



# A DIGITAL TRANSFORMATION OF TOYS

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Business Plan

EIT Digital Summer School

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## Table of Contents

<b>Executive Summary</b>	<b>2</b>
Objectives	2
Mission Statement	3
<b>Opportunities</b>	<b>3</b>
Problem	3
Solution	3
Target Market	4
Competition	4
<b>Execution</b>	<b>5</b>
Market Analysis	5
Analysis Results	7
Advertisement	7
Offline Advertisements	7
Event based Advertisements	8
Online Advertisements	8
Pricing	8
<b>Technical Overview</b>	<b>9</b>
Architecture	9
Implementing IoT	10
Data Analytics	10
Application Design	13
<b>Company</b>	<b>16</b>
Overview	16
Team	16
<b>Finance</b>	<b>16</b>
Start up Expenses	16
Profit & Loss Statement	18
Break Even Analysis	18
<b>Future Undertakings</b>	<b>19</b>
<b>Business Model Canvas</b>	<b>19</b>
<b>References</b>	<b>19</b>

# Executive Summary

In today's world the key determining factor in women's employment pattern is motherhood. Working women are increasingly being judged and compared for not being able to give quality time to their kids. While giving up a flourishing career is not an option anymore, working mothers these days rely on daycare centres and nannies to bring up their children and still feel anxious about their kids. What if, we say, toys are capable of giving these people a bit of relief from these daily worries?

So, we conducted a survey to find out if the parents would like to receive genuine information about their kids when they are out of their sight. Well 78% of them agreed that they would like to have it, provided, it would be a non-invasive way and even would like to spend some extra bucks for it. They explicitly requested for added educational value on top of the existing smart and interactive toys. So we strongly believe that a lot more could be done to transform the contemporary smart toys for the benefit of not only the children but also the parents and the toy manufacturers.

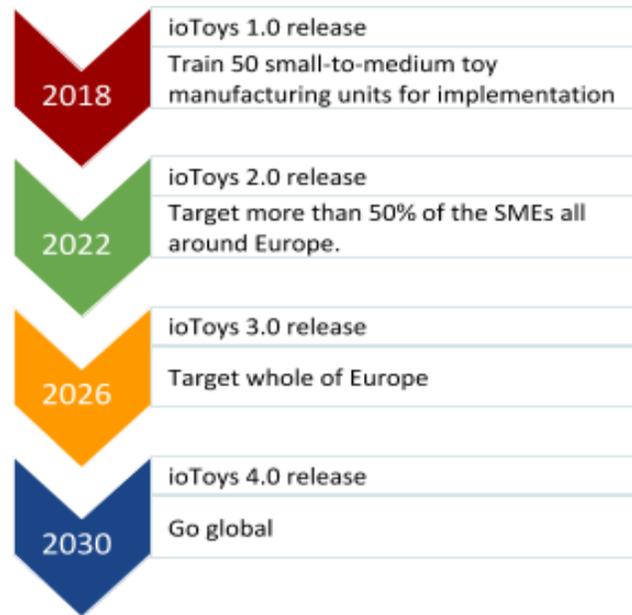
**ioToys** provides an integrated solution in the form a smart toy which help the parents to keep a tab on their kids' moods and emotions throughout the day, track the environmental conditions their kids are in, help the manufacturers assess their products qualitatively as well as quantitatively and at the same time being that loving friend to their children. It will provide the technology to be used in the toys to collect and send data to the parents. It would also provide an application for the parents to receive this data and show interesting analytics on top of it. And a boon to the manufacturers will be a platform where they would study relevant data analytics which is capable of transforming their business for better.

Our business model is built on the toy manufacturers. We would provide them the technology and means to implement the technology in the toys. And we will have a 15% share on the profits incurred by the sale of these toys. We would also provide them a software platform to connect with the toys, collect data and data analytics, for which we would charge them a monthly subscription fees. The subscription fees depend on the level of customization of the software platform.

To summarize, **ioToys** is about making toys 'smarter'. We, as a part of ioToys team, intend to solve the problems working parents face for their children. We will use technology to bring the parents virtually closer to their children so that they could be a part in their kids' growing up phase.

## Objectives

To start making profit at the end of 2nd year mark while having at least 50 small toy manufacturers companies as our customer within the first year.



## Mission Statement

***Making the toys smart smarter*** - is our mission statement. We strive to transform toys from pure entertainment products to something which, on top of being friends to the kids, would guide the working parents to understand their children more and be a part of their growing up phase.

## Opportunities

### Problem

The problem can be divided into two main sections: the manufacturer side and the parents side.

The manufacturer, after it creates the toy, advertises it and sells it to the consumer, has absolutely no feedback regarding the performance of the toy. This lack of data about the product pulls back the improvement process of the toys. The manufacturer is interested in parameters such as the age and region of the consumers, in order to focus the advertisement on the target customer, lifetime of the product, defects on certain batches of products and also which parts of the toys are used and in which purposes. The data collected regarding the usage of the toy will be analyzed and reported to the manufacturer in order to improve the interaction of the toy with its user.

On the parents side, the problem is found in the fact that as they have full-time jobs, the time spent with their children is not enough to have a clear overview over the behavior of their children.

## Solution

The solution proposed is a smart toy , which is constituted by a classic toy with integrated sensors to collect parameters such as movement , touch, temperature, humidity, etc. The data collected from this sensors would be used to give a report and an analysis of the child activity to their parents on their mobile app. As the sensors collects data regarding the environment in which the toy it is used, alarms will be triggered in case of danger. Also, for the toy, additional plug-ins can be purchased , such as GPS tracker, and the parent can activate it in case of need.

The smart toys will send data that will be analyzed and improvements will be suggested to the manufacturer, in order to make better products, to advertise it better and to create a superior experience for the children and parents.

## Target Market

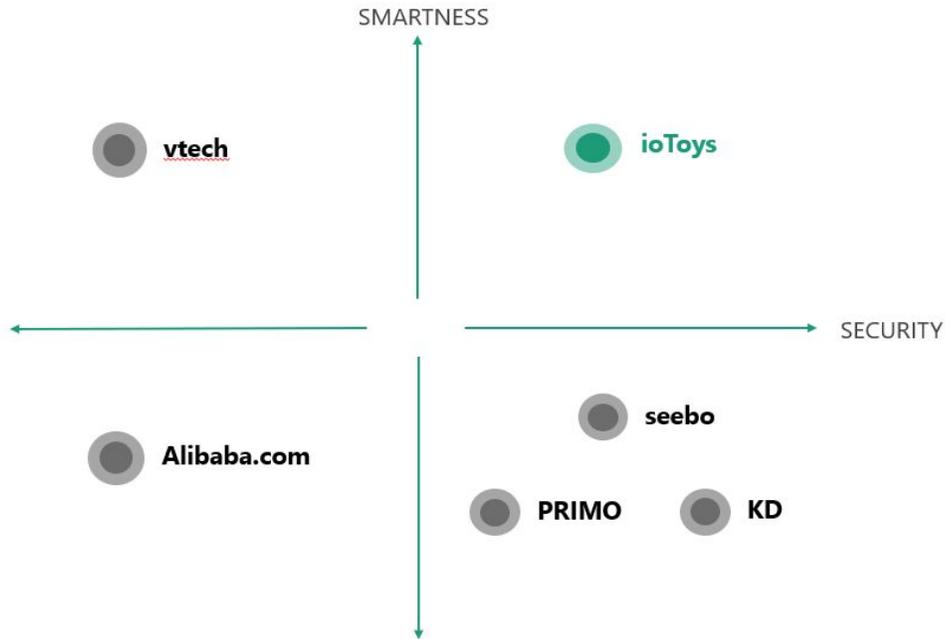
The EU toy industry encompasses 5000 Small Manufacturing Enterprises (SMEs) where 84% of the companies have 0 to 9 employees. The rest 16% comprises of the toy manufacturing giants who are already producing sophisticated products. They emphasizes on data collection and data analytics to cope with the competition and growth. So **ioToys**, with its new technology, aims to target these SMEs because of the following reasons:

- The small to medium sector is mainly focussed on traditional toys rather than smart ones
- They do not have means to collect feedback data from the customers and use the data to increase their sales or improvise their products

We plan to reach a number of 100 SMEs within one year of our launch, taking into consideration the difficulty of convincing them as well as the problems they would face in adopting our technology with limited workforce and knowledge.

## Competition

The European toy industry is the second largest toy exporters in the world, after China. It is a highly competitive market with new shifted focus on smart toys from traditional toys, where safety and technology are two of the most important driving factors. Based on these, we could draw a competitors graph and position our company favourably in the plot.

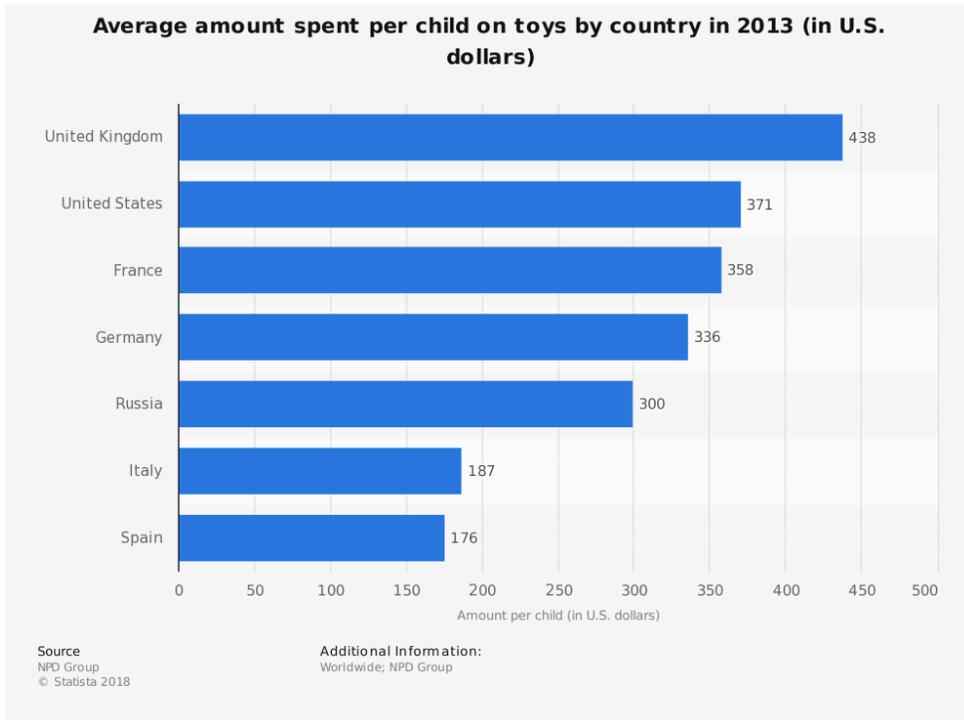


ioToys aims to make smart and interactive toys which are capable of collecting data in a non-invasive way and secured way whereas 'vtech' in the second quadrant is already going through a legal battle due to its ways of collecting data without buyer's consent and proper security. The third quadrant companies generally deal with traditional toys with no means of data collection and so no requirement for security. 'Seebo', 'PRIMO' etc in the fourth quadrant offer secured toys but their products are not able to collect data and extract useful information from it.

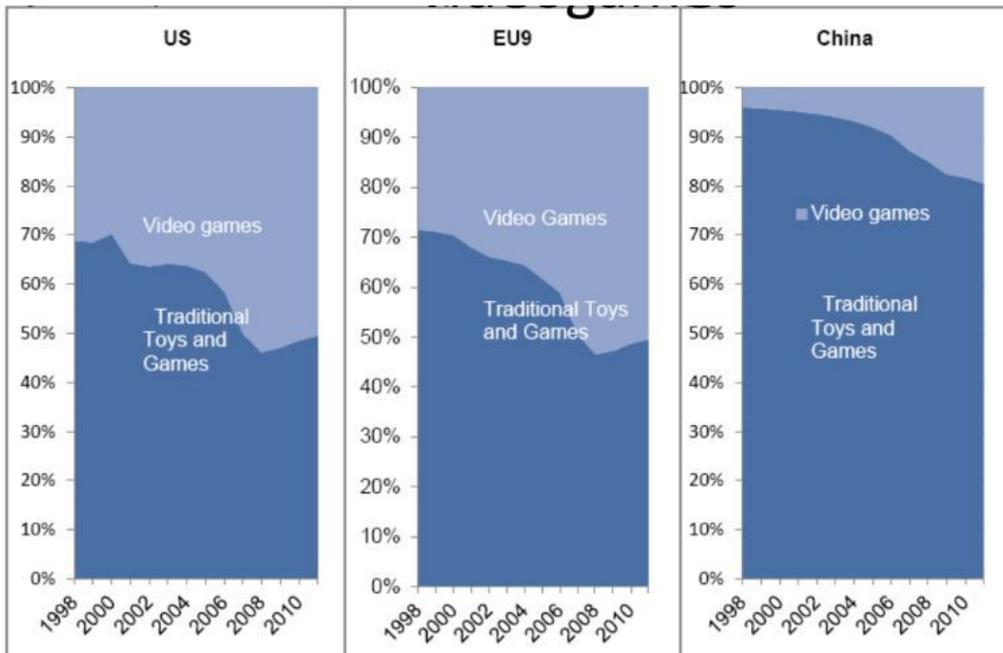
## Execution

### Market Analysis

Traditional toy market is still relatively immense despite the rapid growth of video games market with a reported revenue of \$88.8 Billion dollar in 2016. In US alone, toy market is a \$20.74 Billion dollar industry according to a survey conducted by NDP Group in 2017. While in the EU it has a market size of about \$18 Billion dollars as of 2016. Additionally, the average amount spent on toys can be seen below.



Looking at the comparison between video games and traditional toys from 1998 to 2010 across different regions gives an overview of the market cap between the two major industries.

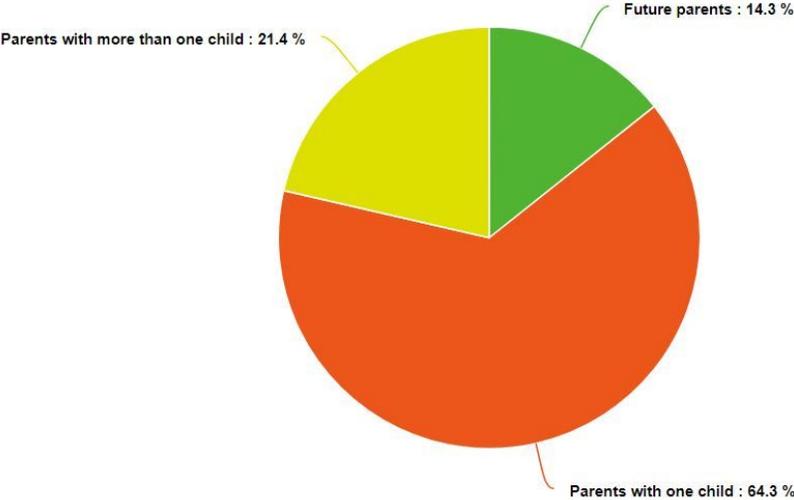


While the top 10 toy manufacturers in the EU show the biggest market share of 10% by Mattel Inc provides an opportunity for our service since we are going to target smaller toy manufacturers, which are approximately 4400 that employee less than 10 people, which falls under the rest of 55% market coverage.

Top 10 companies in the EU market	€ million	% of total
Mattel Inc	1343.6	10.08
LEGO Group	1108.5	8.32
Hasbro Inc	1084.9	8.14
Private Label	575.2	4.32
Simba-Dickie Group GmbH & Co KG	386.2	2.90
Giochi Preziosi SpA	375.7	2.82
Geobra Brandstätter GmbH & Co KG	316.8	2.38
VTech Holdings Ltd	296.9	2.23
Ravensburger AG	234.1	1.76
Takara Tomy Co Ltd	203.6	1.53
Other	7403.9	55.55

## Results

We conducted interviews and surveys among 17 random people to find out if there is need for what we are proposing. Our demographics included future parents, parents with one child and parents with more than one child, their division can be seen below.



The response we got from the parents confirmed that parents indeed would like to know more about the state of their child more importantly 21% reported they would like to know more about the child's

mood while 79% would like to know how they are feeling. 78% of the interviewees admitted they spend less than 6 hours with children due to other commitments like work hours. Interestingly, parents would be willing to spend more on a toy if it has educational added value while having smart interactions with other toys as well.

## Advertisement

Based on the nature of our product, we would like to advertise our product via the following three approaches: advertising from toy manufacturers, launching our advertising campaigns, and utilizing the Internet and social media .

### Offline Advertisements

#### **Advertising from toy manufacturers**

As we are collaborating with small to medium toy manufacturers to transform their traditional toys into smart toys. As most of the toy manufacturers already have their own channel of advertisement, we would like to fully utilize these opportunities during our collaboration with those toy manufacturers.

To be more specific, through the collaboration, we would like to include one extra page in the instruction book of the toy or a separate booklet in the toy box depending on the size of the toy which will include a brief introduction of our company, our online platform, and our main advantages over other online platform for smart toys. Furthermore, we would also like to include a logo of our company on the package of the box.

In this way, parents would be able to know more about the company upon first purchase of the smart toys powered by us. And hopefully, when they are purchasing the next toy, they would be able to quickly locate the toys with our logo on it as they know the extra value we can provide to them with our online platform.

### Event based Advertisements

#### **Launching our advertising campaigns**

Since our goal through advertisement is attracting end users to use our product, we do know that advertising through the channel of toy manufacturers only is not enough. And we would like to promote advertising campaigns that could bring our product closer to parents and children. Thus, we would like to organise offline activities within our target market (European countries) where children can have fun playing with smart toy powered by our platform and parents can better understand the benefits brought to them by our smart toy platform. Small competition regarding the knowledge of how to use our platforms with smart toys will be organized and winners will be getting free samples of smart toys and free memberships of our platform to play around with.

In terms of frequencies and locations of the campaign, we are hoping to arrange at least monthly advertising events in public places where most of the parents and children have access to like kindergartens, toy retail stores, and park with playgrounds inside.

With the help of these campaigns, we are hoping to achieve a stage where our target end users would become more familiar with our products and their benefits.

## Online Advertisements

### **Utilizing the Internet and social media**

Living in the age where Internet and social media prosper, we acknowledge the undeniable impact that they have brought to our daily lives. And we have learned that social media has more and more power day by day for spreading information in a fast manner. Thus, we would like to utilize this power by sponsoring those who has a voice in today's social media. For example, we will sponsor youtubers for their videos whose target audience include young parents with children from 3 to 12 years old. By sponsoring the videos, we would like the youtubers to mention our company name, how does our platform operates, and what are the benefits that our platform has.

Apart from advertising through social media, we will also build our own website through which our potential customers could understand who we are, what we are offering, and how do our products work. Also, we would like to make some online advertising like those in youtube or facebook to approach more people.

## Pricing

In terms of pricing, we will adopt the following strategy.

For the dashboard for manufacturers which will mainly provide information to manufacturers in terms of their toy usage statistics and customer feedback, we will operate on a subscription model with 50 euros per month for a standard model and 100 euros per month for a customized model. This subscription fee will include information for a maximum of 2000 toys, and if the manufacturer wants feedback for more than 2000 toys more than more subscription should be purchased based on the number of toys divided by 2000.

For the dashboard for parents a one time fee of 8 euros per toy will be charged from the manufacturers, and this will be included in the retail price of all the toys. And if the toy manufacturer decide to use our online platform sell to parents for new content update for the smart toys a amount of 15% of the price will be charged.

Features	Standard	Customized
Dashboard For manufacturers	€50 per month (Charged annually)	€100 per month (Charged annually)
Sensor Integration technology + Mobile app For parents	€8 per toy sale	
	15% of the profits incurred	

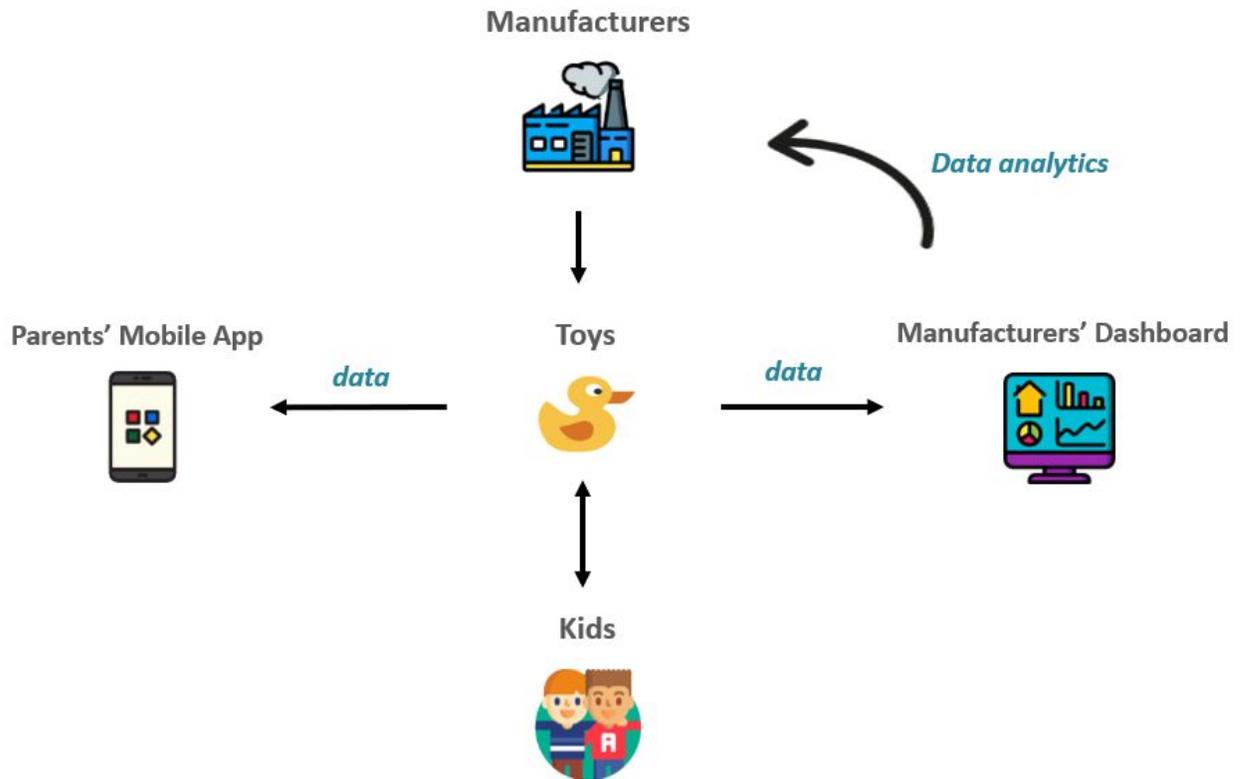
To sum up, our main revenue will come from the subscription fee from manufacturers' dashboards, one-time charges for each toy, and part of the revenue from sales of content updates for smart toys.

## Technical Overview

### Architecture

We start with software development of the mobile application for parents. Side by side, the small toy manufacturing units will be provided training to integrate our technology in their traditional toys like implementing the sensors and the whole ecosystem of data sensing and communication with the parents' mobile applications.

After sale, the toys on activation, will be able to send data to the parents' mobile app. We will provide useful analysis of the data received and show them on the app.



From the manufacturer's side, we will provide them with a web dashboard. The toys will be able to send data to the dashboard as well but anonymously. We will provide advanced data analysis on the data which will help manufacturers analyze the sales or the feedback from using the toy or any fact that would be beneficial for their business.

It's important to mention that security is taken into account in every link of the communication via private keys and encryption algorithms. Authentication is carried out by the server and data is anonymised when it reaches manufacturers.



emulate the parents as “clients”. The website which displays the multiple dashboards for the sensors represent the manufacturer's as “clients” from the server’s perspective.

The way the data is processed and transformed into child’s *behaviour* is done by combining the multiple sensors and the time they produce high signals such as a continuous vibration. We assume the child is utilizing the toy in an *aggressive* manner if the shake vibration sensor is being triggered continuously for a prolonged time. We also estimate the way the toy is used thanks to pressure sensors and the high sensitivity vibration sensor. Other sensors provide relevant information such as the stress the toy is put into and the quality of its surroundings.

## Data Analytics

*ioToys’* data analytics offer our clients, the toy manufacturing companies, actionable insights into the performance of the products and the children’s behavior with respect to the products. For instance, an interactive prototype toy with installed accelerometers, gyrometers, temperature and oxygen level sensors can record environmental factors like temperature and oxygen level of the surrounding as well as the playing child’s moods based on his actions and interactions with the toy. The data analysis will be provided to the parents as well as the manufacturers.

### Parents

It is important for the parents to know about their kids when they are in a play house or with their nannies. They will receive daily data of their kids in the mobile application directly. The application is capable of processing the raw data and convert it pictorially. For instance the application, if finds more than 2 hours of punching action of the kid to the toy, will automatically summarize the mood of the day as ‘violent’. With the help of it, the parents can keep track of the kids’ moods and take necessary actions.

### Manufacturers

Traditional toy manufacturers do not ideally have a way to get the feedback about the sold toys so that they can improve the quality of the toys or increase their sales, most importantly channelize their efforts to prosper the business.

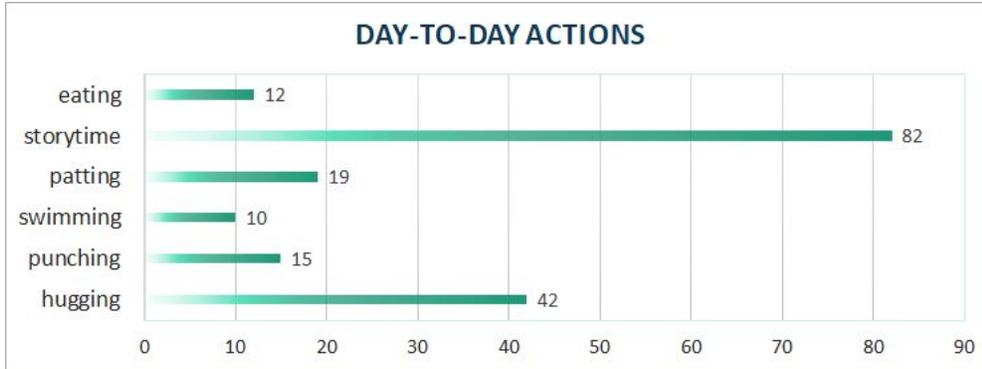
Now the manufacturers will receive data anonymously from individual kids which can be analyzed based on region, age, time to understand the toy usage patterns.

**Below are some examples of data analysis we did on real data collected from a prototype toy.**

#### I. Day-to-day actions of a child (for Parents)

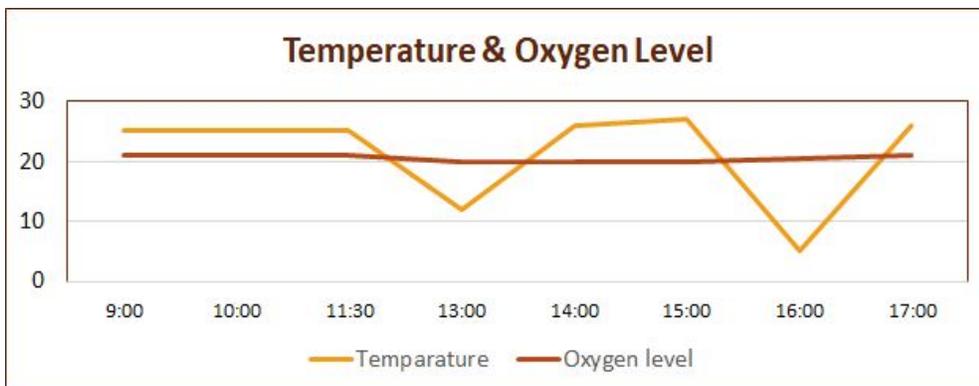
Based on the sensor recorded data, we plotted the time spent by a particular kid interacting with the toy. E.g. the kid spent 10 minutes swimming which means the the kid was playing with the toy in the swimming pool. Also, he was punching the toy for a total of 15 minutes.

By studying daily actions of the kid, the parent can keep a track on their kid’s moods throughout the day, whether the kid was being violent or he is spending too much time in the water.



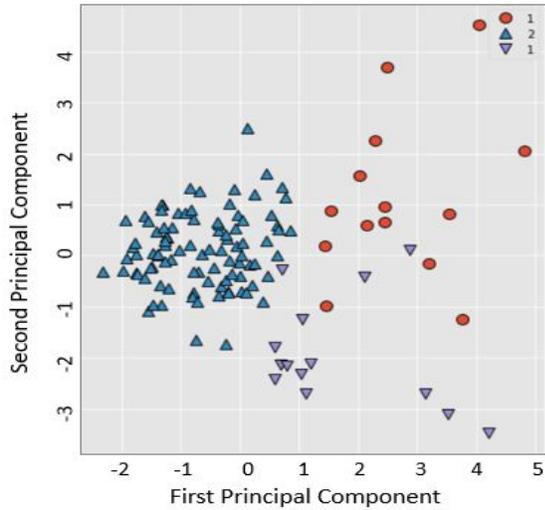
## II. Playing conditions of a child (for Parents)

The toy is capable of sending measurements of temperature, surrounding oxygen level, humidity etc to the application through which it is easy to understand if the ambience is healthy for the child. E.g. in the below graph we can see that there has been a drastic temperature level drop between 11:30 a.m. to 13:00 p.m. which says that the child has been outside for some time.



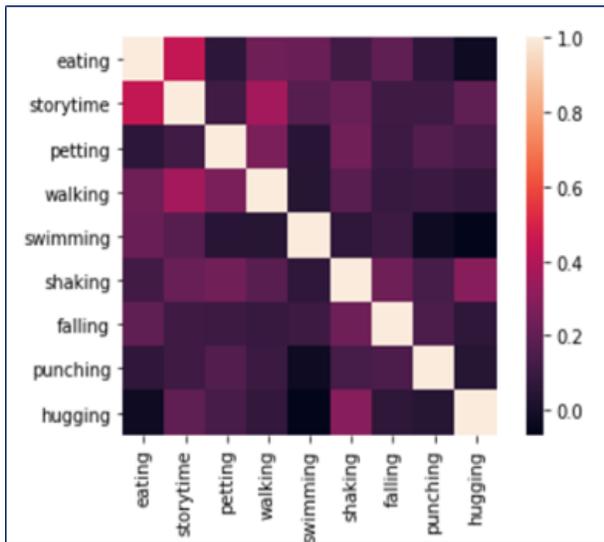
## III. Clustering of kids' actions based on country (for Manufacturers)

We had daily actions of 122 kids from three areas France, Germany and Spain. The data was ten dimensional which is why we performed Principal Component Analysis to downsize the dimensions and ran clustering algorithm on it. We obtained three clusters based on the actions and the regions of origin of the kids, which on further analysis will reveal the relation between the 'typical' actions of a kid from a certain region.



#### IV. Correlation among kids' (for Manufacturers)

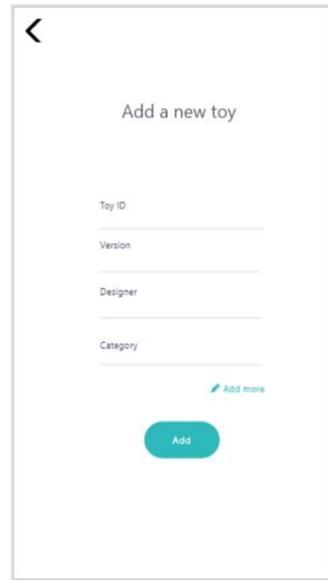
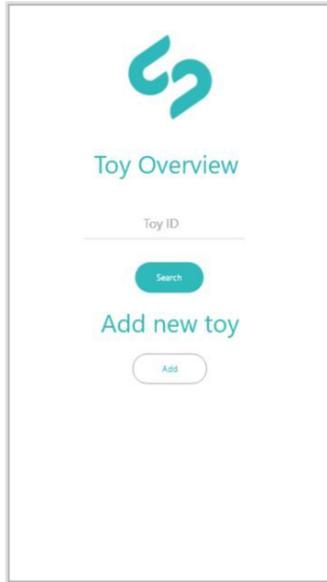
We generated a heatmap with the activities of the kids and as it can be seen, a kid who spends more time swimming is more likely to spend time hugging the toy as well. Or a kid who spends more time doing story time activities is less likely to spend time eating with the toy.



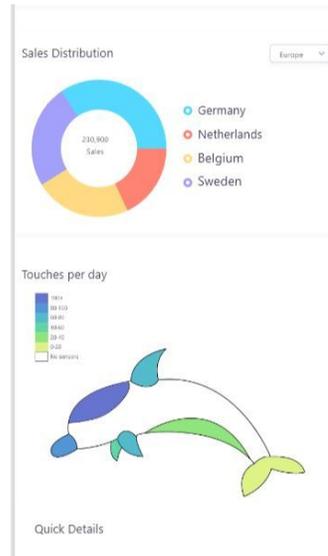
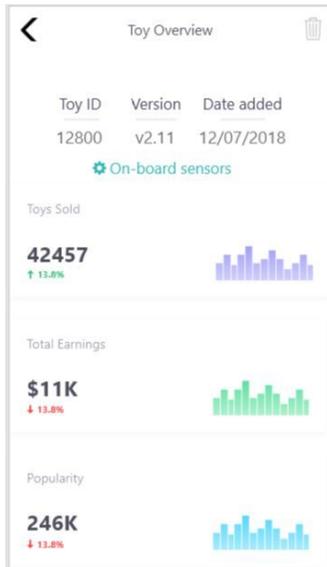
## Application Design

To enable stakeholders, understand the technical flow of information better we created prototypes for our applications using Justinmind prototype and Adobe XD, for both parents and toy manufacturers.

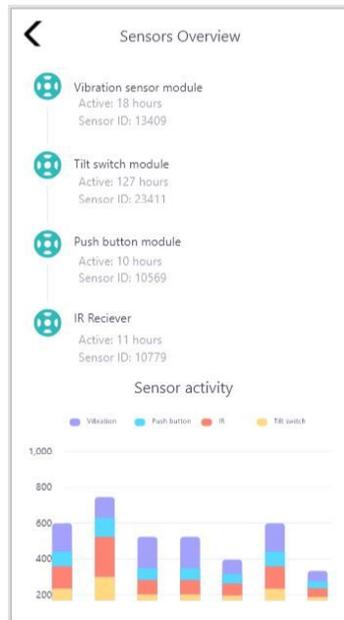
Firstly, the toy manufacturers are presented with a minimalistic homepage from where they can search for a particular toy using its toy ID or add a new toy (as seen below).



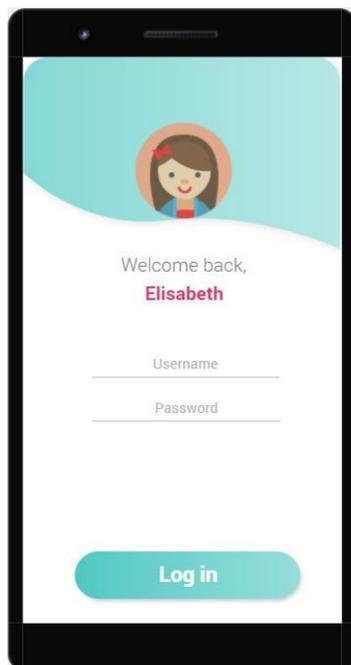
Furthermore, once the manufacturer enters a specific toy ID that they want to search for, they are given an overview of all the relevant information associated with that particular toy. For instance, how popular the toy is, how many units are sold, regional statistics, sales distribution etc. (see figure below).



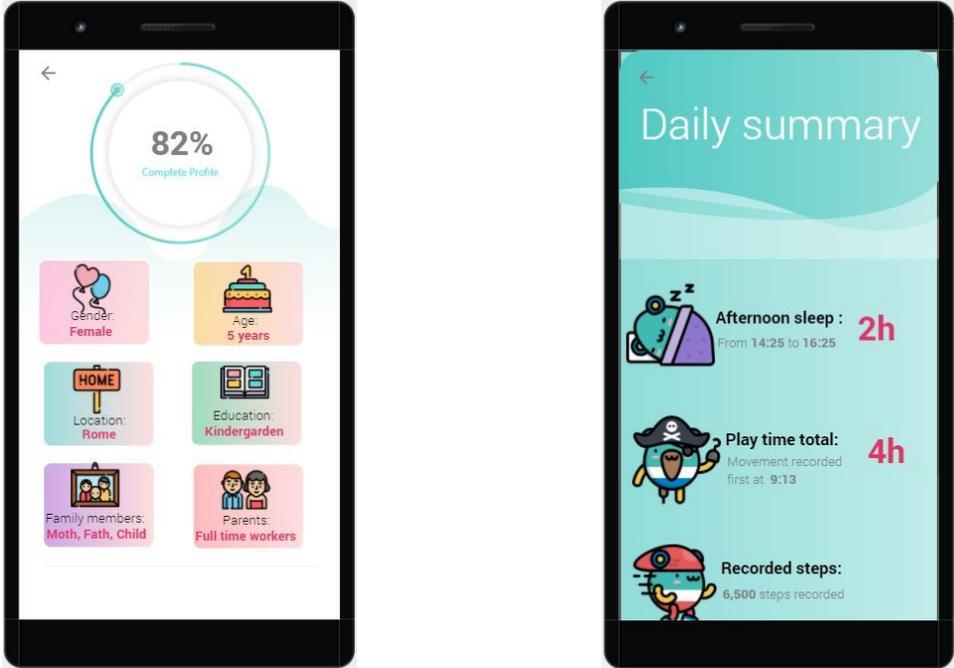
Lastly, the toy manufacturer can inspect what sensors are placed on board the toy (as seen below), how long they've been active for, the most used sensor, how a particular sensor was triggered or estimating the life and durability of the sensors and the toy itself.



For the parents we made a separate application that has a much simplistic approach in terms of the functionality it offers in combination with the toy so that parents find it easy to use without getting overly complicated with details. As seen below once the parent logs in they are given an overview of the features connected with toy and the data generated by the sensors to create summaries.

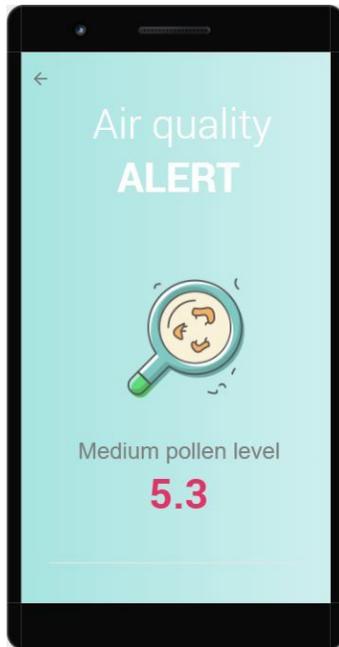


Moreover, parents can customize the application by allowing what kind of information the sensors can have access, in accordance with the new GDPR, hence giving parents the complete authority over the information used by the toy. After which they view summaries based what permissions were given to calculate information like sleeping pattern or play time during the whole day or month.



The parents can fill in a profile for the owner of the toy , such as gender and age of the child , the education in which the child is enrolled , the family members and the working status of the parents. The profile details feeling is not mandatory but is useful for the both for the analysis provided to the manufacturer and to the parent, the child being framed into a specific group .

Besides the daily and monthly summaries, parents have access to information processed by the individual sensors like temperature or humidity sensors to get more insight about the environment their child is in. The application can send alarms in the form of notification to the parents in case of a drastic increase or decrease of temperature in the room or if the toy is placed in a room in which the pollen level is higher than medium.



## Company

### Overview

The company was founded when Reply.IT, a consultancy and system integrator approached our team with the purpose of establishing a solid business plan for the new generation of IoT enabled toys. We at ioToys in conjunction with Reply.it, challenge the ways traditional toys use technology to deliver an attractive proposition to not just the toy manufacturers but to the parents as well. Our integrated solutions in the form of smart toys revamps the way in which parents learn about their children wellbeing and preferred type of toys. Our toys also enables manufacturers to continuously improve their toys by getting constant feedback on their toys' performance hence giving them insights into how they can improve their sales.

### Team

# Finance

As already stated, our company intends to create revenue both from the sales of the toy itself and the mobile application to end customers and from the platform offering feedback information to the manufacturers. Additionally, we have identified as our most important expenses, the cloud server fees and the costs for developing and maintaining such an app and platform, which also include the salaries required to this end.

## Start up Expenses

Areas of Expense	Percentage	Cost
Advertisement	43%	100k
Salaries	34%	80k
Rent & Cloud	9%	20k
Travel	9%	22k
Miscellaneous	5%	12k
<b>Total</b>	<b>100%</b>	<b>234k</b>

Advertising	43%	100k
Salaries	34%	80k
Rent&Cloud	9%	20k
Business Travel	9%	22k
Misc	5%	12k
Total	100%	234k

In terms of start up expenses, our plan for how much money is needed during the first year is as follows. In total, we divide all the expenses in 5 categories, advertising, salaries, rent&cloud, traveling, and Miscellaneous Expense.

For advertising, we hope to organize at least one major advertising event per month, and hopefully will have event each week during summer and Christmas seasons. Our approximately reserve 8k per month for advertising event which should be able to cover the rent for advertising place, cost for set up stages or tables, and cost of the smart toy as presents.

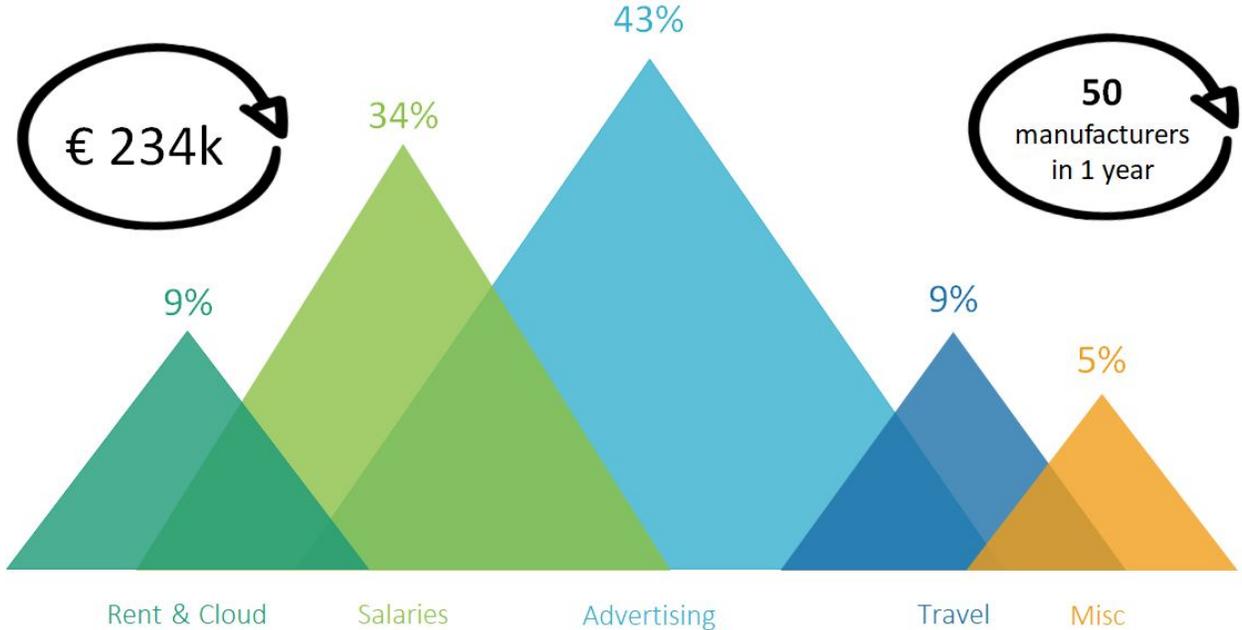
For salaries, we would like to hire 3-4 full time employees and several others for part time during busy times.

For rent and cloud expenses, 10k will be devoted for the rent of a office which will serve as our base. The other 10k will be used for the rent of cloud service that is required by our platform.

For business traveling, our budget for the first year is 22k which is intended to cover the cost of traveling for our employees to approach potential customers, cost for business meetings and meals, and the cost of traveling for advertising campaigns.

Finally, a budget of 1000 euros per month is reserved for miscellaneous expense that are out of our expectations.

All the expense above, which sums up to 234k euros, are based on our estimation before starting the business. Our plan on how to spend the budget will change accordingly if things do go as expected.



### Profit & Loss Statement

Based on the previous section, we expect our main expenses to be salary costs. These costs are for the creation and maintenance of the mobile app and the platform, which require both backend and frontend development, solutions and upkeep. The second higher source of expenses are rental fees, both for our offices and the backend cloud infrastructure. Based on an elaborate financial plan, we have calculated that our monthly expenses will, on average, sum up between 55,000 and 60,000 euro.

Taking into account that the toy market is highly diverse and a lot of manufacturers and toys already exist, we do not expect our sales to be high in the first few months of our company's operation. Therefore, we expect our company to have higher expenses than profits for an extended amount of time, until the product becomes established in the market and sales start increasing. We expect that sales can increase relatively quickly as the size of the toy market is quite big and new products, offering new services can indeed sell well when their benefits start being recognised by consumers.

We, therefore, expect our losses to start stabilising by the end of our first year and our cumulative debt to reach its highest point of around -235,000 euro in the middle of our second year. Based on our calculations, if by the end of the first year, we manage to gain around 50 SME toy manufactures as customers, then, by the end of the second year, our profits will be significantly larger than our expenses, and therefore our debt will be paid back relatively quickly.

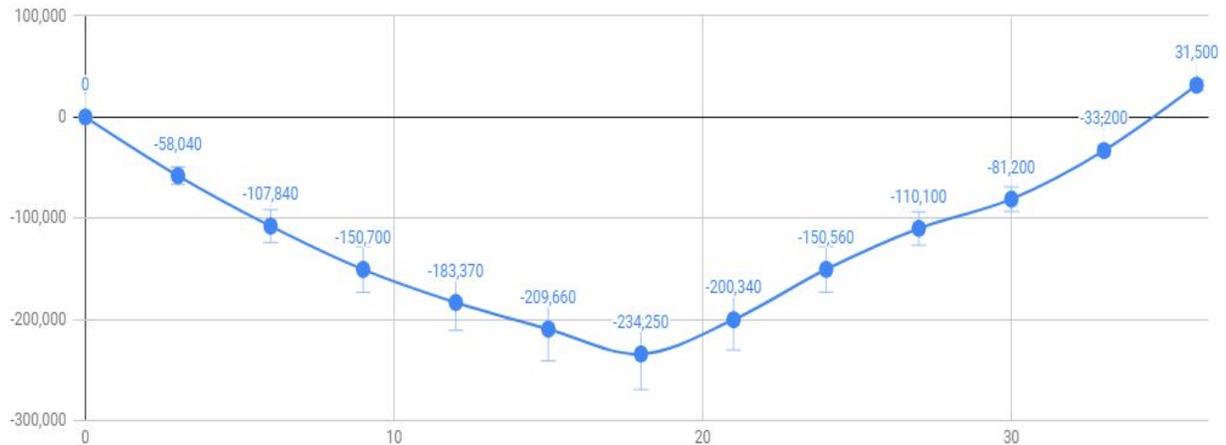
It is worth noting here that, since our monthly expenses are expected to be relatively stable until our company starts scaling up rather dramatically, our company could also become profitable based only on individual toy sales, even if we do not reach our intended target of attracting 50 toy manufacturers as customers within our first year. Since toy sales are also the aim of manufacturers themselves, we can expect that our company can be based on this synergy of interests between itself and the toy manufacturers, in order to prove profitable within less than two years.

## Break Even Analysis

Based on the previous section, we expect our company to break even in less than 3 years and from then on, be profitable. In particular, as it can be seen on the following figure, we expect that we will have a cumulative debt of -234,250 euros after one year and a half and from that point on our company will start to have more profits than losses, therefore breaking even after less than 3 years since the company was formed. To this end, we assume that we can reach either 50 SME toy manufacturers as customers within our first year of operation, or that the sales of the toy will be more than 10,000 per month by the middle of the second year. Therefore, in our case, quick expansion of the company's outreach is essential.

Nevertheless, taking into account the size of the market and the number of toy manufacturers, we believe that either assumption (and both at the same time) are rational. We also note that the scenario being examined and presented is neither too pessimistic nor too optimistic. For example, in the best case scenario, both assumptions will prove true, leading into an even faster break-even point, and in the worst case scenario, entering the market will take a bit longer, with the break-even point occurring at the end of the fourth or fifth year. In either case, however, once we are able to truly enter the market, by establishing our product in it, a quick and high profit rate is bound to occur based on the size and characteristics of this market. Thus, we note that we have identified that one of the more significant obstacles that our company faces is successfully entering the market. To this end, we are considering leveraging the synergies of toy manufacturers in order to increase toy sales, which is one of their own aims, too.

Cumulative financial position



## Future Undertakings

## Business Model Canvas

<https://canvanizer.com/canvas/wu33gbH9kFnOC>

## References

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