

# Market and Competitive Analysis

RTLS



“ Real-Time Location System Based Solutions ”

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# 1. Market Analysis

## 1.1. Main Market Premises

A market trend that has appeared during the last 15 years initially in the logistics market sector has been the advent of RTLS solutions. A real-time location system (RTLS) is the technology used to find, track, manage, and identify the geographical location of a target on a real-time basis with the help of tags and readers. This market was mainly based on the use of active RFID technology for indoor application. Furthermore, the rapid proliferation of mobile phones, especially smart phones with their adoption of multiple wireless technologies, which has provided stronger interest in making such solutions more mobile.

Zernam has chosen to adopt the new Bluetooth Low Energy beacon technology standard as well as other new state-of-the-art technologies as core elements of the solutions that it proposes to the market. The competitive advantages of such technologies will be explored further in this document.

Furthermore, based on many of Zernam's core technologies and architecture are established for use in RTLS and LBS markets.

The type of solutions that Zernam is providing are not to be restricted just to a local or regional market. The market outreach is intended to be global.

## 1.2. Environmental / PESTEL Analysis

It is important to start with an analysis of the higher environmental conditions for the targeted market. The main environmental aspects considered at a macro level are: Political, Economic, Social, technological, ecological and legal aspects.

### 1.2.1. Environmental Analysis of RTLS Market

Political	Economic	Social
<ul style="list-style-type: none"><li>● Push towards more investment for improved cost-effective logistics and operational infrastructure. This is an important prerogative for many countries to remain competitive</li></ul>	<ul style="list-style-type: none"><li>● Mainly positive economic outlook for the next 2-3 years in most countries.</li><li>● Logistics is one of the most important economic sectors.</li></ul>	<ul style="list-style-type: none"><li>● Large segment of the population are weary of technology that may endanger their right to privacy</li><li>● There is a need for tracking solution for high security venues</li></ul>
Technological	Ecological	Legal
<ul style="list-style-type: none"><li>● The mature RFID Technology dominates. Considered limited for RTLS application</li><li>● RTLS is often a subsystem of EAM or ERP solution at enterprise level</li></ul>	<ul style="list-style-type: none"><li>● Helping to better manage logistics could have important positive impact on the ecology - less wastage</li></ul>	<ul style="list-style-type: none"><li>● No major effect</li></ul>

As can be seen, the environmental situation for RTLS is quite positive. RTLS Market is used in a multiple of market segments, nonetheless they have many commonalities to each other and similar environmental issues.

### 1.2.2. Environmental Analysis of Indoor LBS Market

Political	Economic	Social
<ul style="list-style-type: none"> <li>● Need for technologies to address the future growth and security needs</li> <li>● Some countries remain politically unstable and need to be avoided</li> </ul>	<ul style="list-style-type: none"> <li>● Mainly positive economic outlook for the next 2-3 years in most countries.</li> <li>● Trend towards improvement and better cost effective use of infrastructure</li> </ul>	<ul style="list-style-type: none"> <li>● Large segment of the population are weary of technology that may endanger their right to privacy</li> </ul>
Technological	Ecological	Legal
<ul style="list-style-type: none"> <li>● High proliferation of mobiles phones that have multiple communications standard</li> <li>● Public pressure may cause communications solutions providers to restrict tracking and identification ability</li> </ul>	<ul style="list-style-type: none"> <li>● No major effect</li> </ul>	<ul style="list-style-type: none"> <li>● There are already data privacy laws and regulation in place and which need to be acted upon. These are more importantly regulated by OECD, EU, USA and in many developed and emergent countries</li> </ul>

As can be seen seems, the environmental factors are neutral to slightly positive. Many of the negative factor are manageable. Location-based solutions are used in multi-market segments, nonetheless they have many commonalities to each other and similar environmental issues. The economic prerogative of the private sector is more important than that of the public sector.

## 1.3. Market Segmentation of RTLS

### 1.3.1. Identifying Market Segments

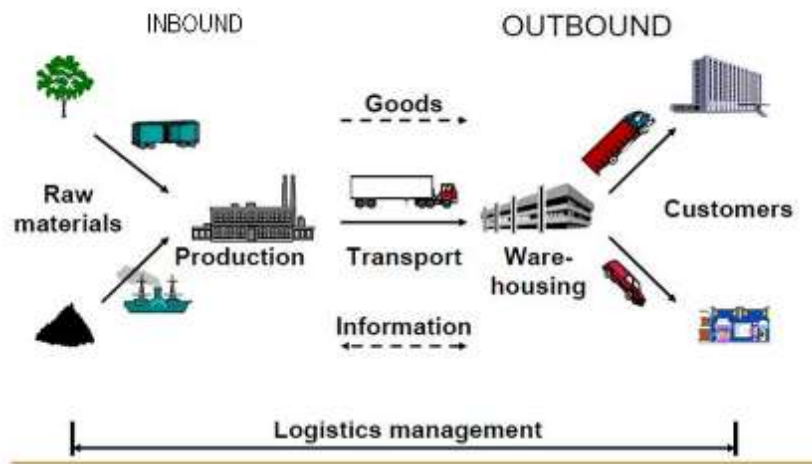
The applications and market segments to which Zernam can provide its solution vary widely, however RTLS has shown to impact the following main areas:

- Healthcare
- Transportation
- Logistics
- Manufacturing
- Industry
- Defense & Security
- Education
- Retail
- Hospitality

In all of these market segments there is a need for a new more efficient and dynamic asset and people management solution. They want solutions that are not gated or scanned at specific points as has been the case with passive RFID or NFC technology, they need to be able to track objects live. However, RTLS only makes sense for assets of high value or for employees and customers.

### 1.3.2. Asset Tracking and Monitoring System

The main logistics business and asset management processes make important demand on efficient and cost effective tracking and monitoring of goods. The following graphic illustrates the main logistics management processes:



Besides, the more obvious need of tracking the movement of goods, the more important priority for many logistics companies is the cost of warehousing. The ability to store, locate, monitor, move goods efficiently, plus the need to optimize storage place use, minimize wastage and being more expedient is key operational prerogative. For this reason the logistics industry makes important use of tracking and monitoring technology. There is important increase in investment toward new ICT logistics infrastructure and the evolution towards automated logistics. The seamless end-to-end process flow integrated logistics tracking and monitoring of goods is an important consideration in the industry.

Technologies currently in use are barcode and RFID systems and more recently GPS systems have also made in-roads. There is strong interest of wireless tracking technology as well. The need for better tracking technology solution is more important for high value goods, especially for:

- Aerospace
- High Tech
- Medical Goods & Equipment
- Capital Industrial Goods
- Automotive parts

The advent of state-of-the-art RTLS solutions such as those proposed by Zernam in the market is seen as a means to achieve high efficiency, reducing wastage and cost, while having a better control of a company's valuable assets.

### 1.3.3. Applications

Logistics processes and applications are broad. It is important here to mention only those that are relevant for tracking and monitoring applications of goods:

Abbr	Application	Functions	Type of Data
<b>RTTS</b>	Real-time transportation tracking System	Tracking of logistics transport vehicles; transport tracking of goods (especially high capital goods)	Identification of vehicles and goods, Location data, tracking of movement
<b>IST</b>	Inventory/storage tracking	Location tracking; goods identification	Identification of goods; location data
<b>LTT</b>	Life time tracking	Tracking of shelf life of short-lived products; tracking of quality and value depreciation	Identification of data; time stamping
<b>SAS</b>	Security Alert System	Damage detection, especially of fragile goods, theft detection and tracking; integrity loss of dangerous and hazardous goods	Identification of data; time stamping; position change data; tracking of movement; various sensor data
<b>THDM</b>	Tracking history data management	Systems level processing of complete history of goods through the logistic process	System level processing of Identification of goods; location data; time stamps; movement tracking; condition changes
<b>LAS</b>	Logistics Analytics System	System level aggregation of logistic tracking data for process improvement and cost tracking	System level processing of Identification of goods; location data; time stamps; movement tracking; condition changes

The following applications are for people tracking solution:

Abbr	Application	Functions	Type of Data
<b>SER</b>	Security & Emergency Response	Security functions include situation of overcrowding, unauthorised access, crimes, physical violence, natural disasters, detection of criminals, ...	Detection of unusual behaviour, movement tracking, change in density of crowd, signal loss, ...
<b>AEE</b>	Attendance / Entry-Exit	Detecting who has entered and exited a defined location	Detection of movement across geofenced area
<b>MBI</b>	Market, Business Intelligence	Tracking consumers and their behaviours. Location/service offer popularity. Market Communication effectiveness. Location layout improvement, ...	Detection of individual and crowd movement tracking, length of stay, changes in crowd density.
<b>APTDM</b>	Adaptive and predictive Crowd & Traffic Management	Helping to manage the flow of crowd, especially in confined locations. Taking preventive measures for alternative guidance of crowd or providing additional resources. Improvement of traffic management system and location layout, ...	Tracking of individual and crowd movement, changes in crowd density. Communication with other traffic management system's devices.

### 1.3.4. Comparison of Asset & People Tracking and Monitoring Technologies

As mentioned earlier there are several tracking technologies in use. Below is a comparison of the most relevant technologies for us:

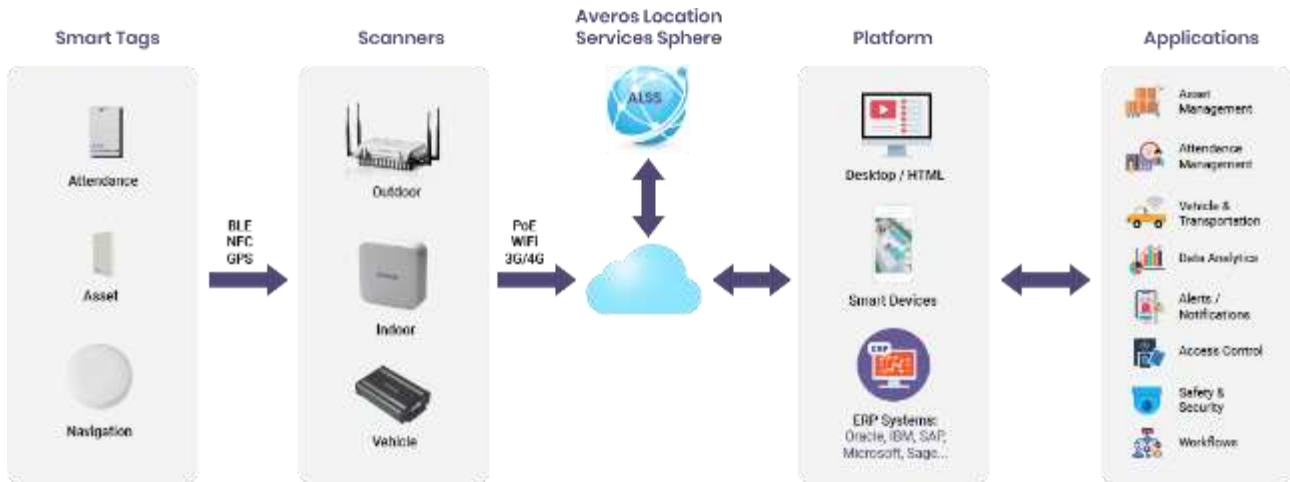
Technology	ID	Location	Movement	Remote reading	Unit Cost of tag	Systems cost
CCTV/Image processing	✓	LOS	LOS	No	None	High
Barcode reading system	✓	manual	manual		Low	Medium
RFID tag and readers	✓	manual	manual	<100m for active RFID	Medium	Medium
GPS tag and tracking system	✓	<10m outdoor only	✓	✓	High	Low
WiFi tag and tracking system	✓	<4m	<20m	<20m	Medium	High
Bluetooth tag and tracking system	✓	<1m	<100m	<100m	Low - Medium	Medium

For high volume goods the unit cost of the tag is the most critical factor and therefore barcode reading system still remain competitive, despite their many flaws and reliance of human interaction. For very high value goods rise of simpler GPS tracking tags are fast becoming popular, however it's lack of pin-point accuracy on the location of goods, especially of small dimension goods limits its broader application, moreover they do not work indoors. For many goods, especially medium valued goods RFID tag systems have made a lot of inroad. However, the more novel Bluetooth LE tag tracking system has a lot of competitive advantages that can compete with both RFID tag system and many applications currently used by GPS tracking systems.

## 1.4. Proposed Solution

### 1.4.1. System Overview

The following diagram illustrates the system and technology stack that Zernam has built for RTLS and how it integrates within larger solutions used by end-customers:



### 1.4.2. Products & System Offering

As of early 2020, Zernam the following two RTLS based systems to the market:

#### *ALS – Advanced Real-Time Tracking System*

Zernam's Auto-Localization System (ALS) Suite of Middleware software enables the development of advanced IOT & RTLS applications for various market solutions, such as live tracking of assets or persons. ALS is available either through the Cloud or as a highly secure Onsite Server.

#### Key Components:

- Smart Card Beacons Gateways
- ALS Server
- Camera Engine

#### Key Features:

- Manage and tracking
- Analytics & BI module
- Real Time Location Service
- Incident Reporting
- Alert Systems
- Notifications

#### *VALS – Auto Visitor Location System*

Zernam's Visitor Auto-Localization System (VALS) is an advanced Visitor Tracking and Management system that offers a range of features for building and venue administrators and or security personnel, from visitor scheduling to tracking and monitoring of a visitor's movements within a high security venue.

#### Key Components:

- Smart Card Beacons
- Gateways
- VALS Server
- Camera Engine
- Security Personnel Mobile App

## Key Features:

- Pre-Registration
- Visit Invitation
- Visitor's Document Management
- On Arrival Registration
- Live Tracking
- Notifications & Alerts
- Live Camera Streaming
- Evacuation List
- Visit Records

## *Planned Product & System Offering Early 2021*

Zernam has identified additional new RTLS systems offering with strong market potential. The following new systems offering are planned:

- Urban Tracker Solution (our mixed indoor & outdoor live tracking)
- Asset Tracking Solution (for Warehouse & logistics use-cases)
- Kiosk Apps for VALS
- Upgrades of VALS



## 1.5. Market Segmentation of Indoor LBS

### 1.5.1. Types of Locations

NaviBees' detection and tracking technology is well suited for crowd management functions. In fact, it has been successfully tested in the most crowded location in the world, i.e. at the Holy Mosque in Makkah, where between 1 to 3 million people gather any day of the year.

There are several venues and locations for large crowd gatherings; we can identify the following such categories of locations:

- Shopping complexes/mall/centres
- Tourism and entertainment venues/attractions
- Sporting venues
- Convention centres & exhibitions
- Religious/cultural facilities
- Public transport hubs (e.g. Airports, Railway stations, ...)
- Major planned events
- Public Institutions (i.e. Universities, Museum) --> easy start-up

Usually, such locations are often found in greater number in larger urban areas. They vary also from country to country as it often depends on such criteria as level of economic development, social/cultural customs and practices and strategic geographic locations.

The sales volumes of location, navigation and tracking system depends directly on the surface area of the locations that need to be covered.

It is difficult and beyond the scope of this study to provide detailed market figures for all above categories of locations and therefore the market analysis study has to concentrate on only three categories. This should provide sufficient market information to determine if any one country or market is attractive enough or not. The selected categories are the following:

- Shopping complexes/open air markets
- Convention centres & exhibitions?
- Public transport hubs (i.e. Airports)
- Customers through technology partners (e.g. ESRI, CISCO, ...)
- Public Institutions (i.e. Universities, Museum) --> easy start-up

### 1.5.2. Applications

All applications in crowded locations are focused on assisting individuals and groups of individuals in finding their relatively precise location and helping them navigate using BLE tags and Bluetooth technology integrated in their smart phones. We can identify the following 8 types of applications:

Abbr	Application	Functions	Type of Data
ODR	Origin-Destination Routing & Tracking	Helps find current location and user can select a destination and a route is calculated and actively tracks the users movement as we moves towards his destination	Continuous location data is sent using BLE ID code - does not require online interaction
IBS	Interactive Business Services	The location manager can provide interactive services such as notifications or special commercial offers, downloadable data/files and access to its online service	In app services - online data stream
BPIS	Business Processes Integrated Services	Localization and tracking based solutions that integrate into business operations, processes and work flows	In app services - online data stream
ILS	Inventory Location Service	Special ID allocated tags are used on mobile and important objects within a location to keep track of it	Continuous location data is sent using BLE ID code to a transceiver unit
MBI	Market, Business Intelligence	Tracking consumers and their behaviours. Location/service offer popularity. Market Communication effectiveness. Location layout improvement, ...	Detection of individual and crowd movement tracking, length of stay, changes in crowd density.
APTM	Adaptive and predictive Crowd & Traffic Management	Helping to manage the flow of crowd, especially in confined locations. Taking preventive measures for alternative guidance of crowd or providing additional resources. Improvement of traffic management system and location layout, ...	Tracking of individual and crowd movement, changes in crowd density. Communication with other traffic management system's devices.
SER	Security & Emergency Response	Security functions include situation of overcrowding, unauthorised access, crimes, physical violence, natural disasters, detection of criminals, ...	Detection of unusual behaviour, movement tracking, change in density of crowd, signal loss, ...
SCM	System Configuration & Maintenance	Secondary application used by administrators and technical support with tools to help deploy the system (e.g. placement of tags and transceivers/Fahim), testing the system and checking the vitals of the system	User map data of location, BLE ID data from tags, signal strength measurement and tags & Fahim's vital data

### 1.5.3. Comparison of Indoor Location, Navigation and Tracking Technologies

Solutions for indoor navigation have only recently appeared in the market. This is mainly due to the fact that new technologies have appeared on the market that are based on those integrated in the newer generation of smart phones. Here is a comparison of these technologies:

Technology	Location	Navigation	Accuracy	Limitations	Solution Cost	Install cost
Optical/Image processing	✓	✓	Variable	Only line of sight	High	High
Magnetism	✓	✓	<2m	Sensitive to layout changes	Low	Low
BLE (Bluetooth 4.0)	✓	✓	<2m	Battery life time <3-5 y	Low	Medium
WiFi (optional: AP)	✓	✓	<6m	Line powered	Low	Low

As can be seen from the above comparison table, BLE solutions are proven to provide a good level of accuracy for indoor navigation, were often there is restricted space. Another relatively competitive solution would be using variable magnetism of building structure, which could be to map and overlay on a layout plan of the Building. This would be detected using compass function that is integrated in most smart phones. However, the operational reliability and its sensitivity to small magnetic changes and influences in the environment could easily disorient it. This technology needs to be monitored. Other solutions are not viable on their own due to limitations in term of accuracy and practicalities. An alternative is being considered is a mix of various above-mentioned technologies.

### 1.5.4. Market Use-Cases

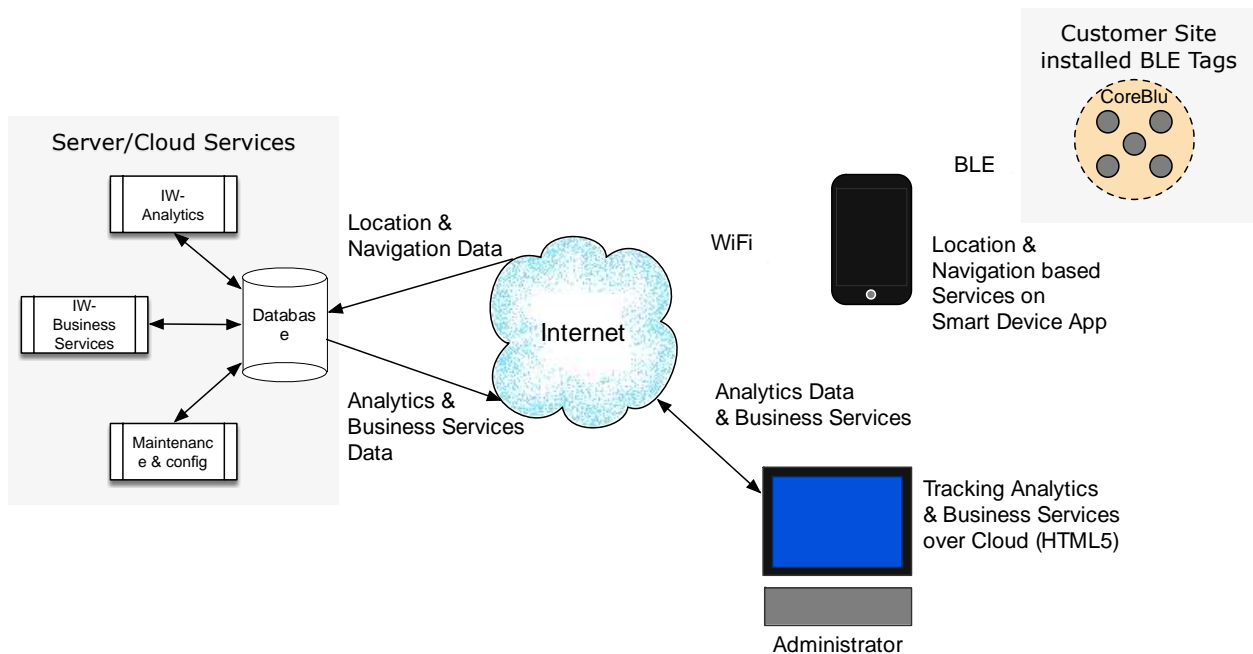
The following 6 priority use cases and the type of applications required are summarized below:

Use-Cases	Applications								Platform		Priority
	ODR	IBS	BPIS	ILS	MBI	APTM	SER	SCM	App	HTML	
	1	1	2	2	2	3	3	1	1	2	
Shopping Mall	M	M		O	M		O	M	M	O	2
Museum	O	M			O		O	M	M		1
Exhibition center	M	O		O	M	O		M	M	M	1
Airport	M	M	O	O		O	O	M	M	M	1
Industrial Plant	O	M	M	M			O	M	M	O	3
University/Offices	M	M	O					M	M		2

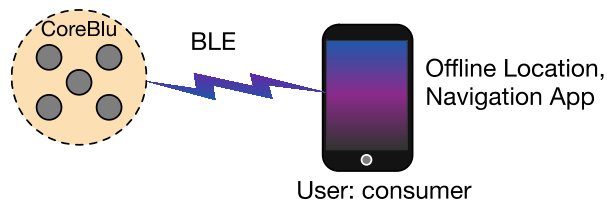
Abbrev: M=must-have, O=optional

## 1.6. Proposed Solutions

### 1.6.1. NaviBees - Online Solution



### 1.6.2. NaviBees - Offline Solution



**Note:** There are several solutions variations possible between the "Basic" and "Advanced" versions.

### 1.6.3. Products & System Offering

#### *NaviBees – Indoor Navigation & Positioning System*

Zernam's Indoor Navigation and Positioning solution "NaviBees" allows users instant familiarity for a venue that would otherwise seem extraneous. With features such as Indoor Positioning, Turn-By-Turn Navigation, Maps, and Points of Interest (POIs), users confidently and efficiently reach their destinations.

#### Key Components:

- CoreBlu Beacons
- 3D Mapping System
- Web CMS Portal

#### Key Features:

- Indoor Positioning
- Indoor Navigation
- Notifications
- Voice Navigation
- Location Sharing
- POIs and Search
- Save POI Location
- Multiple Floors
- Analytics

### *Planned Product & System Offering Early 2021*

Zernam has identified additional new LBS systems offering with strong market potential. The following new systems offering are planned:

- IPS (Indoor Positioning System) Solution (without Navigation)
- Kiosk Apps for Navibeas
- Upgrades of NaviBees

## 1.7. Market Position & Opportunities

### 1.7.1. RTLS Market Size Forecast

The global market for RTLS is expected to exhibit strong growth during the forecast period and is positively affected by the continuous pressure on companies to enhance their operational efficiency. This constant pressure on companies to increase their profit margins and enhance customer satisfaction is a critical factor that results in this market's profound CAGR of nearly 40% by 2020. Some market segments, especially RTLS in Healthcare sector is expected to grow much more rapidly with a CAGR of over 50% by 2020.

The market share per sector for RTLS can be distributed as follows:

	2019	2020	2021	2022	2023	2024	CAGR	Market share
<b>Healthcare</b>	276.5	429.5	644.2	966.3	1'449.4	2'174.2	50%	20%
<b>Transportation</b>	669.4	838.8	1'006.6	1'207.9	1'449.4	1'739.3	20%	16%
<b>Logistics</b>	627.6	786.4	943.6	1'132.4	1'358.8	1'630.6	20%	15%
<b>Manufacturing</b>	460.2	576.7	692.0	830.4	996.5	1'195.8	20%	11%
<b>Industry</b>	341.7	445.3	556.6	695.7	869.7	1'087.1	25%	10%
<b>Defense &amp; Security</b>	194.8	283.0	396.2	554.6	776.5	1'087.1	40%	10%
<b>Education</b>	225.0	304.5	395.8	514.6	669.0	869.7	30%	8%
<b>Retail</b>	140.7	190.3	247.4	321.6	418.1	543.5	30%	5%
<b>Hospitality</b>	84.4	114.2	148.4	193.0	250.9	326.1	30%	3%
<b>Others</b>	83.7	104.8	125.8	151.0	181.2	217.4	20%	2%
<b>TOTAL</b>	3'104.0	4'073.4	5'156.6	6'567.5	8'419.5	10'870.8	23.2%	100%
<b>GCC</b>	<b>34.4</b>	<b>45.5</b>	<b>60.1</b>	<b>77.3</b>	<b>102.4</b>	<b>131.6</b>	<b>41%</b>	<b>4.10%</b>

Note: above yearly revenue values in USD million

RTLS Market segment is growing from USD 3.1 Billion in 2020 to about USD 11 Billion by 2025, A CAGR growth rate of over 28%

The GCC RTLS Market segment is growing from USD 24 Million in 2020 to about USD 132 Million by 2025, A CAGR growth rate of 40%.

### Market Opportunities and Threats

The following opportunities and threat analysis can be made of the RTLS market situation:

Opportunities	Threats
<ul style="list-style-type: none"><li>● Fast growing market</li><li>● Demand for newer solution providing cost saving and more versatile inventory tracking solution</li><li>● Successful technologies are adopted quickly by the logistics industry</li><li>● No data privacy concern for logistics &amp; assets tracking solutions</li></ul>	<ul style="list-style-type: none"><li>● Successful technologies are replicated fast by competition. Requires fast growth to remain viable and ahead of competition</li><li>● Solution for other niche markets dependent on the large retail/shopping centres markets</li><li>● Data privacy concern for people tracking solutions</li></ul>

### 1.7.2. Indoor LBS Market Size Forecast

The following is an estimated forecast per type of location for indoor localization and navigation based solutions:

Applications	2019	2020	2021	2022	2023	2024	CAGR
<b>Offices &amp; Hospitals</b>	3'393.1	4'580.7	6'184.0	8'348.4	11'270.3	15'215.0	35%
<b>Shopping centers</b>	3'494.0	4'192.8	5'031.4	6'037.7	7'245.2	8'694.3	20%
<b>Exhibition/fairs</b>	2'620.5	3'144.6	3'773.6	4'528.3	5'433.9	6'520.7	20%
<b>Airports</b>	1'756.2	2'283.1	2'968.0	3'858.4	5'015.9	6'520.7	30%
<b>Other indoor LBS</b>	2'514.0	3'042.0	3'680.8	4'453.7	5'389.0	6'520.7	21%
<b>TOTAL</b>	10'384.8	12'662.5	15'453.7	18'878.1	23'084.1	43'471.3	26%
<b>GCC</b>	103.8	151.9	231.8	320.9	404.0	782.5	32%

Note: above yearly revenue values in USD million

As can be seen the market potential, especially for use in Offices, hospitals and airports markets are expected to grow rapidly to bring in over a USD 43 Billion in 5 years, as the demand for better location-based customer interaction and business intelligence data grows rapidly.

- The fact is that the important dominance in terms of market size of the US, means also that a near future if NaviBees would aim for global market presence than a market positioning in the USA would become an important strategic imperative for a new indoor navigation technology solutions provider to become viable in the long term.

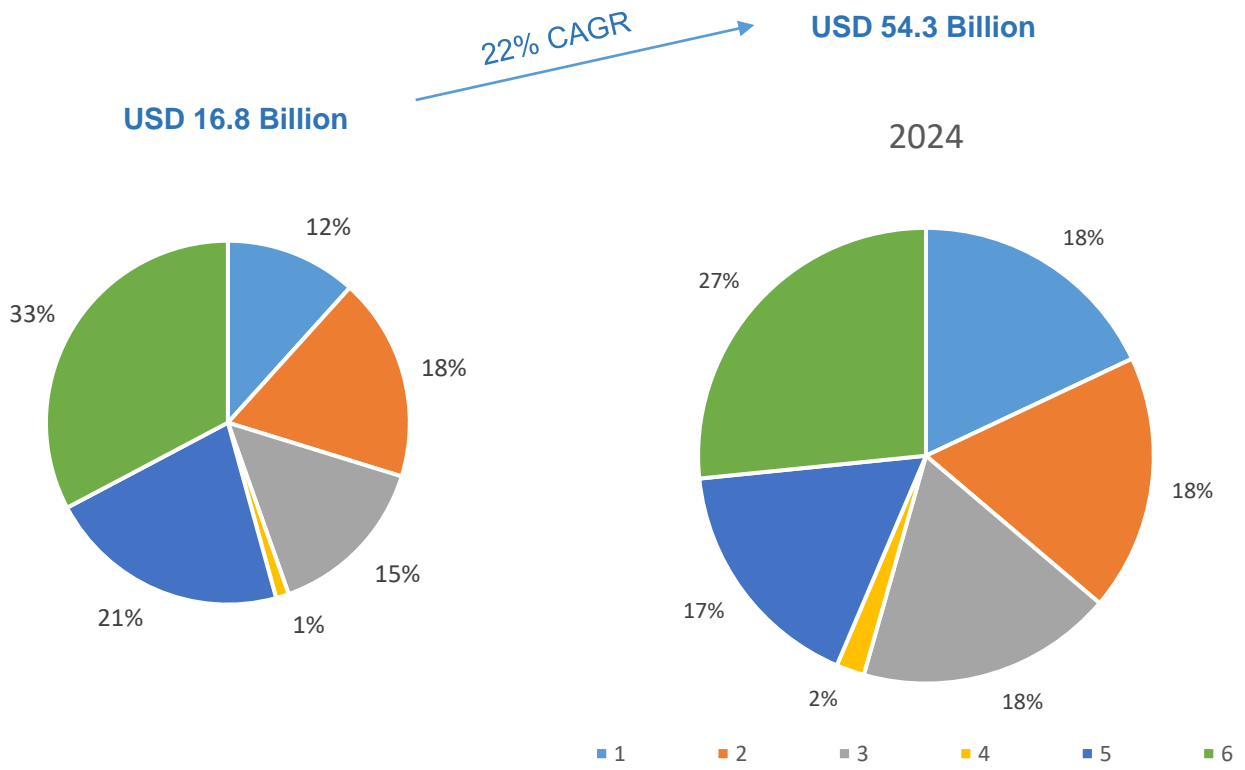
#### Market Opportunities and Threats

The following opportunities and threat analysis can be made of the Indoor Positioning and Navigation market situation:

Opportunities	Threats
<ul style="list-style-type: none"> <li>● High growth high demand market for crowd and customer tracking and navigation solutions for consumer oriented market and business intelligence</li> <li>● High demand for complete high level systems solution – higher value than device only</li> <li>● Wide application in multiple business sectors: more diversified, less risky</li> </ul>	<ul style="list-style-type: none"> <li>● Strong US market domination</li> <li>● Solution for other niche markets dependent on the large retail/shopping centres markets</li> <li>● Mobile phone manufacturers and providers might limit or block access to mobile device ID info</li> <li>● Wide open market for competitors</li> </ul>

Overall the opportunities presented here outweigh the potential threats, especially since the solutions that we propose are bespoke in nature and therefore offset the main threat that would come from competition at least in the short term. Nonetheless, here fast growth and acquiring strong market share at a global level will be important in the long term.

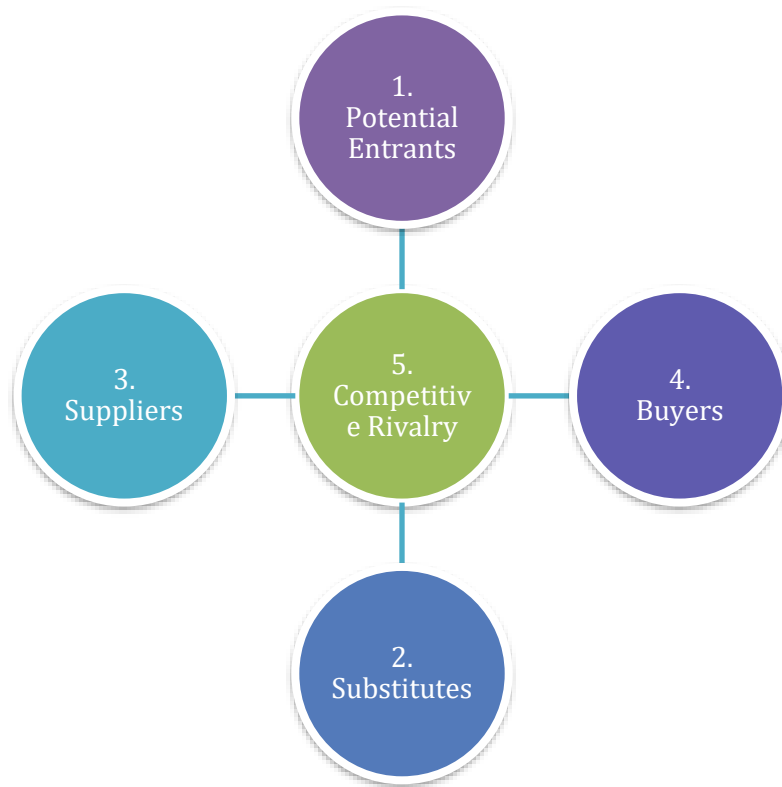
## 1.8. Overall Relevant Markets Growth





## 2. Competition Analysis & Positioning

### 2.1. Competitive Forces Analysis



#### 2.1.1. Competitive Analysis of RTLS Market

- |   |                               |   |
|---|-------------------------------|---|
| 1 | Threat of entrants            | ● Medium entry barrier; mainly because barcodes and RFID tag systems are well established. Otherwise fairly open for new innovative solutions   |
| 2 | Threat of substitutes         | ● Improvements in GPS tags and future adoption of more accurate Galileo based system needs to be follow-up carefully - However low power usage is not likely to be achieved and it is still limited for outdoor use only  |
| 3 | Bargaining power of suppliers | ● Low - use of standard components  |
| 4 | Bargaining powers of buyers   | ● Medium - strategic decision for buyers.   |
| 5 | Competitive rivalry situation | ● Although several competitors have recently established themselves in the market. The market still remains wide open and growing fast. Currently, there is a good window of opportunity to provide a competitive offering and gaining a strong position in the market. |

## Competition Comparison Matrix

The following table gives an overview of some of the top RTLS technology companies. As can be seen the market is dominated by US market and many serving exclusive the larger and lucrative healthcare sector. There are several indian and chinese based companies, which are not featured in this current comparison matrix.

	 Zernam	 ZEBRA	 Quuppa	 UbiSense	 ticto	 STANLEY. Healthcare
Price	Low	Mid	High	Mid	Mid	High
Scalability	✓	✓	✓	✓	✓	✓
Vertical Integration	✓	✓	X	X	X	✓
Eco System	✓	✓	✓	X	✓	✓
Usability Ease	✓	X	✓	X	✓	X
Market Focus	GCC, expanding EU	Global	EU, Russia	US	US, EU	US, expanding globally

## Competitive Positioning

Largest RTLS technology company is Zebra Technologies, they serve multiple market segments. Most companies still concentrate on the old established RFID technology, very few have diversified in this are with some exceptions, like the ones display in above comparative table.

Zernam should have a similar competitive business model as Zebra Technologies and it would be the first GCC based RTLS technology company. By putting priority on BLE technology, it is able to provide more cost-effective solution than the traditional RFID technology. Having its own hardware solution provides it with more-competitive solutions and a control on added advanced features as it responds to more demanding future market requirements. On the other hand it also makes sense to collaborate with some competitors where our respective market positioning difference. For example, in January 2020 has entered into a partnership with the Finnish based Quuppa.

### 2.1.2. Competitive Analysis of LBS Market:

- 1 Threat of entrants ● High - Generally low entry barriers for new players at least for the next 3-5 years. It may become more competitive by then.
- 2 Threat of substitutes ● Medium - Future improvements and lower cost of competing technology solution and new standards for indoor navigation set by large technology providers and technology consortium, e.g. Qualcomm iZat in partnership with Nokia HERE: <http://www.azosensors.com/news.aspx?newsID=6367>
- 3 Bargaining power of suppliers ● Low - use of standard components and hardware under own control.
- 4 Bargaining powers of buyers ● Low - wide open market with many types of customers and niche markets
- 5 Competitive rivalry situation ● Medium - There are already several providers using BLE/iBeacon technology.

### Competition Comparison Matrix

The following table gives an overview of some of the top Indoor Navigation & Positioning technology companies. The LBS market has grown quite large and has become competitive. Zernam remains very competitive in its offering as can be seen.

	 Zernam					
Overall Pricing	Low	High	Mid	High	Mid	Mid
RTLS & IOT integration	✓	X	✓	X	X	✓
App integration	✓	✓	X	✓	✓	X
Scalability	✓	✓	✓	X	X	X
Low Maintenance Cost	✓	X	X	X	X	X
Market Region Focus	GCC, expanding EU	USA, expanding globally	Global	France, EU	EU, expanding globally	EU, expanding globally

### Competitive Positioning

Although there are already several successful solutions providers, the market is still very large and there is low entry barrier at the moment. There are already a few providers using BLE technology with solutions with high enough accuracy. However, these solutions are costly using standard hardware system and not optimised for the application. Moreover most of these providers concentrate their activities at a local and at most regional level.

Competitor solutions pricing and its structure vary widely, this is mainly due to the difference in their positioning, as some are more technology-oriented, while others are more service-oriented and a few are a mix of the 2. In GCC countries there is still a need for both technology and services providers, there are not enough skilled services providers in the region.

NaviBees has the potential of providing a more competitive solution in the market, by being able to offer:

- competitively priced solutions
- standard SDK solution
- industry specific advanced solutions
- Integration with various Location based Services (e.g. BMS, Wayfinding, Crowd Analytics, ...)
- Use of various Map System platforms (currently only supporting VisioGlobe)

### 3. Value Proposition

#### 3.1. Strategic Targets & Approach

The strategic approach needs to be identified for each of main 3 stakeholders: customers, suppliers and competition. Strategic targets need to be set for the stated stakeholders. This will help the later development and implementation of the business plan.

Product	Market	Stakeholder	Targets	Approach	Prio.
Sensor based devices	RTLS	Customer	<ul style="list-style-type: none"> <li>Low cost</li> <li>High performance</li> <li>Additional features</li> </ul>	Market Development	2
		Supplier	<ul style="list-style-type: none"> <li>Outsourced production - safeguard measure for IP protection</li> </ul>	Risk Management	
		Competition	<ul style="list-style-type: none"> <li>Competitive pricing</li> <li>Better performance</li> <li>Differentiation</li> </ul>	Offensive	
Scanner & Gateways	RTLS	Customer	<ul style="list-style-type: none"> <li>Unique product</li> <li>Modular &amp; configurable</li> </ul>	Product Development	3
		Supplier	<ul style="list-style-type: none"> <li>Outsourced production - safeguard measure for IP protection</li> </ul>	Risk Management	
		Competition	<ul style="list-style-type: none"> <li>Competitive pricing</li> <li>Competitive Performance</li> </ul>	Defensive	
Middleware Platform	RTLS, LBS	Customer	<ul style="list-style-type: none"> <li>Various vertical solutions platform</li> <li>Customizable</li> </ul>	Product Development	1
		Supplier	not critical		
		Competition	<ul style="list-style-type: none"> <li>Competitive pricing</li> <li>Better performance</li> <li>Differentiation</li> </ul>	Offensive	

Priority is set for the development of various vertical-oriented middleware platforms, where we can earn higher margins and differentiate ourselves better from the competition. Furthermore development of BLE based devices is also important, and which we can more easily develop and differentiate ourselves in both LBS and RTLS markets. Development cost and time are expected to be lower for this as well. Otherwise, the development of Scanners and Gateway remains a low priority, it is important to have a general product line of scanners and gateways to cover most use-cases, but in many cases a 3<sup>rd</sup> party or OEM product might be better economical and technical sense. Furthermore, earning from scanners & gateway are not expected to be high.

#### 3.2. Value Proposition

“Zernam’ unique and state-of-the-art technological solutions help provide your company and your customers with full and real-time localization and situation awareness of your environment, your customers, your staff and your valuable assets and thereby improving your customer experience and operational efficiency as well as improving your market positioning.”

## 4. Marketing Mix Plan

A holistic view of the marketing mix is presented here, where not just the obvious features related to the external market (4Ps) are viewed for each product segment, but also other factors of influence from the company's internal contribution as well as border line interactive factors. The same marketing mix plan are valid for RTLS and LBS based solutions.

### 4.1. External Marketing

- Product → High reliability, quality and long-life product.
- Price → Low price, high volume for tags, above average pricing for receiver units and competitive pricing for application SW
- Promotion → Discounted/free test installation for large customers. Promotional volume package deals
- Place → Mix of direct and indirect local sales. Strong reseller support program

The following table summarizes the HW & SW products, engineering services and solutions that Zernam would offer to the market:

### 4.2. Internal Marketing

Products	Pricing	Agent Add-on Value	Agent Sales Pricing
<b>HW Devices tags &amp; scanners</b>	CoreBlu & Loris devices sales	resale	25% margin on devices + & installation Cost
<b>3<sup>rd</sup> Party HW</b>	Devices sales	resale	10% margin
<b>Zernam SDK</b>	License cost per user per year or month	Business Development	25% margin
<b>3<sup>rd</sup> Party SDK</b>	License cost per user per year	resale	10% margin
<b>Custom SW Development</b>	Partial development cost & license cost per added feature user per year	Customer requirement. Configuration for customer needs, Business Development	25% margin
<b>Engineering Services</b>	Hourly work rate or package work rate	Business Development	20% margin
<b>Warranty &amp; Maintenance cost for HW &amp; SW</b>	1 years included; 4% of sales price for 3 years extended warrantee	Covering Installation & customization warrantee	4% of sales price
<b>Server platform</b>	License cost per user per year	resale	25% margin

- Internal Communication → VoC (voice of customer) needs to be handled with high priority and needs to be managed by sales, after-sales, marketing and top management. A simple but effective CRM system should be put into place at least in the 2nd growth phase of the company.

- Service & Quality → Lean six-sigma approach to handling of quality issues from customers, production and engineering. Strong after sales support team needed from the start.
- Training → Training of personal for handling of customer, quality and technical issues is high priority, especially if operations are carried out in countries where these competencies are not at the same level as in top developed countries.
- Productivity → A scheme for productivity enhancement and continuous improvement using above mentioned lean six-sigma approach should be institutionalised.

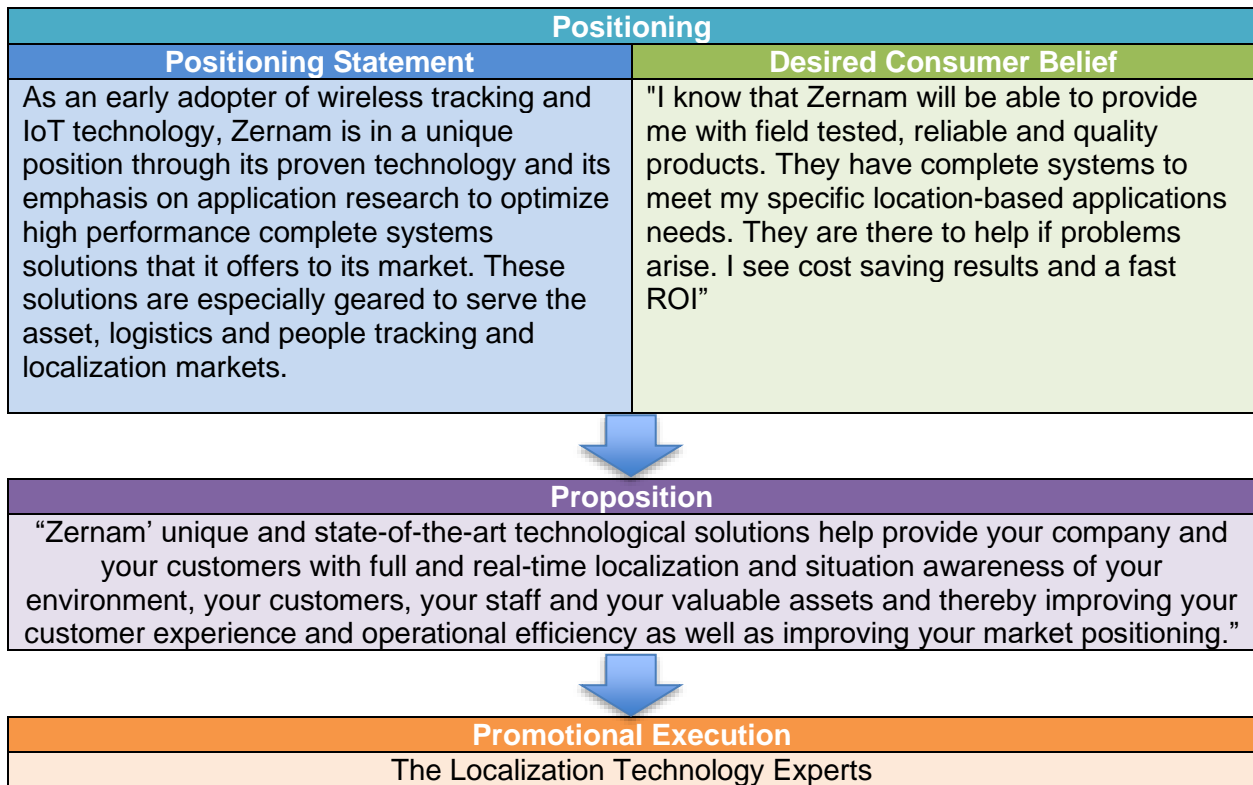
#### 4.3. Interactive Marketing

- People → An active employee competence enhancement and high level of empowerment should be developed as a strategic policy.
- Process → In a 1st phase all primary and secondary activities need to be defined clearly. In a 2nd phase an efficient and growth oriented ERP system needs to be introduced that would integrate the above-mentioned CRM platform as well.
- Physical Evidence → All products developed need to be field-tested before market release. Especially for TMS and logistics market. Field test can be leveraged by UQU unique position of the city of Makkah and KSA as a country at large
- Partnership → Technology partnership for enterprise solution (i.e. ERP & EAM) would be important. We should be able to negotiate a cooperative agreement with key prime contractors.
  - A technology partnership with specialist in some application specific software for partner could be helpful
  - A supplier partnership in general with a CM (contract manufacturer) needs to be established for most or even all of our products).

## 5. Market Communication

### 5.1. Brand Positioning

Zernam's brand positioning can be summarized by its positioning statement as it has been expressed in the earlier-mentioned "Value Proposition" and by the desired belief that we would like our customers to develop when confronted with the company. This positioning would also lead to the main promotional message that should be communicated and reinforced in the market. This brand-positioning proposal for the company can be stated as follows:



### 5.2. Brand Names

#### 5.2.1. Loris

The logo for Loris consists of the word "Loris" in a bold, blue, sans-serif font.

Loris is so named after a small marsupial animal that has heightened senses. Furthermore, the name is easily pronounceable in multiple languages and not used very commonly.

#### 5.2.2. CoreBlu



CoreBlu's logo conveys the image of a central and important Bluetooth element. It is easy to pronounce and retain. This product name and logo is universally applicable.



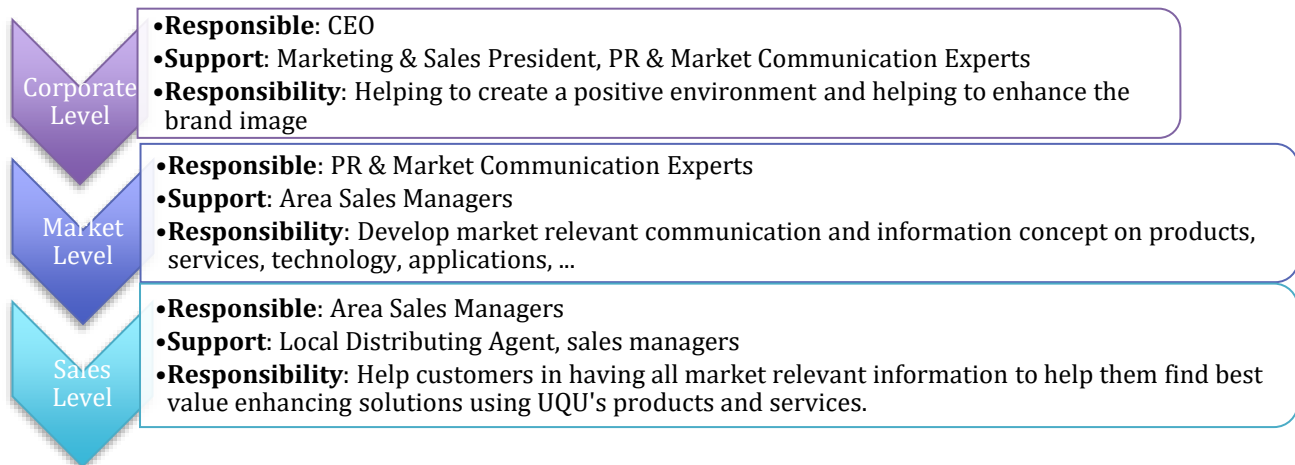


# Navi Bees

The fictitious name NaviBees is a shortened compound name based on 2 words: "Navigation" and "Bees". It is meant to convey the sense to navigation easily, accurately and intuitively as bees do in nature. This is communicated in a light-hearted, fun and nature-appealing manner to the public.

## 5.3. Market Communication

The overall goal of Zernam' Communication Marketing and PR approach is to help promote its products and services as well as to strengthen its market position and improve its brand name and image using targeted use of various media in a strategic, comprehensive and effective manner.



### 5.3.1. Marketing Communication Activities

There are a whole range of possible Marketing Communication activities that could be undertaken, however it important that we limit ourselves to those measure with greatest impact and best value per cost. Unfortunately, however it is difficult to know beforehand the impact of a particular campaign and this needs to be carefully evaluated. This is especially challenging, as there are differences from country to country and due to differing types of products and services that we would be offering. Although at the current stage it is not possible to conclusively establish which measures are the most appropriate, we can propose the following list of best practice measures and with some future trials and errors, we should be able to efficiently home into a more targeted approach:

#	Activity Type	Activities & description	Responsibility	Prio.
1	Corporate ID	Design of a corporate ID and logo that communicates Zernam's vision, values and culture	Corporate	High
2	Brand Strategy & Promotion	Branding Zernam as a provider of reliable tracking solutions. A message that is integrated in all other market communication activities	Corporate	High
3	Corporate, Crisis & Change Communication	By measured use of Press Releases and communications to properly inform of changes, challenges and successes that the company experiences	Corporate Market	Low
4	Corporate Website	Website design, which reflects the corporate ID and which is framed and formulated to express the main marketing message. This is the main public face of the company. The use of SEO	Corporate Market	High



		and web analytics could help enhance its impact.		
<b>5</b>	Online Relations	Online Social Media, Blogs and Forums have taken an important role in today's market communication approach. Although, Zernam could make use of it, it should be carefully studied whether which channel is appropriate for the company's products and its markets	Market	High
<b>6</b>	Advertisement	Targeted Online and Print Advertisements in specialized media for help promote Zernam's brand image and its products	Market Sales	Low
<b>7</b>	Technical Publications	Publications of technical articles and white papers would help promote Zernam's brand image as an expert in its field and market	Market	Med.
<b>8</b>	Academics	Contacts with Universities and Engineering Schools would have a double benefit, as it improves Zernam's expertise and know-how in tracking technology and also help promote its brand image as an expert in its field.	Market	Low
<b>9</b>	Market Relations	Although Zernam should be actively engaged in the market specialized community groups (standardization groups, lobby groups, ...) the impact in initial years should be very limited due to its small market footprint.	Market Sales	Low
<b>10</b>	Customer Relations	By measured use of eNews, sales and marketing workshops and the general use of customer relationship management tools are effective ways of attracting customers	Market Sales	Med.
<b>11</b>	Products Relations	Product Release information needs to be timely and efficient. Furthermore, it is important that cases of successes are publicized well using the media mentioned above and any product failures communicated properly and prompt actions taken	Market Sales	Med.
<b>12</b>	Event Marketing	Although exhibiting at trade fairs is not expected to make any significant impact on sales for Zernam's type of market and products, it does enhance Zernam's brand image and gives it exposure and improve its networking. It is important to be present in relevant shows.	Corporate Market	Med.
<b>13</b>	VIP Relations	Networking with key players in the public and private sector would help enhance Zernam's brand image and ease its market presence.	Corporate	Low