader and co-owner of a product company developing solutions for managing supply chains at the FMCG market.

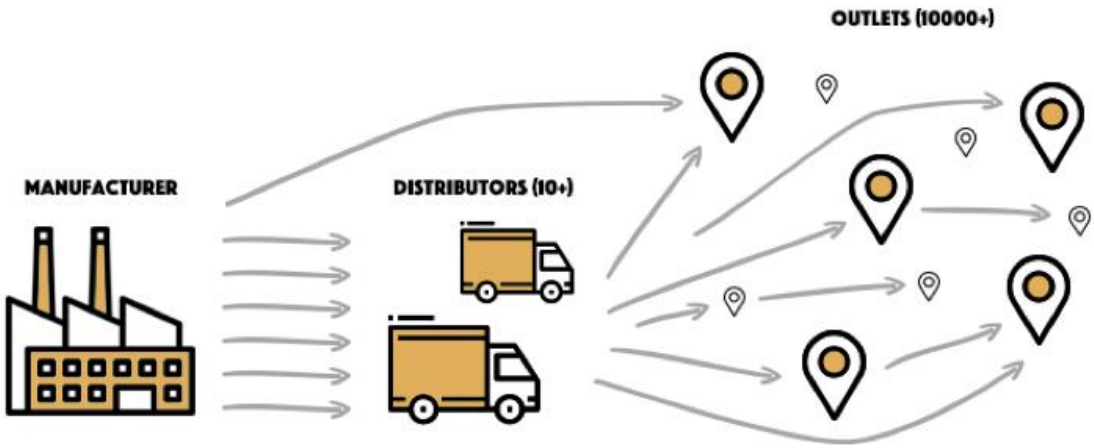

Image 1 Goods flow chart

We trace back the whole merchandise supply chain, starting from its production at the factory (or import for imported goods) and up to its retail sale to end user. Our company develops a range of mutually connected products for each stage of merchandise movement, helping to plan production, optimize logistics, manage stock, control merchandise display in the store and so on. We work on a rather wide CIS market.

A rather high demand for our program products is to a great extent conditioned by a significant share of local retail; according to acort.ru (Network trade share n.d.), in 2009 in Russia its share amounted to 80%. While big chains have their own solutions to manage supplies and optimize leftover stock, small stores (corner store being the main format) haven’t had efficient tools for a long time which allowed us to occupy this niche.

Presently one of the main threats to our product line is the stable growth of chain retail during the last ten years, and according to the same portal its share in the food segment achieved 39% in 2018.

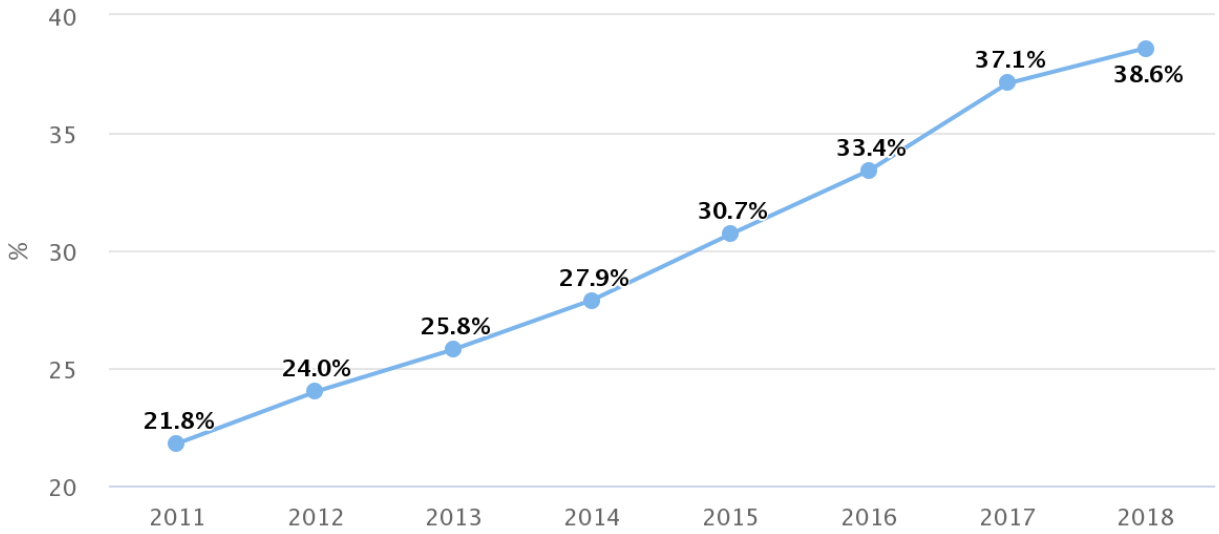

Image 2 Share of chain retail in food segment

According to Nielsen's study (Nielsen: 5 sources of growth in the FMCG market in Russia n.d.), in the nearest five years the share of chain retail in the food segment may grow up to 60-65%.

The constantly growing share of chain sales lowers the demand for our program products lineup. The consequences of this situation already start manifesting themselves in sales decline and may lead to our products losing their relevance. For example, this was the fate of such companies as ICQ, LiveJournal and Nokia who used to be leaders in their segments for a long time but were unable to adapt to the changing reality in time.

To stand up to the challenges created by contemporary trends we have to constantly update our product lineup.

In the framework of this research I put myself a task to find and validate an opportunity for a new product. I defined the following criteria:

- The product has to be aimed at the same market (FMCG);
- It has to complement the existing company products;

- It has to be capable of breaking even within two years after launch;
- It needs to have sufficient upscaling potential;
- It has to be relevant for five to seven years into the future with regard to current FMCG market forecasts.

According to the same Nielsen's study (Nielsen: 5 sources of growth in the FMCG market in Russia n.d.) the role of field forces (sales reps and merchandisers) at FMCG market will be growing in the nearest five years. I decided to focus my search on this segment.

CHAPTER I: ROUTE OPTIMIZATION

1.1 Problem statement

One of frequent problems current clients come with is optimization of field forces daily routes to reduce time spent for visiting one store and to save fuel costs.

Most often it is about optimizing a four-week schedule of visiting stores according to the given regularity.

I analyzed the initial data available in our database to evaluate the scale of the problem:

- The current product now manages activities of 5,000 field forces;
- They perform about 10,000,000 visits per year;
- 70% of them drive a car;
- Their average distance covered is 35 km per day;

Therefore, total annual budget for the fuel amounts to about $3,000,000. If we manage to optimize it by at least 5% this will mean annual savings of $150,000. Besides, less time on the road will allow each field force to service more stores which might lead to additional savings.

As this demand was voiced many times by several existing clients and is rather significant I decided to research the possibilities of optimizing field forces routes.

1.2 Initial task assignment by the client

Each field force has an assigned pool of stores he/she is to visit.

Every day the route starts and ends in a fixed point which has set coordinates; this might be a company office or the force's place of residence depending on work conditions. The time spent on the road from the starting point to the first visit point

and from the last visit point to the finishing point can be either accounted for and paid for or not, depending on the arrangements with the field force.

Each store has coordinates and one of the required visit modes:

- Once a week, on any day (e.g., on Mondays);
- Once every two weeks, on any day;
- Twice a week (Tuesday and Thursday);
- Three times a week (Monday, Wednesday, Friday);
- Every working day.

The routes are cyclical and repeat every two weeks.

The stores have to be distributed by days according to the given regularity of visits so that the number of covered kilometers is minimal.

1.3 Research and reformulation of the problem

For a pilot project, upon client's consent I took actual routes of 24 agents who covered a small town in Ukraine.

In the initial formulation of the task, the most logical solution was to clusterize stores by neighborhoods with their further distribution over the days of the week. But such obvious and direct solution had several significant drawbacks as it turned out during the very first test on pilot data:

- It didn't take into account the necessary time for task completion in a store and led to accumulation of all stores in a specific neighborhood in one day. As it turned out, the employee spends 30 to 60 minutes in each store depending on the tasks they have.
- Though stores may be located close to each other they can be divided by a railroad or located on a one-way street so the time spent on the road between them does not correlate with the physical distance.

For further work on the solution I did the following:

- I added “time necessary for task completion in a store” parameter into the list of requirements;
- I added force type – pedestrian or car;
- I built the matrix of all distances between the stores assigned to one force;
- I reformulated the problem using the theory of constraints.

In the end of this stage, the new formulation of task was the following: to build a cyclical route for each field force for two weeks with minimal distances to cover with the following limits:

- Total work time for a field force per day does not exceed eight hours, taking into account both the time on the road and the time spent executing all the necessary tasks;
- All stores are to be visited according to the given schedule.

The new task formulation was build according to theory of constraints, i.e. to optimize A target function while adhering to all B constraints. This allowed the use of ready-made tools designed for solving such classes of tasks. This also opened up an opportunity to extend the list of constraints in the future if necessary – for example, to take into account the store’s working hours.

1.4 Wider understanding of the problem

After formulating the task according to the theory of constraints I asked myself whether it was reasonable to choose optimal distances as a target function.

I assumed that a more integral task can be more useful and practical, namely the following:

- There is a list of stores in the region that are to be regularly visited according to the schedule;

- We have to find a minimal number of field forces and their routes able to cover all the given stores while adhering to all the necessary constraints.

In case it is possible to perform all the necessary tasks using a smaller number of field forces the total savings (hiring and training employees, reimbursing car costs) can be much greater than just savings on fuel costs.

Therefore, I tried to redistribute all stores among all the available field forces according to their type and vehicle to minimize their quantity. The main problem I faced at this stage was a sharply growing number of possible combinations and distance matrix as now instead of N small sets of objects per each force I had to work with one large set of objects for the whole region.

1.5 Technologies we use

In the framework of this research the following tools were used:

- OpenStreetMap was used as a source of geodata to calculate distances between different objects. It allows the calculation of both automobile and pedestrian routes. (Geofabrik Download Server n.d.) It allows the download of all maps of Europe for further use, is free of charge and distributed under an ODbL license which allows users to freely share, modify, and use a maps database.
- Open Source Routing Machine or OSRM is installed on a server managed by Ubuntu and works with OSM maps, which allows to quickly and efficiently calculate routes between a significant number of objects without paying for the amount of requests. It was used to calculate distances and the necessary time for automobile and pedestrian routes.
- OptaPlanner is a Constraint Solver written in Java. It solves constraint satisfaction problems using construction heuristics and metaheuristic algorithms. OptaPlanner combines sophisticated AI optimization algorithms

with a very efficient methodology for evaluating intermediary solutions viability. OptaPlanner is an open-source software released under the Apache License. It was used to obtain optimal routes with regard to distance matrix and the given constraints.

- Google OR Tools is a software for combinatorial optimization, which seeks to find the best solution to a problem out of a very large set of possible ones. It includes a specialized library for identifying the best automobile routes according to the given constraints. The OR Tools software suite is licensed under the terms of Apache License 2.0. It was used to evaluate solutions found with the help of OptaPlanner.
- Google Directions API (Directions API | Google Developers n.d.) is a service that calculates directions between locations, used for additional optimization of daily routes taking into account the situation on the roads. It is a commercial service which costs 5$ per thousand of requests. As it was used at the very last stage for finished routes, not a big amount of requests and therefore not that much spending was required.

1.6 Dynamic routing

When optimizing the database of field forces, its efficiency became much lower due to the requirement for a store to be visited by the same employee. This is a historical practice based on the lack of instruments for efficient work of different field forces with the same store and the value of a personal relationship between a field force and a stock manager. Presently there is no practical need for that. As an experiment, I decided to look at an option to optimize the whole store pool in case the constraint of a store being visited by the same employee every time is removed.

In case of such an approach the concept of planning routes in advance changes in general. The task of advanced planning is transformed into a dynamic distribution task when we have a pool of available users and a pool of tasks to be executed.

Therefore, we have a possibility to factor vacations, days off and any other force majeurs.

The gist of the solution is to distribute all visits with a fixed date among all available forces and also to look for optimal additional visits without a fixed date (which can be made on any day of the week).

1.7 Intermediate Results

From the addition 1 you can see the calculations for different variants of route optimization.

For the first variant, I compared current routes provided by the client for the pilot and the routes optimized by me while preserving the connection between stores and specific agents.

As you can see from the table, total distance has been reduced by 4% and time spent by 2% but for specific agents the values fluctuated between -8% and 12%, sometimes manifesting changes for the worse.

To validate the obtained result, I registered trial access to AntLogistic and uploaded anonymized data for route optimization. The obtained result was comparable to the one I had calculated.

During the second stage I compared current routes provided by the client with the following options:

- We find a minimal amount of agents enough to cover all stores while preserving the condition of one store being always visited by the same force;
- We find a minimal amount of agents enough to cover all stores while allowing for a store to be visited by different forces (dynamic planning).

To make a point, I also divided total time costs by the time spent on the road and the time spent executing tasks in a store.

	Original routes	Optimized agents		Dynamic routes	
	value	**value**	**Savings**	**value**	**Savings**
Agents	23	19	17%	19	17%
time on the road	180	155	14%	146	19%
time in the store	1280	1280		1280	
Total time	1460	1435	2%	1426	2%
Workday load	79%	94%		93%	
Distance, km	7176	6058	16%	5850	18%

Table 1

As you can see from the table 1:

- In both cases the number of agents is significantly reduced, i.e. by four (17%);
- Though the time on the road has been markedly reduced (14% and 19%), total time reduction has remained within 2% as the most time is spent to do work in the stores;
- Major optimization in the number of agents was managed through making their working schedule denser – according to original routes, the agents worked 32 hours a week on average, and according to optimized ones, 39 hours. This questions the initial assumption that the task in a store takes 30 minutes on average – most probably this value is underestimated and the optimization result will be much lower then;
- In both variants we achieved significant reduction of distances (more noticeable when one store can be visited by different agents). Similarly to the previous point, in reality the optimization will be a bit lower due to imprecise assumptions about the average duration of a visit.

AntLogistic software turned out to be incapable of calculating the optimal number of agents and routes for the whole region due to a significant volume of input data and therefore a significant amount of possible combinations. So I did not manage to compare my results with their solution.

1.8 Competitors

This solution has several types of direct competitors:

- Other field force management systems including basic functions (optimizing routes for one agent). For example, Soft Serve Business Systems Salesworks (Effective Sales Process n.d.) is one of successful systems with implementation of such function;
- Companies specializing in logistics, e.g. Ant Logistic (Ant Logistic n.d.) actively working on the CIS market. It does not have integration with field force management systems but for a rather reasonable amount (150$ per month in an extended package) they provide services of optimizing the store pool for several agents at the same time. In our pilot their system was unable to calculate a solution for the test dataset but successfully managed smaller amounts of data;
- Specialized API services for routing like GraphHopper (GraphHopper Directions API with Route Optimization n.d.) which can optimize routes for one agent for 150-300 EUR/month depending on the price plan and has the widest possible functions and available integrations for this task. Have great documentation and support. No ability to work with more than 300 points at the same time.

1.9 Limitations and constraints

When working on this task, I faced two problems I was unable to solve:

- Bad quality of initial data – most existing clients do not have a high-quality database of store coordinates and use non-standardized addresses not suitable for automatic processing. Due to a rather significant amount of data per client (between 100,000 and 1,000,000 stores) addresses normalization is not an issue that can be resolved in reasonable time.
- Impossibility of factoring situation on the roads and traffic jams when planning routes. Even a simple rearrangement of two points on the map can significantly change the time on the road and lead to the breach of time constraints. An attempt to factor in the situation on the roads means that we cannot consider the distance and time on the road as permanent values and therefore, building a matrix of distances between all points is impossible.

The first one has a serious impact on the project.

1.10 Financial model and market assessment

This section includes three potential subproducts, each having a different approach to price formation and different evaluation of potential market. All evaluations will be based on the following prerequisites:

- Current amount of field forces serviced in existing products;
- Current market share;
- Evaluation of potential amount of target field forces on the CIS market based on the previous two items is 25,000;
- Possible service penetration into the market is 5-10%;
- Admissible service cost is a third of client's expenses saved.

Optimization of existing routes, depending on the frequency of new points added, can be either a regular or a one-time service. For the first group of clients, a more logical model will be a monthly fee per agent; for the second group, it will be hard to find a price/value ratio appropriate for both parties. Based on the pre-requisites above, I estimated possible revenue at up to 10,000$ per month.

Optimization of field forces database is a one-time service which is actually closer to consulting because it means extended research and staff reorganization. It is extremely difficult to evaluate the market due to its irregularity and long duration of service provision which can take four to six months. Based on a realistic estimate of two or three implementations per year, the possible revenue may amount to 30,000$ per year.

Dynamic routing is, on the one hand, the most profitable for the client which allows it to sell it at a higher price but on the other hand, it has maximal potential resistance in the course of implementation, which reduces its possible market share. Possible monetization amounts to a monthly fee per agent at around 10$. The total possible revenue would thus be up to 10,000$ per month.

1.11 Managerial conclusions

Optimizing store routes per one field agent is a basic service available in competing products and not bringing any significant benefit to the client on top of that. I don’t see any opportunity in it for a separate product or a paid module integrated in the main product. As most work has already been done during this research, this service was included free of charge into the main product to increase its competitiveness.

The service on optimizing routes over the whole region allowing to find an optimal number of agents to cover it has a range of objective drawbacks:

- it needs a lot of resources for calculation;
- it requires the client’s readiness to perform layoffs and reorganize team work;
- it causes resistance during implementation as it changes accepted business processes;
- it requires a high-quality database of addresses or store coordinates which the clients lack in most cases.

And on top of that it is most probably a one-time consulting service as the client won’t need it on a permanent basis.

I don’t see any opportunity to upscale it and build a sustainable business model.

Therefore, the first iteration aimed to optimize the field forces database and their routes did not provide us with an opportunity to create a new competitive product.

CHAPTER II: PLATFORM FOR COLLECTING AND PROCESSING PHOTOS FOR MERCHANDISING

Inspired by Asymmetric Competition, a course from Adrian Slywotzky, I decided to try finding a solution to the problem from another angle: instead of optimizing routes I tried to exclude the very need for field agents' movements.

2.1 User segmentation and opportunities for the product

To find an opportunity for a new product I segmented field agents performing visits and decided to look at their key groups separately.

Commercial agents, about a half of field employees, attend local stores to do the following:

- collect orders;
- work with documents;
- accept cash payments for merchandise.

The solutions for excluding the visits altogether or reducing their amount in this segment are possible but they face significant resistance from commercial agents, more due to the habit than objective factors.

The second segment of field agents is merchandisers most of whom work with retail chain stores. This group of users can be segmented into three narrower segments:

- Producer's merchandisers who collect statistical information on merchandise display and have agreements with the chains on merchandise display management (they are able to physically move the goods in the store);
- Producer's merchandisers who collect statistical information and control merchandise display but the merchandising itself is performed by chain store employees;
- Employees of merchandising agencies who collect statistical information in the framework of market research.

The last two categories always take pictures to confirm the collected data and do not perform any physical interactions with the merchandise and the store staff.

And it is in this segment of field employees that I've seen an opportunity for the new product which could significantly optimize or totally exclude the need for visiting stores by merchandisers and also provide additional advantages to all stakeholders.

2.2 Solution overview

The solution is to create a multi-functional platform which will allow to perform the following key actions:

- To collect photos in the indicated locations which would satisfy the requirements provided (e.g., photos of specific shelves in the framework of price research) through involving freelance agents. These could be both store employees and regular people who live nearby and for the sake of small additional earnings are ready to perform some courier tasks. In particular, this model is successfully implemented by kabanchik.ua platform but in a wider range of various unstructured tasks;
- To verify photos with the help of moderators to control authenticity and assure quality;
- Using staff employees, to digitize the photos made (e.g., so that it is possible to provide prices in numbers tied to product range in the framework of price research or to check the compliance of merchandise display);

If such model is used, the platform clients could be the following:

- Merchandise producers who could commission all three stages and receive a consolidated report as a result;
- Marketing agencies who want to save money during the stage of data collection for further processing and analysis.

The quality of photos and their compliance with the set criteria and locations will be checked both through the program (it would be possible to enter data only if you are in the given geolocation) and through visual control by the moderator responsible for photos acceptance and solving disputes with the agents.

As quality and reliability is an especially relevant issue in the context of involving freelance agents, this model envisages additional options for their control, in particular:

- Special dated tables with a QR code to be placed on shelves during photo collection to confirm the photo's date and source;
- Possibility to give a certain percentage of tasks to different agents and to compare their results as a means of cross-control;

2.3 Opportunities for growth

This model envisages several variants for further development. One of those is integration with automatic recognition systems for photos.

We have successful experience of integration with Intelligence Retail able to determine the following with 96% accuracy:

- Prices tied to merchandise;
- Availability of special offers;
- Compliance with the planogram;
- Display width;
- Lacking items;

The automation of this process will allow regular price check and planogram control in a semi-automatic regime with rather high accuracy.

The second direction for possible development is gamification in photo collection to reduce costs and additionally motivate agents. For example, there is an

auction model when each task starts from a minimally possible price which rises to a set limit by 5 UAH every hour. Such approach ensures the usage of market mechanism so that the task is completed for a minimally possible price.

2.4 Financial model and market assessment

To evaluate the current cost of merchandising agency visit, we compared prices of two agencies providing both one-time and regular merchandising services in different regions of Russia: RetailLux.ru (Merchandising order, merchandising services from RetailLux n.d.) and Rgorks.ru (Rgorks advertising agency n.d.).

The price range was between 1.6$ (130 RUB) and 3.5$ (250 RUB). When the store is visited once a week without any contact with merchandise (only control and data collection) the price range narrows down to between 2.16$ (160 RUB) and 2.70$ (200 RUB), which allows us to approximate the average price for visit at 2.4$.

We didn't manage to find prices per visit on the territory of Ukraine in open sources but after making phone calls to two agencies we received an average price of 2.1$ (56 UAH) for the same service.

To evaluate the cost of visit by the producer's employee, we based our assumptions on a range of offers published at work.ua (Merchandiser jobs in Kyiv n.d.), same frequency of visits (once a week) and 60 visits per week (average number of visits according to our statistics). Thus we received an estimate of 1.95$ (50 UAH). The price turned out to be comparable to that of the agency as the revenue of the latter is obtained by aggregating tasks from several clients during one visit.

In the framework of our pilot project we involved a team of ten students who collected photos for Colgate & Palmolive and Splat brands from the given stores for a week, to teach the neural network to recognize prices. 4,000 photos were collected with the payment of 0.75$ (20 UAH) per visit and 0.11$ (3 UAH) per price entered. When we introduce the auction principle we'll be able to claim the range of 0.55$ (15

UAH) to 1.1$ (30 UAH) with the median of 0.75$ (20 UAH) for a visit on the territory of Ukraine, and most probably 10 to 15 per cent higher for a visit in Russia. When several tasks are available on the same location (which is totally possible if the flow of incoming tasks is large enough) the price of the visit will be even lower.

The cost of photos digitization does not depend on the location of their collection but does depend on the amount of data entered; according to our estimates, it may be between 0.11$ and 0.3$ per photo, in most cases not more than 0.15$.

We should also add income tax to this price which will be collected during the payment (18%) and the service's commission (its pilot value is 20%).

Therefore, the final price of the visit with the help of the service (variable part of costs) will be 1.28$ on average for Ukraine and 1.40$ for Russia, which is a totally competitive price.

In case of further automation the cost of digitization for one photo will amount to 0.1$; this will allow to reduce variable costs and increase the accuracy of data but requires initial investments. Most probably it will be reasonable when a certain monthly amount of processed photos is reached.

Several small clients ready to test this service in a pilot mode collect about 30,000 photos per month. With the commission of 0.25$ off one visit we have 7,500$ worth of earnings per month which should be enough to cover fixed costs.

For all our current products clients collect and analyze about 8 million visits per year. As in this segment the share of our product does not exceed 20% the total amount of visits is no less than 40 million per year.

If we assume that possible penetration of the product in the market may amount to 5%, with the commission of 0.25$ off one visit the total potential earnings can amount to $500,000 per year, which is already a sum of commercial interest.

2.5 Risk assessment

In this section I reviewed possible risks, their probability and degree of influence on the project.

Possible conflicts with the staff in chains during photo collection.

Probability: high; degree of influence: low.

Making photos in supermarkets on the territories of both Ukraine (Photography in supermarkets: implementation features n.d.) and Russia (Medvedev called legitimate photographing price tags in stores n.d.) is legal and cannot be restricted. In conflict situations with the supermarket security guards one should use the prepared prompt card. One should also note that even merchandising agencies having direct contracts with chains face such problem.

Authenticity of photos: incompatibility of date or location.

Probability: low; degree of influence: high.

Both technical (checking the shot's and the phone's location as well as QR codes placed on shelves, independent clock in the app) and administrative means (manual checks by moderators and additional customized cross control) will be used to identify such situations.

Low quality of photos.

Probability: low; degree of influence: high.

It will be controlled by the app during filming. Users with bad cameras in their smartphones will be unable to participate in this service.

Insufficient flow of orders at the project start.

Probability: high; degree of influence: high.

At the product launch generally available registration will be closed. Instead of that, staff agents will be recruited in pilot cities so that they could execute the first

orders. This is done to avoid negative reactions from the first users who, upon seeing no available tasks in the app, will delete it and never come back.

Tax risks during payouts to one-time agents.

Probability: low; degree of influence: high.

This service will work as a tax agent, deducting and paying taxes during payouts to one-time agents. To do this, a bank will be involved which already has a payout solution for natural persons. Preliminary consulting has shown that in this case the risk is minimal.

Risks assessment summary shown in table 2:

Possible risk	Probability	Impact
Possible conflicts with the staff in chains during photo collection	high	low
Authenticity of photos: incompatibility of date or location	low	high
Insufficient flow of orders at the project start.	high	high
Low quality of photos	low	high
Tax risks during payouts to one-time agents.	low	high

Table 2

2.6 Competitors

This product does not have direct competitors. The following might be viewed as indirect competitors:

- Merchandising services section at kabanchik.ua[]. This is not a direct instrument as it does not have functions to distribute and control tasks as well as to aggregate the results. It also does not provide validation and quality control services;

- Marketing agencies. They are not direct competitors because they can become service users themselves to optimize their direct costs and also in case of using complementing services like automatic display control which cannot be quickly checked by a human.

2.7 Competitive advantages

The beneficiaries of this service can be the following:

- Producers who are willing to regularly control their shelf share, merchandise display, prices and availability of products;
- Marketing agencies;
- Any other market participants willing to collect or process photos according to geolocations provided – e.g., control of outdoor advertising on billboards.

The main competitive advantages are the following:

- Price: this solution will allow the producers to do research about twice cheaper than the current market median, and marketing agencies will be able to reduce their costs;
- Speed: the term for doing research can be reduced to three days, with the first data available on the same day, which will allow to correct the task on the fly, if need be;
- Wider coverage of the territory which cannot be ensured in case of standard approach. The coverage will include both cities and accessible stores because marketing agencies work only with a fixed list of locations.
- A possibility not to hire a special team of merchandisers for the producers or to have fewer of those, exclusively to manage goods display or process the data obtained through the service.

Additional competitive advantages:

- A possibility to automate photo processing which will reduce the number of errors and enhance the accuracy of the result;
- Photos authenticity which will be achieved through checking the picture's geolocation and the phone's location, QR codes placed on the shelves, manual checks by moderator and additionally customized cross control when a portion of tasks will be handed out to several independent couriers.

2.8 Necessary components and technologies

This project envisages the following components needed for its implementation:

- Administrator's web interface allowing to manage the clients' pool;
- Client's web interface allowing to create tasks, determine the information needed for collection and the list of needed geolocations, review the collected data in the form of report or download raw data, review billing information;
- Moderator's web interface allowing to review tasks and photos uploaded for them and also to accept or decline them and solve disputable situations with the agents;
- Operator's web interface allowing to review tasks and pictures taken and to enter the necessary data in a digital form;
- Mobile app for couriers allowing them to see the list of tasks nearby, to reserve a task, to execute it and to upload the necessary photos.
- Billing platform taking all performed actions into account and managing payouts to agents and invoices to clients.

To deliver the platform, the following is planned:

- Full separation of backend and frontend;
- To deliver the backend, usage of LAMP stack + Symfony framework;
- To deliver the frontend, usage of React;

- To deliver a mobile app, usage of React native;
- Usage of REST API with json data structure for communication between backend and frontend.

Such approach will allow to reduce costs due to compatibility of frontend and mobile application code through using React on both platforms.

The total time necessary for delivery of the first version is estimated at 16 weeks of development.

2.9 Environmental changes

During the work on this project COVID-19 pandemic started and kept actively spreading.

As of the beginning of April, the activities of merchandisers for the pool of current clients have fallen by 60%. Some of them have already faced some challenges or expect them in the near future.

According to Retail&Development Advisor (Rgorks advertising agency б.д.), depending on the segment the store works in and its location, retailers' earnings have decreased by 15 to 75 per cent.

On the one hand, it can make this product more relevant as it aims to reduce client's costs. But on the other hand, the focus on internal issues and work strategies in a crisis situation will most probably make the companies more wary and reserved when looking at new solutions.

2.10 Managerial conclusion

Despite the fact that the project has quite complex implementation, it is able to create a long-term marketplace with high demand in the long-term future and fits well with current trends on the FMCG market.

There are no direct competitors at the moment, and substitute products either do not pose a threat, or vice versa, imply the option of cooperation.

Having performed all the analysis described above I believe this product to be rather promising and relevant for the market but not earlier than late 2020 – early 2021, first of all due to the current COVID-19 pandemic and the decline on the retail market that will follow.

In summer 2020 it is necessary to evaluate the current situation on the market and the forecasts concerning its further restoration, and in case of positive results, to resume works on this project for its further launch.

Stage III: Platform for direct orders from outlets

3.1 Window of opportunity

In March 2020 due to COVID-19 epidemic a lockdown was announced on the territory of almost all CIS countries with restrictions to free movement over the cities. This concerned field forces as well. According to the statistics from our clients, the number of visits in March and April fell by 40%. In case of merchandisers this does not pose a direct threat to the main business processes. But in case of sales reps some local stores can be left without goods on the shelves as currently the store places its orders during the visits of a sales rep.

So it is here that I saw an opportunity to create and promote a new product designed for placing direct orders from stores. The very idea of this product is not new but it didn't enjoy wide support and popularity in the past due to the conservative stance of stock managers and sales reps contacting them.

However, the impossibility to perform visits and the risk to remain without goods on the shelves can radically change the attitude towards an opportunity for stores to make direct orders.

3.2 Solution overview

The solution is a multifunctional marketplace, its key function being the possibility of making an order by a store or a sales rep without visiting a store and the need to call it. All platform participants will be working in a single database, which will allow the store to interact with several suppliers at once on the same resource, without the need to use tens of different platforms with varying interfaces and modes of access.

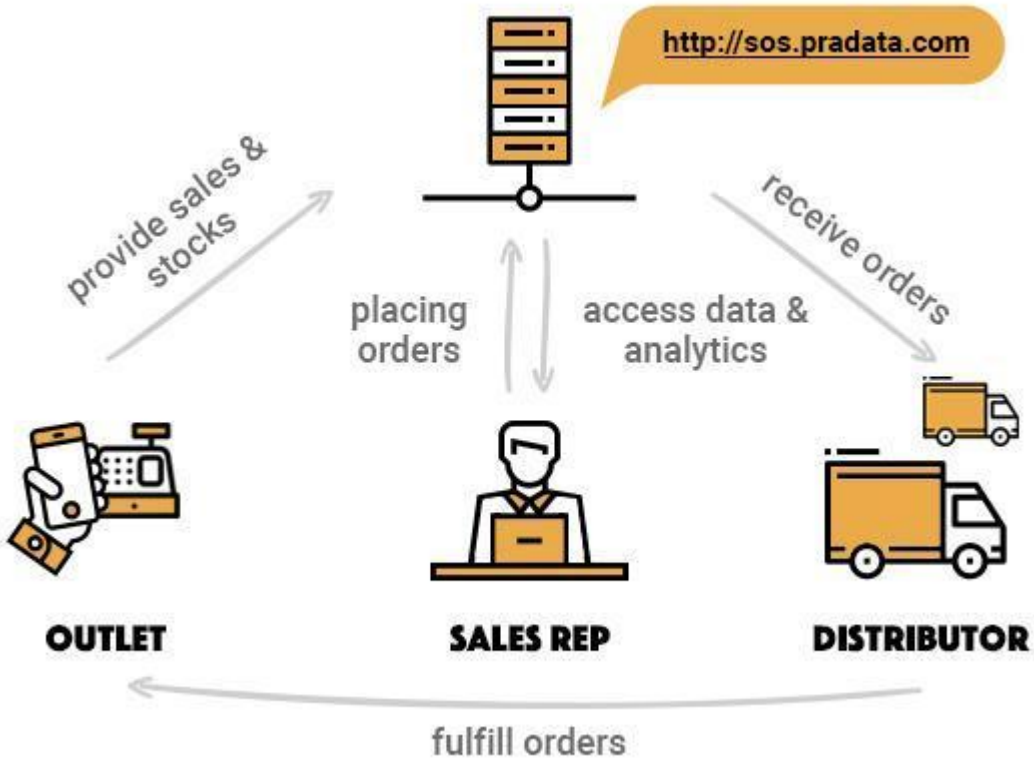

Image 3 Data flow chart

The portal's main functions are pictured on the scheme. Let us look at the process participants and the actions performed by them in more detail.

Distributor.

The distributor provides the main reference data such as:

- The list of stores it works with;
- The list of sales reps and their relations with the stores. This is an optional item as the stores can place orders independently but I assume that most often the order will be placed or corrected by sales reps;
- The list of products available for orders and their stock levels;
- The list of available price lists and their relations with the stores.

Apart from providing reference data, the distributor receives the placed orders into its account over API, confirms store registrations and can build analytics on the data entered.

Store rep.

Store rep, most often stock manager or managing director for one or several stores, working as one legal entity. He/she can register independently on the portal and apply from one or several stores; after the application is accepted, he/she can view the available range of goods, prices and stock levels. He/she can enter the following data: actual merchandise sales for the periods, actual merchandise leftovers for the period, and the desired order.

The store can build statistical reports on its leftovers, sales and orders.

Sales rep.

This is an optional participant of the scheme who can review data entered by stores he/she manages and also correct these data if necessary. He/she can also independently place an order instead of the store based on leftovers or sales provided by it.

The sales rep can build statistical reports on his/her leftovers, sales and orders within the stores available to him/her.

Now let us look at the main work scenarios.

In the most basic scenario the store places an order which goes to the distributor's accounting system. Preliminary consultations with several loyal distributors have shown that such scenario most probably won’t be popular due to frequent incompetence of store reps. According to the provided information, often they cannot correctly calculate the order taking into account a product’s seasonality or one-time events (e.g., world football championship) and demand peaks for certain items associated with those.

The following scenario envisages for a store to enter facts, most often actual sales, less often (due to a long list of the range) leftovers. Based on this information,

a sales rep forms an order which is uploaded over API to the distributor's accounting system.

And the last option, the most advanced, envisages the transfer of all entered actual data into a decision-making system where the order is formed after which it goes back to the portal and is downloaded to the distributor's accounting system.

The portal envisages a function of recommended order (or automatic one if it does not require confirmation) to simplify the formation of optimal range and quantity.

The process of connecting new users is designed in a way to minimize the amount of provided data and actions required from the client. This has been done to accelerate implementation and lower costs for attracting a new client.

3.3 Financial model and market assessment

The final beneficiaries of this service will be distributors as it is them who receive profits from supplying their merchandise to the stores.

The basic version will be provided free of charge until the end of 2020. This decision was made for the following reasons:

- Competitiveness – SSBS E-assistant, our direct competitor, has a similar offer with a free trial period;
- Social component – the usage of this platform will allow companies to keep working during the lockdown when physical visits are restricted;
- Marketing component – a long free trial can attract more clients during the platform launch as it will enable familiarization with its functions and evaluation of advantages from long-term use without additional expenses.

Further on, the following monetization is envisaged for the project:

- A small monthly fixed fee between 100 and 200$. This is a comfortable sum for a distributor; it is based on the price cut of software products for distribution in the lower price segment;
- A micro-sum for each order made by the store, 0.05$. This is also a typical practice on this market conditioned by the fact that the distributor gets profits from each order and shares a small amount of it (less than 1%) with the intermediary service;
- Additional modules significantly expanding or complementing service capabilities can also be provided for an additional monthly fee.

When evaluating the current number of distributors and stores we cooperate with, the market share we occupy, and the frequency of orders from the stores we can estimate the market value at 10M USD per year and 8,000 to 10,000 possible clients at the CIS market.

The desirable market penetration within the first three years will amount to 5-6% according to an optimistic scenario and 3-4% according to a pessimistic one.

3.4 Competitors

This product has several direct competitors:

- MED manufacturers & retailers interaction automation software (MED n.d.). The solution is aimed at the Russian market and was first published in November 2019. No peak in marketing activity was noticed in March or April though. We didn’t manage to obtain their price policy from public sources but most probably the solution is in the upper price segment. It is not a recognizable solution or vendor among our target clients;
- Softserve Business Systems E-assistant. The solution is aimed at wide CIS market. Since March 2020, it has been actively promoted through webinars, Facebook ads and direct sales. It provides favorable connection and usage

terms for 2020. One can obtain an extensive review of functions from a webinar available at SSBS channel (SSBS Webinar "B2B instruments: E-Assistant & Telesales" n.d.). According to my estimate, presently it is the only competitor posing threat.

- Portal OPTIMUM BestShop from CDC Corporate Development Center (Portal OPTIMUM BestShop n.d.). The solution is aimed at the Russian market and was launched a rather long time ago. The possibility to enter data by a store is not among key functions. During the last year no marketing activity has been noticed, and the product looks more abandoned than active.

Out of indirect competitors one may note teleselling systems and distributors' internal solutions. The drawback of the former is in the impossibility of working with big product lists which is going to be reviewed in detail in the section on competitive advantages. The latter are designed exclusively for work during the sales rep visit or call and not for direct use by the store.

3.5 Competitive advantages

Two main groups of competitive advantages can be singled out:

- advantages concerning direct competitors;
- advantages concerning replacement products (e.g., teleselling solutions).

In this section I identified the main competitive advantages of both groups.

Order recommendation system

One of key competitive advantages is a recommended order system hinting a store or a sales rep how much and which merchandise should be ordered. Such recommendations can be built based on several factors:

- Information about store sales (if provided);
- Calculated sales which can be obtained from store leftovers and its orders if the store provides information on leftovers;

- Even if the store does not provide any additional data and simply enters an order, after three to four weeks these data will also be enough for order recommendation, though less accurate.

Advanced analytical system

Except giving out standard statistics on data the system uses, it has a range of reports which can provide direct recommendations for decision-making or specific actions. An example of such a report is Out of Stock when statistical data on leftovers are compared with sales forecast based on sales history, merchandise seasonality and recommended stock for a specific store type. The result of such a report is singled out positions with surplus or deficit stock which might cause the lack of merchandise on the shelf and loss of profit as a consequence.

Analytics for blind zones

A part of analytics is a system of identifying blind zones in the merchandise range. In this solution, stores are clusterized to single out groups of stores similar to each other in a range of features (size, sales volume, location, proximity to infrastructure objects). This enables it to recommend articles the store doesn't work with yet but they are successfully sold in other stores within its cluster.

Long tail

This competitive advantage is key in comparing the product with the teleselling system. During a phone call, a store provides data only on key (the most popular) items, at the same time omitting items with low turnover that have either run out or are close to it. This causes out-of-stock and loss of profit. The situation happens due to a rather long list of items the store works with. In the framework of this solution, when the store uses a recommended order function it already has all the necessary items filled out with preliminary values and the manager only has to review and confirm the order.

Multifunctionality of use

This is system has been initially designed in the most flexible way possible, which allows to implement several mechanisms of its use:

- A store forms its order independently;
- A store enters information on leftovers and/or sales based on which a sales rep forms an order;
- All the data entered by a store are transferred over API into a distributor's decision-making system where the order is formed and transferred back.

Marketplace format

This solution envisages Marketplace format when all participants are located on the same portal. This allows a store to communicate with many distributors via one solution, which is much simpler and more preferable. This is also another advantage in comparison with the SSBS solution in which each distributor has a separate system.

Analytics available to the store

In this case the advantages from using the system will be received not only by the client (distributor) but also system users (stores) in the form of available statistical reports on sales, leftovers and orders placed.

Flexibility and reaction speed (small team)

From "Technological entrepreneurship", a LVBS course by Denis Dovgopoliy, I got an inspiration that small team size and its mobility can also be a competitive advantage, especially when compared to such "giants" as SSBS. We offer a more flexible and mobile solution allowing us to perform integration or customization faster and for a smaller budget. This can be a key factor in the decision-making of some clients.

3.6 Risk assessment

Falling interest after lockdown is lifted

Probability: average; degree of impact: average

True, falling interest in this product after lockdown is lifted will be something bound to happen. But even after the quarantine is over the environment for product promotion will be favorable:

- Distributors and stores who already implement it most probably will keep using the product for a rather long time. It is a conservative audience which accepts changes with difficulty but uses them for years after implementation;
- COVID-19 has demonstrated a new type of risk, namely pandemic and isolation, which was not taken into account before. The press has unconfirmed information about a repeated epidemic spike in the fall (Lyashko announced a possible second wave of coronavirus in the fall n.d.). This will be reflected in general moods at the market and taken into account during decision-making;
- In any case, the distributors have noticed the new product, become interested in it and are ready to implement online orders from stores. Even if the interest declines it will be higher than before COVID-19 outbreak.

Resistance from sales reps or stock managers

Probability: average; degree of impact: average

Both sales reps and stock managers are an extremely conservative audience which doesn’t like changes or optimizations in their operational processes. Moreover, stock managers can have technical difficulties when they start using a new product. However, in the current situation when the former cannot physically perform their work and the latter risk remaining without merchandise on the shelves while only teleselling systems are available as an alternative the resistance will be minimal. After the lockdown is lifted the resistance will most probably increase but stay on an

acceptable level as the product does not leave sales reps without work altogether but only optimizes it.

It is also necessary to note that we have been facing resistance from sales reps for the last seven years of developing software to automate and control their work. If merchandise producers and distributors are on our side, this resistance can be overcome.

Strong competition from SSBS

Probability: high; degree of impact: average

A similar system from SSBS (SSBS Webinar "B2B instruments: E-Assistant & Telesales" n.d.) is really a direct competitor of the offered product. But as we evaluate the market as rather spacious, practically empty and in the active demand phase, there will be enough space for both products there.

It is also necessary to note that we have been successfully competing with SSBS in other products for the last seven years at the market of managing supply chains in FMCG segment and have a lot of experience in this.

Unsuccessful monetization after free trial period

Probability: low; degree of impact: high

Monetization method chosen for this product is typical, and the sum of monthly fee is rather low for the distributor. Moreover, its variable part (payment per each taken order) emerges at the moment of the distributor obtaining the revenue which rules out the situation of distributor paying to his/her own loss.

3.7 Sales strategy

As this platform is planned as a mass one and I aim to attract over 500 clients in the first 18 months, the sales strategy is initially about minimizing expenses per one client attracted and a short cycle of sales and implementation.

The key factor to attract new clients will be a free trial period until the end of the year when they are able to use all functions of the portal free of charge.

The first stage in the sales will be a newsletter to a database of potential clients who are already our clients or users of our products. This database includes about 5,000 email addresses.

The second sales channel will be resource popularization and promotion through producers who want to see sales and leftovers in local retail stores. Each such implementation, if successful, can attract 50 to 300 distributors to the platform. Later, each of those attracted distributors might want to use all platform functions for his/her needs and therefore be converted into a paying client.

The third sales channel will be a one-page landing website with the description of service provided and context ads on the net. When a potential client is brought to the website he/she will be offered to contact a sales manager using a phone or a web form.

Additional ways to promote and popularize the platform could be the following:

- mentions in webinars held for existing clients of the company using other products (cross promo);
- separate webinars and review articles published on theme resources;
- presentations at specialized conferences and exhibitions;
- webinars and articles based on a case format, with successful implementations used as examples (when they emerge).

Besides, after a year I expect tangible network effect which can be manifested in one of the following ways:

- distributor employees migrating between companies might want to keep using familiar tools in a new company;

- stores which have already started using the platform for merchandise from one distributor might want to expand the range to include merchandise from other distributors and shape their interest bottom-up.

The marketing will be present in the following forms:

- regular webinars with update reviews and analysis of typical tasks that will be solved by existing clients on the platform;
- targeted context ads on the net.

To improve conversion in the sales funnel, a sales engineer post will be singled out; this person will assist clients during the first four weeks when they connect to the platform or start studying its functions, answering all their questions within an hour, helping to implement and customize it for their needs.

Risks assumption summary shown in table 3:

Risk	**Probability**	**Degree of influence**
Falling interest after lockdown is lifted	average	average
Resistance from sales reps or stock managers	average	average
Strong competition from SSBS	high	low
Unsuccessful monetization after free trial period	low	high

Table 3

3.8 Opportunities for growth

The following step in the product development will be the use of possible integration with cash register and obtaining sales and leftovers in an automatic mode. This will allow to:

- obtain automatic leftovers over the whole range which is impossible to be done manually in full as the range is very big;

- get rid of some manual work which will reduce the number of errors and enhance data accuracy as well as reduce time costs of system users;
- enter daily data, which will improve their visibility;
- as a result, more precise recommendations could be made for the order and a fuller picture will be present in statistical reports.

The second vector for systems development is the move from statistical reports to recommendations and notifications about problems. For example, in case we receive daily data on sales and leftovers we'll be able to send notifications when the stock level for some item is too little or instead too great. Besides, in case we receive such information from the store accounting system we'll be able to provide analytics with regard to the merchandise shelf life.

3.9 Technologies used

This solution is developed as a web platform available through a regular browser. We expect that most stock managers and also some sales reps will use the platform from a mobile phone so adaptability of key interfaces was factored in from the very beginning.

Technologies used:

- Programming language – PHP 7, using Symfony 4 framework;
- Database – PostgreSQL 11;
- Framework for front-end – Bootstrap;
- Server OS – Ubuntu LTS 16.05;
- Web server – Apache 2;

Such a stack of technologies has been chosen because the current team specializes in it and has a great quantity of existing developments that can be reused.

These are key factors which allowed us to develop project prototype swiftly and publish the first beta version in four weeks after the project start.

During the second stage, Android app development is planned.

3.10 Resources we need

During the first stage of the project most resources, with the exception of developers, can be shared with other current projects of the company and accounted for on an hourly basis for financial estimation of the project.

Further on, the following roles will be required for the project:

- Sales. The process of sales and implementation will be built to minimize time costs of a sales manager. Still, according to my estimates two to three meetings or calls lasting one to two hours each will be required per client. Therefore, one sales manager will be able to maintain 20 to 30 active pilots within a month. So it would be reasonable to have one sales manager per each big region – one for Ukraine and one for Russia. The following compensation model is envisaged: a small fixed salary and 5% from client's payments during the first three years.
- Sales Engineer. For faster implementation and better client experience during this process, a separate person should be introduced who will be responsible for solving technical problems and answering questions. He/she works with active pilots and new clients during the first two weeks after they started using the platform; afterwards, he/she passes them to the support department. At the very start this role can be played by Sales and Backend Development teams but in the future a separate team will be required consisting of two people or more;
- Marketing manager. This person will be required from the very start of the project. His/her goal would be to secure new leads, popularize the platform and, if possible, to reduce financial and time costs to attract each new clients;

- Support team. It is designed for solving technical problems of existing clients. It will provide support over the phone and answer emails. At the very start this role can be played by Sales and Backend Development teams but in the future a separate employee will be required;
- Backend Development Team. It is required from the very start of work on the app and will grow together with the project, number of clients and provided functions. During the first six months two people will be enough; in the future, significant team expansion is possible;
- Mobile Application Development Team. It depends on the list of platforms to be supported. From the very start it will be absent as the web version will be adaptive and available for use on mobile devices. In case of successful start and first clients acquired, we'll launch Android app development which will make the use of service on a mobile phone more convenient;
- Accountant. It will be required after the first clients are onboarded. With the growth in their number the team might have to be expanded to several people.

Apart from staff expenses for the project, the following expenses are also planned:

- Payment for platform placement and maintenance;
- Marketing budget.

3.11 Project budget and cashflow

These are important assumptions the calculations of project's financial part are based on:

- during the first stage, within six months after the project launch the cost of client attraction consists of per-hour payments to the shared sales team, per-hour payments to marketing manager, and direct ad costs;

- during the second stage, a dedicated sales & marketing team is envisaged; therefore, the cost of one client's attraction consists of the team's salary and their bonuses as well as direct ad costs;
- During the first six months the platform is free for all participants; afterwards, only the first two weeks are free;
- **Lifetime customer value** estimated to 7500 USD, as 30 months, with the average monthly check of $250;
- **Customer Acquisition cost** estimated to be from 500 USD to 700 USD, depends on the product stage;
- By the end of the third year total penetration in the market is estimated at the level of 5%;
- The rate of new clients' onboarding is calculated according to normal distribution – smooth growth in the beginning, a peak during the second or the third year, and then a smooth decline;
- The only variables are expenses for attracting a new client during the first stage, when shared team is involved on an hourly basis; during the second stage, all expenses apart from sales team bonuses are constant though they correlate with the number of clients;
- Marketing expenses will grow with time as it will be harder to attract each following client.

The financial plan for the first three years is laid out in Appendix 1. Its main indicators are the following:

- Required investments – $95,000
- Break-even point – 2nd quarter of 2021;
- Return on investment - 2022;
- Net profit as of the end of 2021 before taxes – $73,968;
- With the inflation rate in USD of 2%, project NPV for the first three years will amount to $400,000 and its IRR = 23%;

Forecasted PNL is presented in Appendix 1.

If the sales are noticeably worse I have also produced a pessimistic plan (presented in Appendix 2):

- Sales volume is reduced by 30 to 40 per cent;
- Market share as of the end of the third year is 3% (instead of 5%).

According to the pessimistic plan, the project's break-even point is expected for the 4th quarter of 2022 and ROI already in 2022. Project's NPV for the first three years is negative and has amounted to 6,200$ which is actually not a bad result. Even if a pessimistic scenario comes to life the platform has financial success but a year later – during the third year, not the fourth one.

With regard to the sum required and the indicators laid out, the project can be invested into using company funds, without taking additional loans.

Thanks to Corporate Finance and Financial Decision Making LvBS modules, I got an understanding that a key success factor in this case is the ability to upscale and bring long-term profit, instead of thinking about quick results and fast return of investments.

3.12 Managerial conclusion

I see a rather good potential in this platform, a great moment in time and a positive financial forecast, with return on investment in three to four years. I evaluate the project's financial model as stable and capable of upscaling.

The main project threats are the following:

- decline in interest after the end of the pandemic;
- competition from SSBS.

Despite the strong position of SSBS E-assistant, which is a direct competitor on the same market with a similar approach, I evaluate our chances to occupy 5% of the market as rather high because:

- Our company has successfully competed with SSBS for the last seven years;
- The market is rather big and is now at its initial development stage;
- The products use totally different stacks of technologies and as a result are significantly different though their target use is the same;
- Currently there is active demand for this product that SSBS will be unable to cover on its own due to limited resources;
- We are a more flexible and mobile company; for some clients this can be a key factor.

The main tasks at the first stage are the following:

- Quick platform launch, before the end of the lockdown, when the interest in the platform is at its peak;
- Attracting the first five to ten clients and their retention;
- Strategy review based on feedback from the first clients;
- Building efficient communication channels to attract the following clients.

Project timeline

- September 2019 – work on the project started;
- September 2019 – a pilot project to optimize field forces routes based on real client data started;
- November 2019 – pilot project results received, presentations delivered to two more clients;
- December 2019 – after an analysis, deemed impossible to build a scalable and competitive product based on the services of optimizing field forces routes or the database of field forces itself;
- January 2020 – development of photos collection and processing service for market research started;
- March 2020 – start of lockdown due to COVID-19 epidemic; decision made to freeze the photo collection and processing service;
- March 2020 – start of urgent development of service to collect direct orders from stores;
- April 2020 – pilot projects to connect the first clients started.

Final conclusions

As a result of conducted research, I reviewed three different opportunities for a product designed for field forces at FMCG market:

- The first one is a system for optimizing routes and database of field agents, which did not lead to an opportunity to create a new product because in the end we obtained a service which was not competitive, on the one hand, and did not have any possibilities for upscaling, on the other hand. The key reason which influenced our decision was the impossibility of upscaling due to the lack of high-quality input data from the client, long term needed for implementation (6-9 months) and resistance from the field forces.
- The second one is a system for collecting and processing photos in the framework of merchandising research, which looks rather promising but during the work on it, due to the emerging COVID-19 epidemic, the environmental conditions become unfavorable. I decided to postpone work on this project for six to nine months, afterwards evaluate the situation again and resume work;
- The third one is a system for collecting online orders from the stores. Unlike the system of collecting and processing photos, the current crisis situation is on the contrary an opportunity to change the traditional business processes and create a new product which is right now in demand. I estimate this platform as rather promising. Moreover, I will try to launch it very shortly and check my assumptions against reality.

Coming back to the key task the whole company has before it, we need to transform its product lineup so that it remains relevant and in demand against the falling share of local stores sales in the FMCG market.

I believe that both the system of collecting online orders from the stores and the system of collecting and processing photos for merchandising research can

become good starting points for the creation of new ecosystems; they will also complement each other. In spite of a long way covered and the failure of the first iteration I believe the task put forward at the start of the project to be completed.

The final picture shown in table 4:

Product	**Key factor**	**Decision**
System for optimizing field forces routes and database	impossibility to upscale	give up the product
System collecting and processing photos for merchandising research	bad timing due to changes in microenvironment	come back to the project in six to nine months
System for collecting online orders from stores	using a crisis situation as a driver for sales	launch the platform shortly and analyze feedback from the first clients

Table 4

Latest status update

Presently (as of May 3) the first version of the web platform was launched to collect direct orders using a basic function; its working name is SOS (Save our Stocks).

When working on the platform, we received ten calls or so from potential clients who contacted us themselves in search for an available solution, which confirms my estimates of demand for the product, on the one hand, and our position as a provider of comprehensive solutions at the FMCG market, on the other. According to our clients' estimates, the activity of field force visits has fallen by 45% and demonstrates trends for further decline, especially in Russia and its regions.

As of now about 15 clients received access to the system and are at the pilot stage. The geography of pilot clients includes Ukraine and Russia, in particular:

- Ukraine – Kyiv, Vinnytsia, Poltava, Ivano-Frankivsk;
- Russia – Moscow, Krasnoyarsk, Kaliningrad.

We also started negotiations with one of producers to implement the platform for their whole distribution network in CIS.

Presently there is high uncertainty about further development of COVID-19 epidemic in general and lockdown measures in the CIS in particular. On the one hand, lockdown will be relaxed by the end of May; on the other hand, certain restrictions will be enforced for a rather long time (at least two to three months). This will maintain pressure on the market and the interest in the product will remain rather high.

Presently the following works are being done on the project:

- we continue developing additional modules to expand the product's functions;
- we communicate with clients testing our pilot and collect feedback;

- we study opportunities for integration with cash registers to obtain data in automatic regime;
- We work on creating a one-page landing with the information about the platform and promoting it with the help of context ads.

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APPENDIX

Appendix 1 evaluation of optimized routes

	Original routes		Optimized routes		Savings	
Agent	**time, hours**	**dist, km**	**time, hours**	**dist, km**	**time, %**	**dist, %**
Kell0001	67.85	407.61	66.03	382.11	3%	6%
Kell0002	71.22	426.3	65.19	369.41	8%	13%
Kell0003	44.58	481.31	46.44	507.74	-4%	-5%
Kell0004	85.5	439.7	78.49	369.9	8%	16%
Kell0005	63.95	206.54	61.91	183.33	3%	11%
Kell0006	59.36	162.51	58.88	142.2	1%	12%
Kell0007	63.05	285.98	60.3	265.28	4%	7%
Kell0008	63.21	184.37	60.44	168.26	4%	9%
Kell0009	60.46	164.04	58.62	145.48	3%	11%
Kell0010	64.54	276.06	61.85	252.67	4%	8%
Kell0011	65.05	198.8	65.33	202.06	0%	-2%
Kell0012	60.57	166.75	60.74	178.29	0%	-7%
Kell0013	63.42	398.83	63.88	413.81	-1%	-4%
Kell0014	63.23	361.97	64.33	360.48	-2%	0%
Kell0015	57.11	196.97	58.29	176.25	-2%	11%
Kell0016	40.59	416.55	41.53	440.59	-2%	-6%
Kell0017	38.11	343.45	39.09	371.01	-3%	-8%
Kell0018	66.89	212.08	61.78	199.5	8%	6%
Kell0033	60.11	149.31	59.81	137.82	0%	8%
Kell0034	64.47	314.17	60.88	277.61	6%	12%
Kell0035	63.78	227.97	63.58	222.4	0%	2%

Kell0036	56.72	341.67	52.95	317.41	7%	7%
Kell0037	59.58	311.56	60.07	332.2	-1%	-7%
Kell0038	59.8	241.83	59.98	251.21	0%	-4%
Total:	**1463.15**	**6916.33**	**1430.39**	**6667.02**	**2%**	**4%**

Appendix 2 optimistic financial plan

	2020			2021				2022
	Q2	Q3	Q4	Q1	Q2	Q3	Q4	
New clients	0	10	30	30	30	45	45	120
Total clients		10	40	70	100	145	190	270
Avg price, month	$ -	$ -	$ -	$ 200	$ 250	$ 250	$ 250	$ 250
Operation incom	$ -	$ -	$ -	$ 42,000	$ 75,000	$ 108,750	$ 142,500	$ 810,000
CAC	$ -	$ 8,400	$ 16,200	$ 22,350	$ 27,750	$ 29,438	$ 31,125	$ 178,500
Dev team salary	$ 12,600	$ 16,800	$ 16,800	$ 25,200	$ 25,200	$ 33,600	$ 33,600	$ 174,720
Support team	$ -	$ 3,000	$ 3,000	$ 6,000	$ 6,000	$ 12,000	$ 12,000	$ 62,400
COGS	**$ 12,600**	**$ 28,200**	**$ 36,000**	**$ 53,550**	**$ 58,950**	**$ 75,038**	**$ 76,725**	**$ 415,620**
Total op. expenc	**$ -**	**$ 3,000**	**$ 3,000**	**$ 6,000**	**$ 6,000**	**$ 9,000**	**$ 9,000**	**$ 40,500**
Net Proft/Loss	$ (12,600)	$ (31,200)	$ (39,000)	$ (17,550)	$ 10,050	$ 24,713	$ 56,775	$ 353,880

Appendix 3 pessimistic financial plan

	2020			2021				2022
	Q2	Q3	Q4	Q1	Q2	Q3	Q4	
New clients	0	10	20	20	20	30	30	100
Total clients		10	30	50	70	100	130	200
Avg price, monthly	$ -	$ -	$ -	$ 200	$ 250	$ 250	$ 250	$ 250
Operation income	$ -	$ -	$ -	$ 30,000	$ 52,500	$ 75,000	$ 97,500	$ 600,000
CAC	$ -	$ 8,400	$ 13,800	$ 21,750	$ 26,625	$ 27,750	$ 28,875	$ 168,000
Dev team salary	$ 12,600	$ 16,800	$ 16,800	$ 25,200	$ 25,200	$ 33,600	$ 33,600	$ 174,720
Support team	$ -	$ 3,000	$ 3,000	$ 6,000	$ 6,000	$ 12,000	$ 12,000	$ 62,400
COGS	**$ 12,600**	**$ 28,200**	**$ 33,600**	**$ 52,950**	**$ 57,825**	**$ 73,350**	**$ 74,475**	**$ 405,120**
Total op. expences	**$ -**	**$ 3,000**	**$ 3,000**	**$ 6,000**	**$ 6,000**	**$ 9,000**	**$ 9,000**	**$ 40,500**
Net Proft/Loss	$ (12,600)	$ (31,200)	$ (36,600)	$ (28,950)	$ (11,325)	$ (7,350)	$ 14,025	$ 154,380