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Navigate and **D**evelop **S**ocially

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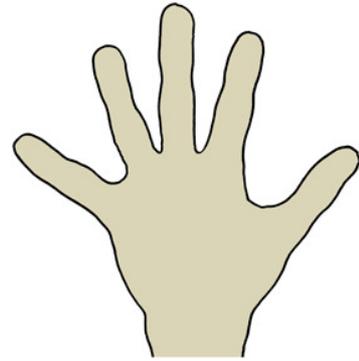
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Summary:
This deliverable describes an exploitation plan trying to specify the most effective route to maximize distribution and take-up of the HANDS toolset by those involved with the care of young people with autism, and associated conditions.

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Contents

1 Introduction

It is important for the HANDS project to develop efficient and effective mechanisms for bringing the HANDS toolset to the education market. Throughout this document an exploitation plan will be developed, which will specify the most effective route to maximising distribution and take up of the toolset by those involved with the care of young people with autism and associated/similar conditions as appropriate.

This will involve plans for drawing on the expertise of organizations with experience in bringing educational hardware and software solutions to the education market, such as BECTA in the UK. We would also draw on the experience of the participating schools and their organizations in bringing the results of similar ICT based projects to the attention of those working with young people with autism.

Please notice that the actual execution of the business plan is outside the scope of the HANDS project itself. The execution may start alongside the project, but will have to be rooted into a separate organisation – but may to a large degree use the same persons that participate in the project.

The PEST and SWOT analysis in this deliverable is based on a paper written by a group of mercantile students from Aalborg University as part of their bachelor work in 2010.

2 The product

This chapter gives an overview of HANDS as a product.

The HANDS product consists of two main parts, a server and a mobile application called the toolset. The mobile application is used by young people with autism diagnose, while the content used by the young ones, is generated by teachers or parents at the server.

2.1 The HANDS toolset

The toolset is running on a smartphone using Windows Mobile 6 operating system. In the project we have mainly used HTC Diamond 2 and HTC Touch HD, but any smartphone based on Windows Mobile 6 will work just fine. The project has chosen not to block any functionality in the phone, so the phone is still a full functioning smartphone able to make calls, browse on the internet and run any other application alongside HANDS toolset.

Figure 1: HANDS toolset page with 5 application icons

 The toolset is basically a platform, where a maximum of 9 screens are able to contain up to 9 applications each. The background, sounds and a lot of other things can be "skinned", i.e. adapted to each user individually – both from the settings on the phone and from the server. Even the settings on the mobile phone can be adapted itself from the server side.

Each application in the toolset is pushed from the server, when the toolset synchronizes the local database on the phone with the server. Each application can be an individually adapted version of the applications from HANDS, or any other application able to run on the Windows Mobile phone. On the toolset screen, each application can have its own icon and text, which is again controlled by the server.

Both the server and the toolset can be adapted to local languages. Currently 4 languages are supported to demonstrate this. The languages supported so far are: English, Swedish, Hungarian and Danish. Translations are done together with local users, to assure that specialist terms are used properly.

Figure 2: HANDS toolset page with 6 actions for a pupil

2.2 The HANDS server

The HANDS server is running on a Microsoft Windows Server platform. This platform is selected since this is the most common used platform in small places like a school. The platform is easy to maintain for less skilled technicians.

The database used is Microsoft SQL database. This can easily be changed to e.g. an open source MySQL database, but that requires more knowledge in

the server room, so for the initial project we have chosen to use the MS SQL server.

Hands Server is running a web service that can be accessed from any browser by teachers, parents or other relevant personnel working with one of the young HANDS users. Each school has one administrative user, which is able to give access to other users – for that school only.

User roles in the HANDS server are:
- Administrators: able to create other users: pupils, parents and teachers. An administrator can be a teacher also. Each school needs at least one administrator.
- Teacher: can see, create and change the content and look/feel of the HANDS toolset on smartphones belonging to pupils on that school.
- Parent: Can see, create and change the content and look/feel of the HANDS toolset on their child's smartphone.
- Researcher: A role created for scientists that are making research based on the user data collected from all phones that are using the HANDS toolset. Researchers can only see anonymized data though.

Technically the setup is a partially connected client-server architecture. A teacher creates the content for a pupil´s phone on the server, and that is stored as a description in the database. On each pupil´s smartphone is a similar database that is containing only data that is relevant for that pupil´s toolbox. The HANDS toolset is then able to interpret the content of the database and present the content to the pupil based on those data. Similarly will any data collection from the smartphone be collected into the database on the smartphone, and this will be automatically synchronized next time the smartphone connect to the internet and activate the HANDS server synchronization.
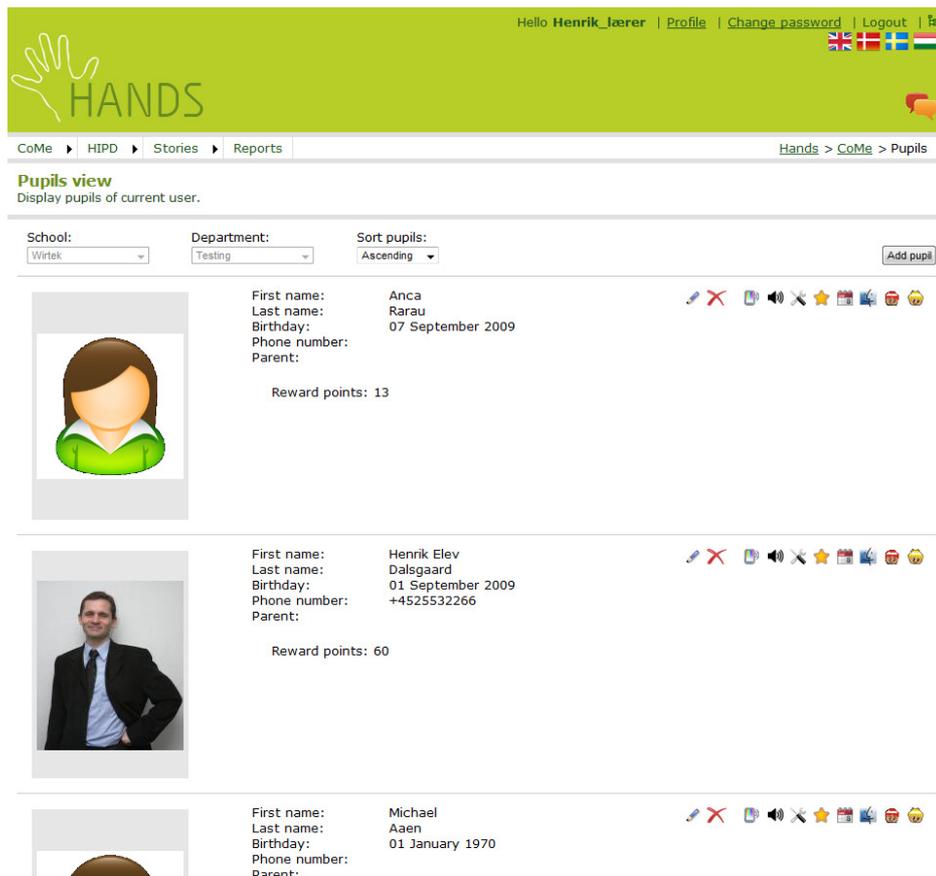
Figure 3: View of Pupils in CoMe in server application

The HANDS system has 3 key selling points:

The toolset gives a unique opportunity for practical research in young pupils with autism diagnose, since practical data is gathered through the toolset. Before HANDS a lot of research has been done concerning people with autism, but only very little has been based on practical work. This collection of data is hence extremely valuable, but does also require a great number of ethical considerations.

HANDS is the first major system in the world trying to take advantage of persuasive interfaces. This gives some new and unique opportunities in trying to chance the social behaviour of young people with autism, while putting focus on each individual´s strengths and needs.

Finally HANDS is suited for a high level of adaption to each. No two HANDS toolsets are to have the same content or functionality, but will be adapted to the specific needs for each end user.

3 The market

Selling ICT healthcare to schools working with young people with autism diagnoses is a difficult market, since it's a very fragmented market, and due to the market being different in each country. In UK Becta is a driving force to ensure innovative use of technology throughout learning, and in this case also covering the area of learning for people with autism diagnose and similar. This means that Becta is the natural place to get access to the relevant market in UK.

In Denmark the autism schools are using a number of independent consultants that maintain specialized knowledge that each school is unable to maintain. The typical situation where a school start using an ICT based tool in working with its pupil, it is typically due to an independent consultant that has some prior experience in working with the tool, and then can help introduce and train the staff in using the new tool.

This situation means that the schools have to be approached very differently in each country in Europe.

The only common way in selling a tool like HANDS to schools in different countries is to start by selling it to the parents, and then let the parents drive the entry of the tool into schools.

3.1 Analysis and markets

In the following chapters are a number of analyses, which are based mainly on the Danish market. Before going into any new markets a proper business case for that particular market should be investigated. To limit this business case we have then focused on one market only. We have investigated other European markets, and will here give a short overview of the differences in how the schools working with autism are using and buying ICT tools.

3.1.1 Swedish market

In Sweden we have both public and private driven schools working with people with autism diagnose. Most of the schools are public though. The market for selling equipment like ICT based tools to the public driven schools is regulated, so that the schools are obliged to buy all their equipment through public tenders. This makes the Swedish market for HANDS very different from the Danish market.

When the schools are looking for ICT based tools like HANDS, they tend to look at experiences presented at conferences on autism, as well as Swedish web sites for the other schools.

Parents to children with autism-diagnose are entitled to getting help – also financial from the local community. Trying to sell HANDS through parents will hence have similar terms like the Danish market.

3.1.2 English market

The Helen Allison School working with young with autism-diagnose is an independent school. All funding for the HA school comes from the price paid by local authorities, when they send someone to attend the school. This is a common model in Britain.

When a teacher discover that a pupil will have positive effect from an ICT based tool like HANDS, the cost for such an item has to be taken from the existing school budget, i.e. the price that the local authorities pays the school for taking care of the training of that child.

To gain access to the English market for a tool like HANDS will hence means that the schools are the main entrance, and that the arguments used will have to be of the kind supporting that HANDS is a better investment than other helping tools that may be on this year's budget in each school.

Knowledge of new ICT tools is typically spread through conferences on topics including autism. A number of these conferences are held in greater London every year.

3.1.3 Hungarian market

The Hungarian market is different from the Nordic markets since the social security and possibilities for (economical) help to autism-diagnosed are not so well established. The Autism-foundation, "Autizmus" is a strong player in all aspects that relates to working with autism-diagnosed, and they have had a strong focus on cognitive psychology, that has established a Hungarian strong-hold in knowledge within this field of expertise.

Accessing the market with a tool like HANDS would hence require close corporation with Autizmus, especially since they could be a key player when trying to argument for economical support to buy ICS support tools like HANDS to individuals with autism diagnose.

3.2 PEST Analysis

In this section an analysis, of the macro environment surrounding HANDS will be conducted. This will be done by using the PEST-model[1].

The PEST-model is focusing on the macro environment of which the company is indirectly affected. PEST includes political and legal factors, economic and demographic factors, social and cultural factors and lastly technological factors. These factors cannot, or only to a limited extent be affected by HANDS. Since these factors are to some degree different between the countries, this PEST analysis has been created with the weight placed on Danish conditions initially. The PEST analysis should be adapted and

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[1] Global Marketing, Svend Hollesen, Chapter 8, page 247.

analyzed for each country before HANDS start market the toolset in new countries.

The political and legal factors will contain an analysis of the crucial political and legal elements in Danish politics which affects HANDS and the environment of autism.

The analysis of the economic factors will be performed on country level, but with an emphasis on economical factors which may give raise to changes in the market, changes which may affect HANDS. Demographic factors will be analyzed to get an overview over the development of children/adults with an autistic diagnosis.

When analyzing the social factors, a determination of the social and cultural relations between parents, teachers, institutional leaders and politicians, will be conducted.

The PEST analysis is made to consider the surroundings and not only focus on internal factors within the project. The weakness of this model is that even though a detailed analysis is performed, HANDS will not be able to act and thereby change these external factors.

Dr. David Ward has described the success of the PEST model, and refers to the extension there has been made, so that the model is updated to the business world[2].

3.2.1 Political factors

In Danish counties the schools themselves are in charge of all decision making. This includes budget allocation, which tools/methods of treatments to use etc. Yet it is required that the school account for their decisions – not only to inform politicians but also the parents.

Even though schools decide for themselves, politicians may have great influence. E.g. by recommending a specific tool, to other schools, of which is proven to help the children.

The requirement of any treatment is that there has to be clear guidelines, a plan and structure of the method. Furthermore, schools are advised not to undertake any treatment which is not properly tested.

It is stated from a political point of view, that decision making including budgeting, choice of treatment etc. is a very sensitive area for the parents, and therefore everybody involved in the process of decision making must take this carefully under consideration.

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[2] http://129.3.20.41/econ-wp/get/papers/0506/0506002.pdf (An Overview of Strategy Development Models)

3.2.2 Legal factors

One act is especially of interest; Law of Social Service. The target group of this law is children/young people with a diagnosis of considerable and lasting reduced physical and mental capabilities e.g. autism[3].

In § 41 it is stated that the municipality shall cover all additional expenditure that is needed to support the child, including courses, and relief etc. Furthermore, it evident from § 42 that the parents may benefit from financial aid when or if one of them has lost earnings in regard of taking care of their child.

From § 112 it is a fact that the municipality shall provide help to assistive tool/technology if:

1. if the tool/technology, in a significant way, can aid the lasting disability,
2. the tool/technology in a significant way can aid to a better daily life and/or
3. the tool/technology is necessary for the person in question, to execute a performance and or job.

Lastly of interest is § 113. Here it is stated that all expenses of consumer goods, of which is not commonly used, can be supported. It can be special computers and other kinds of goods which are needed in a home where kids of disabilities live.

3.2.3 Economical factors

Growth in world economy experienced a heavy decline in the last quarter of 2008. Especially the big industrialized countries where affected, where negative growth were to be found[4].

Energy and food prices rose in the first half of 2008, but declined again ultimo 2008. The price for one barrel of oil fell from 140 USD in summer 2008 to 94 USD ultimo 2008. Inflation was 4.0 in the end of 2008 – the aim of ECB is 2.0.

As a result Federal Reserve eased its monetary policy and lowered the interest rate not less than seven times throughout 2008.

For technology like the HANDS product, the major trend is still that prices are falling to a lower level. This is partly due to the global crisis, and partly due to

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[3] http://www.autismeforening.dk/log/divventura/LA_Socialraadgiver_2009.pdf (Autism Union in Denmark)

[4]

http://www.nationalbanken.dk/DNDK/Publikationer.nsf/side/Beretning_og_regnskab_2008/$file/kap02.htm (Danish National Bank)

increasing use of outsourcing to low-cost areas for more and more parts of software programming.

3.2.4 Danish economy

An analysis of key figures will be conducted and it will be based on statistical and forecast figures in the period: 2006-2009. The year 2009 is forecast figures. The analysis will contain the elements: GDP at market prices, consumer price index (inflation), unemployment rate, current account balance, general government financial balance. The main source of the memorandum items is the Danish National Bank, which is considered reliable.

Memorandum items Denmark	2006	2007	2008	2009
GDP at market prices	3,3	1,6	-1,3	0.6
Consumer price index	1.9	1.7	3,6	2.6
Net export	-1,7	-0,2	-1	
Current account balance pct. of GDP	2.7	1.1	0,7	1,8
General government financial balance pct. of GDP	4.9	4.5	4,5	3

Table 1: Memorandum items in Denmark
Source: Danish Statistics[5]/own creation

A seen in Table 1 there was high growth in GDP in 2006 with growth rates at 3,3 %, afterwards the growth declined and ended in a recession in 2008 with negative growth rates at -1,3 %. It is estimated that there will be growth in 2009. The reason for this recession is to be found in the international markets, where the financial crisis has affected industries all over the world.
Inflation was in 2006 at 1,9 % and raised to 3,6 % in 2008, which is above the aim of ECB of 2,0 %. The rise in consumer prices is caused by heavy fluctuations in energy and food prices.

The progress in domestic demand decreased in 2008. Private consumption almost stopped, which has to be seen in the light of a lower consumer trust and the restrained real estate market.
Investments of the business sector fell in 2008, due to sub optimal market conditions.

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[5] A website which is storing detailed statistics and information about Danish society.

The decline of growth is due to domestic conditions and can be located to a higher import than export which is shown in Table 1, Net exports.

The surplus of the current account balance raised from 31,2 billion in 2008 against 12 billion in 2007. The improvement reflects that the surplus on services has been highly improved and that the reduction of the profit in trade of goods has come to an end. Moreover, the raise in salary has contributed as well, but on the other hand also reduced the ability to compete in international markets.
There has been a decline on the general government financial balance, where the surplus fell to 3 % in 2008, from 4,5 % in 2007.
This is primarily caused by lower income taxes. Government spending and investments increased 0,6 %. This indicates that the financial policy of the Danish government has been moderate expansive.

3.2.5 Demographic factors

In the following, the development of children and adults with an autistic diagnosis are presented. The analysis takes it point of reference in the State of California, where a study though 20 years has been conducted by Department of Development Services[6]. Even though the results are limited to California, it is expected that similar trends are taking place in other developed countries. The same trend is being discussed in Denmark, but we have no corresponding figures to compare with the Californian data.

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[6] http://www.dds.ca.gov/Autism/Home.cfm (State of California Department of Development Services)
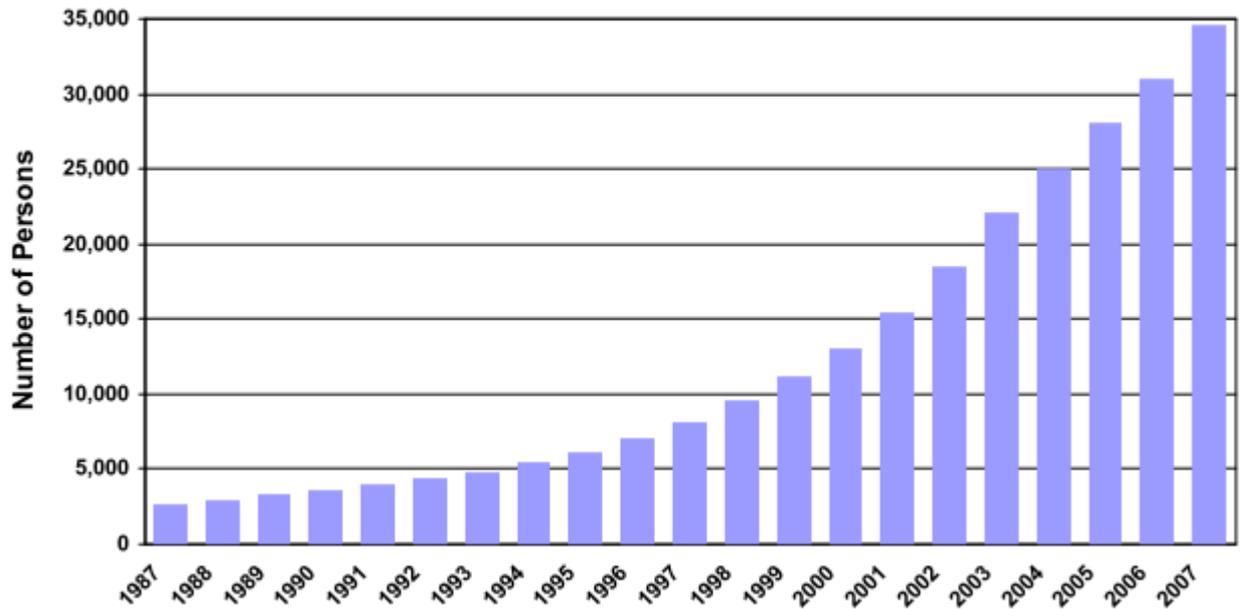
Figure 4: Annual frequencies of persons with autism from June 1987 through June 2007
Source: http://www.dds.ca.gov/Autism/Home.cfm[7]

Figure 4 shows how autism has grown from June 1987 through June 2007. As seen, there has been rather dramatically growth with percentages from 3,1 % to almost 20 %, with annual growth percentages averaging 13,2 %.
To compare with the growth in the population of California, autism grew by 359 % compared to 13,8 % in the period 1990 – 2000.

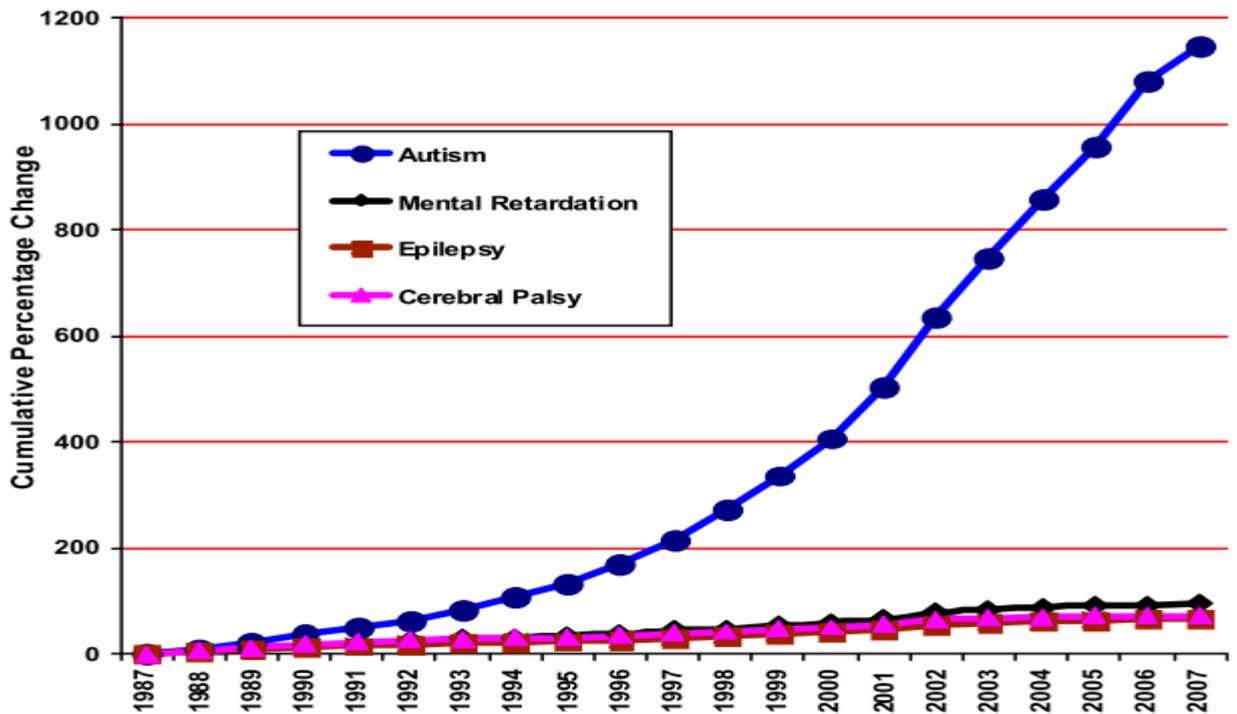[7] (State of California Department of Development Services)

Figure 5: Cumulative percentages changes of autism, cerebral palsy, epilepsy and mental retardation over two decades
Source: http://www.dds.ca.gov/Autism/Home.cfm[8]

Figure 5 displays four different diagnostic categories and the changes over time in percentage.
Mental retardation doubled over the period, while epilepsy grew by 2/3 and cerebral palsy grew by approx ¾. However, autism grew significantly and more than nine times more than mental retardation, epilepsy and cerebral palsy together.
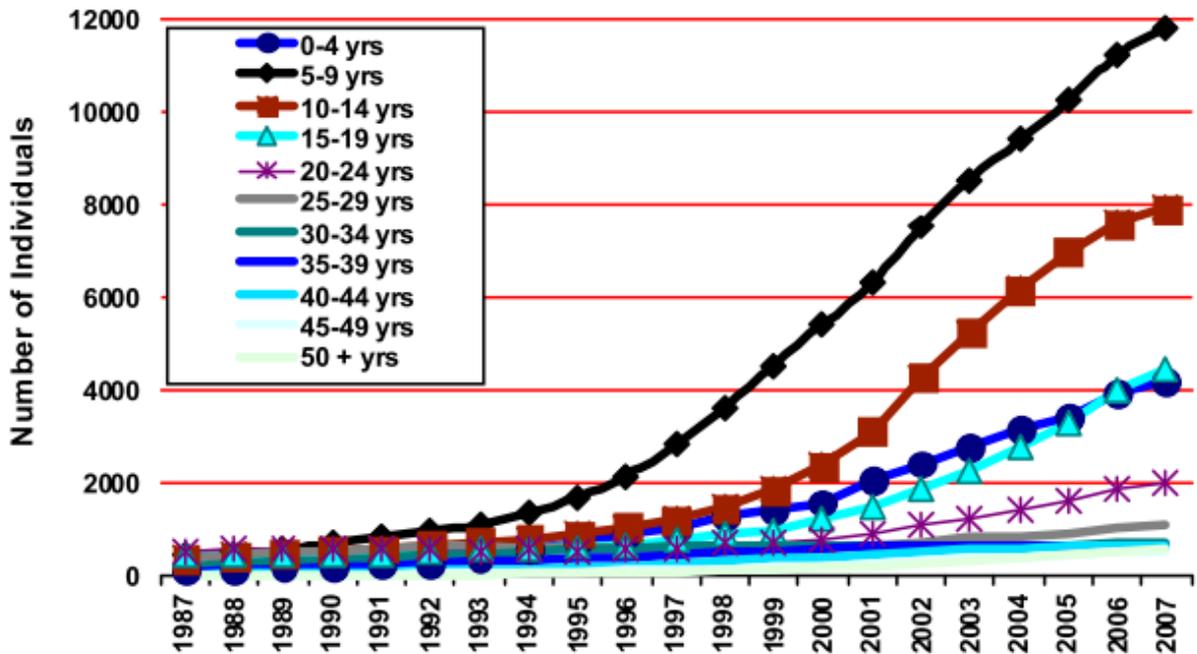
Figure 6: Age distribution of persons with autism, 1987-2007
Source: http://www.dds.ca.gov/Autism/Home.cfm[9]

In Figure 6 it is illustrated that autism is diagnosed in all ages. Furthermore, the highest growth is displayed in the group of children aged 5 to 9 years. Heavy growth is also showed in both the group of 10 to 14 years and 15 to 19 years.

3.2.6 Social and cultural factors

Danish schools for children with autism cooperate with ''landsforening autisme'' (union for autistic children/adults). "Landsforeningen autisme" does a lot of work to share knowledge about autism, and besides that, there are a great number of websites where people with relation to autism can gather information or contribute to debates[10].

Moreover conferences are held few times a year with focus on Autism. An example is "Skive konferencen" (www.skivekonferencen.dk). At these conferences doctors, psychologists and other professionals presents the latest treatment methods and knowledge in medical procedures that can help how

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[9] (State of California Department of Development Services)

[10] E.g. www.autisme.dk, www.autismeforeningen.dk, www.centerforautisme.dk etc.

to determine a diagnosis to a patient[11]. An easy overview of relevant conferences in Denmark can be found at www.autismeportalen.dk.

Aalborg County offers counselling to families having a family member with autism. All family members can contribute in the meeting to find the best ways to create a better life for the person diagnosed with autism. Besides from counselling, parents have the opportunity to join a seminar/course named Nordbo. This course will help the parents to understand autism.

In regard of the schools located in Aalborg, there is no formal community where politicians, teachers and parents meet. This is why, Henrik Thomsen emphasizes meeting the parents, as often as possible, to inform them about decisions and development within treatment and diagnosis of autism[12].

3.2.7 Technical aspects

In the following chapter it will be highlighted which technical aspects that Hands will face in situations where the Hands software is used.

1. It has become evident that schools already use ICT-tools to some extent. It is the overall believe that especially PDA's and other smart phones are used as calendars and such, however is it obvious that Hands ICT solution offers completely new possibilities due to the different programs in the HANDS toolset, as well as the close connection between server and the toolset.

2. The schools working with autism is not expected to have knowledge on suitable smartphones to use with HANDS toolset, so it may be a good idea if Hands suggest phones models for the institutions to buy. It is preferably the software Hands wants to sell and not a solution where a phone is included in the sales. On the other hand institutions seem to prefer complete solutions where both software and smart phone is included. To avoid this, Hands is obligated to offer service on smart phones, organizations are encouraged to buy the phone elsewhere. However, it is believed that costumers will feel safer if

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[11] Interview with Bente Jensen, consultant at "specialcenter for børn og unge" on behalf of Mai-Britt Iversen member of the committee of Family and employment.
[12] Interview with Henrik Thomsen, Alderman School and Cultural committee. The 8 of December 2009.

Hands at least can recommend smart phone models that are somewhat wear- and water resistant.

3. The project so far has shown that there is a huge demand for hotline service and guidance when the HANDS ICT tool is introduced at a school. To give a proper entry to this, "super users" has to be trained at a school before the HANDS toolset is introduced to the rest of the staff and the pupils. This or these super users will have to create the first versions of locally adapted content based on the existing base of content. This way the rest of the teachers can start their work based on content that takes local conditions into considerations.

4. Finally a startup seminar is to be held at a school before the HANDS toolset is taken into daily use. The seminar should include how programs work and how each individual use the functions in the program, so that it will be used optimally. Instructions have to be adapted to each type of users, like parents, teachers or psychologists. This startup seminar should help getting a critical mass of users in each place, so synergy among the new users leads to more local content being created and made available amongst the users.
At these trainings also the ethical aspects of HANDS should be carefully examined in the light of law and local rules.

3.2.8 Conclusion on PEST analysis

It has been clarified through an analysis of political factors that the Danish schools take their own decisions in terms of budgeting, which tools to use etc. The only requirement is that the tool/treatment has to have a documented positive effect on the children.

Throughout this analysis of legal factors it came clear that there are a great deal of legal opportunities for parents and institutions to get expenses, in regard of treatment and caretaking with aim of a better daily lift for the children with autism, covered. Both tangible and non-tangible resources can be supported.

The economic analysis showed a decline in the Danish economy. Growth in GDP and General government financial balance are to be taken into consideration. There has been negative growth in 2008, but it seems that the economy will turn. For HANDS this is an opportunity. If they manage to promote their product, the company may ride along on a new economic boom – should such occur. Furthermore, the government's financial policy is

expansive, which means that there will be spent more on investments, including products/services of which HANDS provides.

By analyzing the demographic factors, there is no doubt there will be a demand for software and other kinds of products which can help these children in their daily life. It is very thought-provoking, that there has been a dramatically growth in the number of people being diagnosed with autism, more than tenfold during the last ten years. Especially children age 5 to 9 and 10 to 14 has witnessed heavy growth.

The analysis of social and cultural factors indicates that there is a need of an official website where a community of parents, teachers and politicians can discuss and exchange ideas, results etc. with each other. HANDS can benefit from such a site, to help establish a community for creating and sharing content to the HANDS toolset. Another big opportunity is that a number of researchers on the universities will be creating completely new research based on the data from HANDS. Some of the data gathered in HANDS project has never been gathered before, so this will lead to a number of opportunities to have the research presented at conferences, which will again be seen as a great way of spreading the knowledge about HANDS as a new type of ICT tool.

PEST analysis covering the other markets for HANDS toolset will have to be created when the commercialization of the project is started in practice. Likewise this PEST analysis with focus on the Danish market will have to be updated at that time.

The schools participating in HANDS project from DK, SE and UK are carefully selected participants in HANDS, since these countries has the best resources among European school for young with autism diagnoses, and since these schools are leaders within experimental treatments of young pupils with autism diagnosis. Finally the Autizm Foundation school in Hungary is selected as participant due to their close corporation within cognitive psychology with ELTE university.
It is hence expected that the initial markets for HANDS will be in Denmark, Sweden and UK, and later the markets in the rest of Europe and USA will be aimed for.

3.3 Open Source

During the HANDS project we have seen how costly it is to create a toolset with such high adaptability to each user. We have also seen the current economic possibilities for the schools working with children with autism.

Based on that, it is likely, that it would be too costly to use a classical consumer-producer business model. Especially since the customisation of HANDS software includes a large amount of pedagogical knowledge and skills and needs to be done either by the individual teacher/school or by an organisation staffed by professionals who are experienced in looking after teenagers with autism diagnosis.

The organisational and social prerequisites for Open Source collaboration do exist. Individuals working with teenagers with an autism diagnosis, i.e. teachers and parents, are typically well organised, they are naturally committed to improving the lives of those they care for, and they are typically eager to know about new ways of working/teaching. Thus all the prerequisites for a successful Open Source collaboration are in place ([Kaptelinin & Nardi, 2006] and [Wenger, 1998]).

The Open Source collaboration is needed to grow the actual content of the HANDS toolset, since the need for individualization has forced the toolset to be extremely adaptable. The adaptability means that the software can be fitted to suit the needs and capabilities of young with autism diagnose, but the adaptability also means that the toolset is very limited in the original form, so content has to be created for each child for the toolset to maximize its potential value for each individual.

Is it possible to utilize an existing (social) network (like facebook) to create the collaboration between teachers and parents, or will we need to create a new forum to host the collaboration when HANDS project ends?

The collaboration forum must support easy sharing of experiences and content to a number of ICT tools including HANDS toolset. Content to be shared includes Icons, pictures, plans, templates and other content like HANDS SSSI's.

3.4 Exploitation

In order to ensure that the costly research in HANDS is taken one step further out in real life to benefit society, it is important that a business model can be defined generating sufficient profit to cover the salaries of the required staff that will provide an easy-to-use software package, training, maintenance, and support. It is foreseen that the developed concept can be deployed in standard modern mobile terminals, thereby lowering the total cost. Also, it is expected that the important need for customization of the HANDS toolset will develop into a community of "Open Source" content developers in schools for autism-diagnosed pupils will contribute to the distribution of the HANDS concept.

4 From project to company

The current HANDS network is more than just a business based network. The participants have reached a high degree of mutual trust and social interactions, friendship and the willingness to help young people with autism.[13] These ideals strengthen the links of the partners in the value network even more. It must be added though, that the project coordinator and his supporting management team travelled a lot to the partners in different countries with diverse cultural backgrounds to establish general commitment for the tasks within HANDS.

But the current project organization is not expected to be viable when HANDS is to be commercialized. A very slim, maybe even virtual organization is needed in the beginning, until sales revenue can carry a larger organization. A possible model is that a company structure is created by letting each project partner have ownership of the new company corresponding to the amount of money and the IPR they place into the new company. This new company may then start by hiring sales resources, while all development resources are bought on an hourly/weekly basis from the knowledgeable participants in the HANDS project. This way the new organisation is kept at a minimum, while the needed knowledge is still available for the new organisation. When first sales are effectuated, the organisation will need some service resources as well to handle the server, and deliver online service for the new end users of the HANDS toolset.

This way, not all knowledge created by individuals within HANDS can be shared; for reasons of cost and time, too much redundancy in knowledge offsets the advantages of specialization and division of labor. But the knowledge will be available to the organization for a pre-agreed price when the new organisation buys time-limited resources from the HANDS project organisation.

In the case of HANDS, where knowledge of autism and the needs and requirements of autistic people is crucial to the development of the business, developing a knowledge management system is the key. This system or infrastructure covers all the steps for maintaining information, from documentation and archiving to the processes and procedures associated with

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[13] Perkmann/Walsh (2007) describe in their article about university–industry relationships that organizational networks are often based on social relationships between individual organizational members.

them. The availability and the proper management of knowledge allows for innovation, where information can be shared and effectively converted and applied to enhance an organization's knowledge system.

4.1 SWOT and TOWS

In the following, a SWOT-analysis will be conducted. A SWOT-analysis is a structured analytical process, which aim is to identify and analyze strengths and weakness of HANDS as well as the external opportunities and threats which are surrounding HANDS.

First element of the analysis will be a recapitulation of organizational factors, where an identification of internal strengths and weaknesses will be located. Secondly, opportunities and threats from the marketing perspective will be pinpointed. Lastly, these elements will be analyzed in order to get a structured overview of the situation of HANDS.

The strengths of the SWOT-analysis are that it an overview of the internal part of the company as well as the external part. Many companies lacks the ability to either to look inside the company due to market-focus while others lack the external view due to e.g. heavy focus on product development. By using the SWOT-analysis this lack of awareness may be reduced or eliminated.
The weaknesses of SWOT, is that if the internal and external analysis is not properly discussed by two or more parties, the elements of the SWOT-analysis may be based on individual feelings and become subjective, which can influence the results in a wrong direction.

Besides SWOT-analysis there are various frameworks and approaches which can be used in the analysis of the companies' strategic position. Nevertheless, SWOT is considered one of the most straightforward[14].
Furthermore, it seems likely to pass the critics of Henry Mintzberg, who sees SWOT underlying the process of developing and determining the strategy[15].

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[14] http://www.sciencedirect.com/science?_ob=ArticleURL&_udi=B6V6K-3SWV663-5&_user=632453&_coverDate=02% (article from sciencedirect: SWOT-analysis: it is time for product-recall, Terry Hill and Roy Westbrook)
[15] Article: SWOT-analysis: it is time for product-recall, Terry Hill and Roy Westbrook, page 2

Internal factors	
Strengths	**Weaknesses**
• **Flat structure**	• **Project manager - monitor**
• **Fast decision making**	• **Project manager – essential link**
• **Information flow**	• **Partners loose commitment**
• **Modern communication tools**	• **Danger of partners not doing a proper job**
• **Clear tasks and scope of decisions**	
• **Flexible project structure**	• **Lack of link to environment**
• **Strong relations**	

Table 2: Strengths and weaknesses

Strengths

- The flat structure of the company enables disputes to be solved at the lowest level of hierarchy. As when the work packages have responsibility for their own decisions, which indicates empowerment of teams.

- Fast decision making is a result of only 3 hierarchies in the project structure. Furthermore HANDS has decentralized work activities, which has resulted in very efficient and less time-consuming decision making.

- By using the moodle (project online forum) site and *Computer Supported Cooperative Work* through low levels of hierarchy, HANDS has an easy information flow

- Through extensive use of modern communication tools such as video conference, telephone conference and web meetings "virtual teams", HANDS has minimized travel costs.

- Clear tasks and clear scope of decisions has been actualized through the project guide where the structure and roles of members is specified.

- There is a very flexible project structure at HANDS. Within a short time, a new work package can be put together and makes it relatively easy to respond to demands and or changing environment

- The network of HANDS is very strong due to the fact that it is built on friendship, which reduces or eliminates self-interest.

Weaknesses

- It's hard for the Project Manager to monitor each WP or member of the network. This is largely compensated by the project management by distributing the management as much as possible, end by empowering WP leaders correspondingly.

- Due to the project managers role as a key figure in the structure, where he functions as the link between the project board and work packages, he is important and project will be affected if/when he leaves the project. Project manager tries to compensate for this already by including a "second in command" widely in the work, and by letting WP leaders work directly with the PB. But the project is of course affected by his opinions and his way of working.

- If partners loose commitment to the project, the whole project may be endangered. And searching for new and appropriate partners could be a difficult process.

- It's difficult to handle if one partner doesn't do the job properly, the whole effectiveness of the project will be endangered. This is due to the nature of a development project/process, where one activity is based on knowledge gathered in the former activities. If one activity is not properly executed, the knowledge to properly develop activities depending on that knowledge may be blocked.

- In the contemporary structure there is only a few members of the project of which have contact to the surroundings, e.g. the project coordinators is the only one who has relation to the European Commission. This is mainly due to all participants working full time in their own organizations, and only very few are fully committed to working for HANDS project only. I.e. not many of the partners have the time available to build the network that could be possible during the project.

External factors	
<u>Opportunities</u>	<u>Threats</u>
- Schools make decisions regarding tools/treatment - Legal factors - Growth - Open to new ideas - Social media - Specialized forum - Open source - Closed source	- Cut in budgets - Validated testing of tools/treatment - Account for tool/treatment - Sensitive parents

Table 3: Threats and opportunities

- Boards of the participating schools makes their own decisions regarding implementation of new tools/treatments. Which means the school board have full control over the decision making.

- According to Danish law, there are various legal factors which benefit parents and their children diagnosed with autism.

- It is a fact that through the last decade there has been a radical increase of autism diagnosed children and adults. It has more than tenfold.

- Schools and politicians are open to new ideas of treatment.

- Possibilities for distribution of Hands' products could be through a traditional website, making use of social media like Facebook, and creation of a specialized forum.

- In terms of the characteristics of the software the possibilities is to offer this as open source or closed source.

Threats

- Recently there has been a cut in budgets – both in Denmark and in the other countries that are considered as first markets for a commercial

version of HANDS. This is a political decision which may affect implementation of new treatments.

- It is required that a new tool/treatment must be properly tested before used. This puts HANDS in a situation where we need to have positive results before it even can come in to consideration.

- Even though the school board has full control of decision making, the board must account for their decision. This is required from politicians and parents.

- The parents of children with the diagnosis autism are extremely sensitive in terms of what decisions there are taken. A special board of parents has been established, to secure that every decision is verified before being implemented.

To get a better overview of the strengths and weaknesses, each of the points will be marked after their degree of importance and their degree of seriousness. The scale will be from one to five, where five is considered the highest and vice versa.

Strengths	Mark
Flat structure	5
Fast decision making	5
Information flow	3
Modern communication tools	4
Clear tasks and scope of decisions	2
Flexible project structure	5
Strong relations	5

Table 4: Mark of strengths

As disposed from Table 4, the factors considered most important are Flat structure, Fast decision making, Flexible project structure and Strong relations. Less important are Information flow, Clear task and scope of decisions and lastly Modern communications tools.
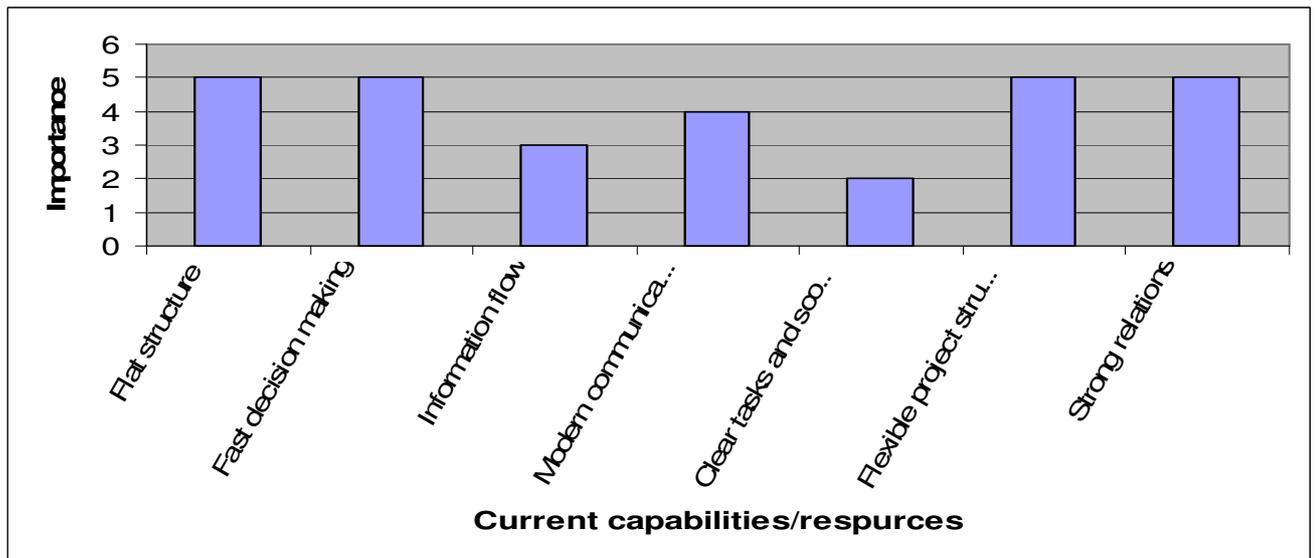It is further illustrated below.

Figure 7: visualization of mark

Weaknesses	
Project manager – monitor	4
Project manager – essential link	5
Project manager – knowledge	2
Partners loose commitment	3
Danger of partners not doing a proper job	3
Lack of link to environment	5

Table 5: Mark of weaknesses

In Table 5 the essential role of the product management is estimated to be very critical for HANDS. Furthermore, the limited contact to the surroundings is considered as a serious weakness. Thereafter, the complication of monitoring the work packages as well as the board is a relatively weakness. Partners loosing commitment and danger of partners not doing a proper job are in the lower scale of seriousness and finally there is the difficulty for the project manager to distribute knowledge to the other levels. It is visualized below.
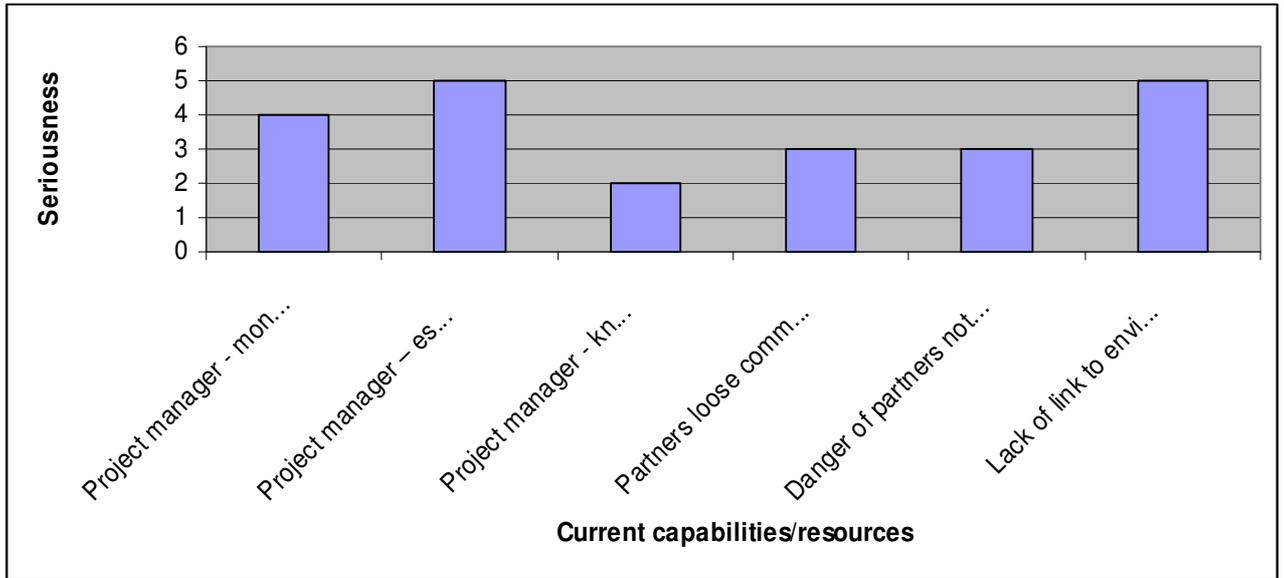
Figure 8: visualization of mark

In the following an estimation of importance and seriousness of respectively opportunities and threats will be conducted.

Consequence of action	Probability of action	
	High	Low
Very attractive	• Schools make decisions regarding tools/treatment • Open source • Closed source • Social media/community • Legal factors	
Less attractive	• Open to new ideas	• Growth

Table 6: Matrix of opportunities

As displayed in Table 6, there are various opportunities which are considered very attractive as well as it is estimated that the probability is high. Less attractive is that the schools are always open to new ideas. This is of course highly important, but if the product is benefitting the children, institutions will seek to this new product. This means that the technical competition in the market is strong/hard for the HANDS. Lastly Growth is

considered less attractive and the probability is also estimated low. The reason for this is to be found in the uncertainty of why the growth has been so significantly the last decade. Some experts say, that it is due to new ways of diagnoses, other say it is a result of modern society and some claim it has to do with the fact that there is less taboo connected to autism today, compared with a decade ago.

The threats are analyzed further below.

Consequence of action	Probability of action	
	High	Low
Very seriously	• Account for tools/treatment	• Sensitive parents
Less seriously	• Validated testing of tools/treatment • Cut in budgets	

Table 7 Matrix of threats

Table 7 show that there is only one actually very serious threat which is estimated to have high probability. When decision making is done, the school board has to account for those decisions and if they are not approved by parents and or politicians it may not be realistic to implement that decision. It is hence extremely important that the universities perform proper research on the data gathered in prototype 2 tests in the project, to deliver a solid scientific foundation for the value of HANDS used by young people with autism diagnose.
Less serious threats are validated testing of tools/treatment and cut in budgets.
Lastly the sensitiveness of the parents is considered very seriously but when the product is right it is estimated that the probability is low.

Next section a TOWS-matrix will be conducted. The TOWS-matrix is an operational way of generating strategic initiatives with point of reference in a combination of the threats, opportunities, weaknesses and strengths. The difference between SWOT and TOWS is that latter has the aim of identifying S/W and O/T while TOWS has the aim of generating strategies of which can create value within the organization as well as the external environment.

	Strenghts • Flat structure • Fast decision making • Information flow • Modern communication tools • Clear tasks and scope of decisions • Flexible project	Weaknesses • Project manager - monitor • Project manager – essential link • Project manager - knowledge • Partners loose commitment
Opportunities • Schools make decisions regarding tools/treatment • Legal factors • Growth • Open to new ideas • Social media • Specialized forum	(S) (O) A) Maintain agile structure and thereby respond to emerging and changing market conditions. B) Establish marketing department.	(W) (O) C) Develop forum for experiences and knowledge as well as content are shared directly between users. D) Letting one or more person/s from each work package have contact to external environment.
Threats • Cut in budgets • Validated testing of tools/treatment • Account for tool/treatment • Sensitive parents	(S) (T) F) Communicate the strong relations/culture of HANDS.	(W) (T) G) Develop a formal and official society.

Table 8: TOWS-matrix

Strengths and Opportunities

- Strategy A
  HANDS should maintain the agile structure of the network, which enables the network to rapidly respond to constantly changing needs from children, teachers and parents. Moreover, it will create a possibility to adapt to emerging and changing market conditions, such as competitors, legal issues, foreign country demands etc.

- Strategy B
  Establishing a marketing department will secure close contact to costumers, new technologies e.g. online ways of distribution, changes in the way of positioning the product, branding, market research etc. This should be the very basis of the commercial organization bringing HANDS to the market.

Weaknesses and Opportunities

- Strategy C
  By developing an online forum for end users, HANDS will have a constructive way of sharing knowledge and content directly between users. This forum shall be based on the initial work from the four schools participating in the project, and the forum must support knowledge sharing on other tools as well, to become the <u>one</u> site where teachers, parents and experts share knowledge, experience and content on ICT tools for this area.

- Strategy D
  By letting several people from the work package have contact to the external environment, it will create strong bonds/relations to clients, investors etc. Likewise it will eliminate the fact that there are only few persons connected to the external environment.

Strengths and Threats

- Strategy F
  HANDS should position and communicate its product and combine
  culture and identity of the network in such a way, that the strong
  relations that connect the network are communicated as well. By doing
  this, a more reliable picture of HANDS will be formed. HANDS will
  not be thought of as only a product, but as an organization with – not
  only professional relations – but also emotional relations.

Weaknesses and Threats

- Strategy G
  Developing a formal and official society HANDS enables sharing of
  knowledge. Knowledge about new technologies, treatments, political
  decisions etc. shared between parents, politicians, teachers and other
  experts. This should be based on the same online forum as mentioned
  in Strategy C, but should try to benefit from existing online medias as
  well. E.g. try to support a HANDS fan site under facebook, since this is
  a well established media used by many of the possible users. The fan
  site must then properly support the online forum as the main site of
  knowledge sharing.

5 Plan

Based on the statements in the former chapters of this Socio-economic
business plan, the first action of bringing HANDS to the market is for the
participating partners to agree on a commercial organisation to take over the
responsibility for the commercialization of HANDS. This organisation must
be agreed upon, and each partner shall be granted ownership as they deliver
their IPR as the foundation for the commercialisation. FP7 program has
prepared this step based on Article 42 RfP – Article II.27 of ECGA (Euratom :
Article 41 RfP) so that:

*Transfers of ownership of foreground are allowed, though the obligations regarding
that foreground must be passed on to the transferee. In principle, as long as the
participant concerned is required to grant access rights, notification must be given to
the other participants, which may object within a specified period. However, they may
agree in advance that no prior notification is necessary with regard to a specifically
identified third party. Contrary to FP6, the Commission must only be notified in very
limited cases.*

5.1 Market segmentation

HANDS is developed aiming at a very specific segment: Teenagers diagnosed with autism, having an IQ over 70. But there are no specifics in the implementation that limits the possible user group to this segment only. Other possible segments could be people diagnosed with ADHD or other similar conditions. So the possible benefiters of the HANDS toolset should – for the commercialisation of HANDS – be defined as: *People with a diagnose that requires a tool for structuring their daily lives, with an IQ over 70 and aged older than 10 years.*

The limitation in age and IQ is due to the maturity it takes to properly use a smartphone device and not breaking the device.

5.2 Unique selling points

Hands have a number of unique selling points:

- HANDS can help increase the teamwork and interaction between teachers, relatives and the toolset user.
- Data collection allows for measuring actual usage and hence the value gained by the end users of the tool set
- The adaptation to each user due to the "One for each" principle gives a possibility for greater value of the tool for each end user.
- The open platform structure makes it very easy to build new functionality into the toolset in the future.
- The research conducted in Persuasive interfaces, E-learning and cognitive psychology gives a foundation for the sound use and possible gains when using HANDS.

5.3 Distribution

Due to the market being very different in the different countries, we will build the foundation for a community online, where teachers, experts and parents can share experience, knowledge and content on ICT tools. The community has to be focused around a web based service formed as a forum, to allow users in the community to add new content to the web service. E.g. to allow for other tools than HANDS to be discussed and has content shared during the same forum. This is to gain a solid foundation for this forum to be the community on the internet that is used mainly by teachers, but also by the parents and other related experts in the area.

The web service shall support a distribution channel for HANDS as well. I.e. it shall be possible to buy the HANDS toolset directly on that forum. This is to make it easy for schools to buy the tool, but also to allow for parents/relatives to try to tool with their child, and hence putting pressure on their local school for buying the tools.

Besides the online forum, the main channels for spreading knowledge about HANDS and hence selling the toolset is through the organisations like "Landsforeningen Autisme" in Denmark, Becta in UK and similar in other markets. These organisations are best aimed through conferences held e.g. on Autism. Therefore it is essential that Hands will be represented whenever these conferences are held, and not only should Hands be represented. Talks with the Danish schools have shown that most often the purchase of a new treatment method is made trough contact made from these conferences. The main reason for that is that by being at these conferences, companies or HANDS seem more trustworthy and reliable.

The overall goal should at all times be to establish contact – hereby, because of the very complex buying behaviour, the aim should be to do one-on-one marketing so the actual presentation is directed to the individuals. The emphasis should at all times be on building up a relationship between Hands and the potential buyer – a way to do so, is by offering the Unique Selling Points and especially the more emotional related ones of the USP's.

5.4 Where to start

The very first thing a commercial HANDS organisation will have to do is to decide where the revenue shall be earned. There are a number of possible sources:
- Revenue from selling the HANDS toolset as "shrink wrap" software to schools, and maybe to parents or other groups.
- Revenue from selling support on an hourly basis.
- Revenue from developing new specialized functionality on the HANDS platform for new specialized user groups.
- Revenue from selling HANDS "as a service" through access to the server part of HANDS.

Considering the economical situation in the markets and on the schools, the entry fee for using HANDS should be low, and the revenues should hence be spread out on the possible sources as the market matures.

Based on the discussions throughout this deliverable, we try to visualize the most important demands that request immediate actions into one figure.

Figure 9 below represents the most important aspect of creating a commercial future for HANDS. This should help emphasizing the most essential topics that are crucial for a business model for HANDS.
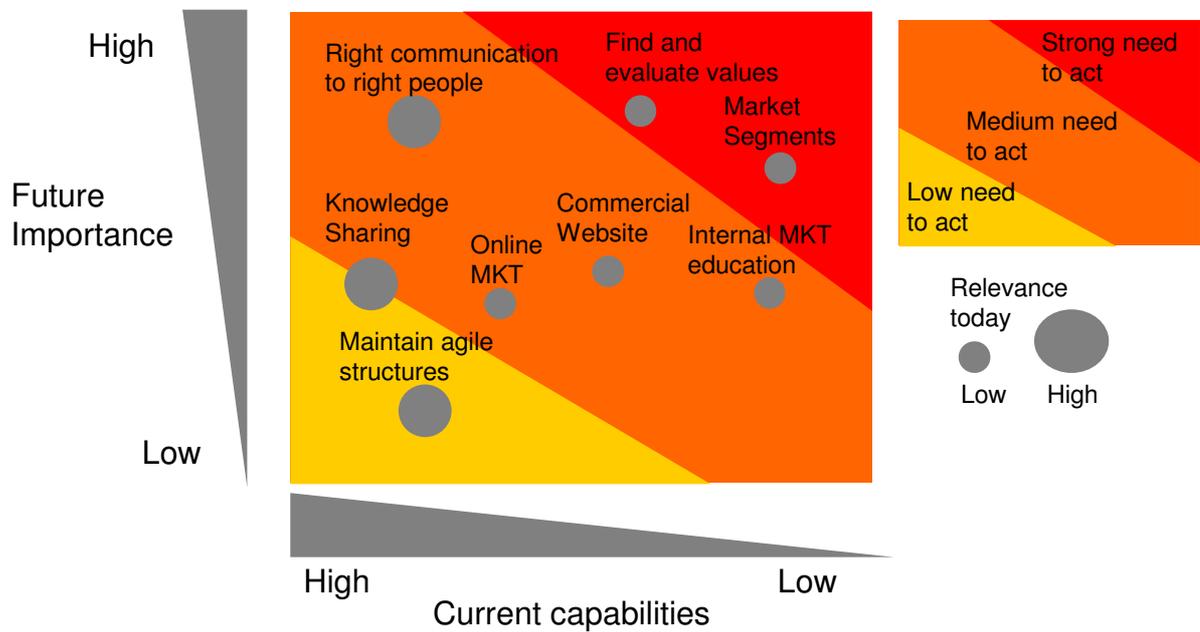

Figure 9: Attention and Action Map

- Find and evaluate tangible and intangible value streams in the organization that ensures the survival of HANDS in the future

- Identify market segments. Who is coming into contact with the offerings of HANDS and for what is the offering useful.

- Make sure that marketing education exists within the organization in order to satisfy crucial customer needs.

- Construct an online community through a web service and forum, where users can learn about the product, order HANDS (and eventually other tools), get support and share content.

- Right communication to right people. The market, which HANDS is entering, has to deal with serious ethical issues. Thus the recommendation and work from the ethical board within HANDS project is extremely valuable and should be brought to the online community as well.

- Online Marketing should determine how HANDS could interact with its stakeholders. Social communication tools like Facebook and

Youtube are such possible channels, and all communication should support and mention the online community and point to the online forum.

- Knowledge sharing is necessary to maintain and improve performance of HANDS organization. Thus further research in the field should be supported and closely followed by the commercial HANDS organisation.

- Maintain an agile and flexible organizational hybrid structure and do continuous improvements to respond to internal and external needs.

6 Conclusion

HANDS already have a well defined group of users. But the segment around the teenagers with autism is very interesting as target for the marketing: the parents, teachers, politicians and Scientists/Psychologists. Each of these segments are interesting, but will have to be addressed in different ways. Thus the segmentation strategy for the commercial HANDS organisation has to be differentiated to focus on each and all segments.

The revenue that can be earned will decide the power that the commercial organisation will have to target and support the markets with. To gain proper entrance into the market, the fee for starting using HANDS should be low, while support in the form of experts is a well known concept for the schools, so that revenue channel should be exploited. This can be done by hiring the original HANDS partner's participants on an hourly basis – where ever this is possible. University employees may have problems with that model, so a special model may have to be developed for the 3 universities.

An online community shall be created and a website supporting knowledge and content sharing as well as easy access to buying the toolset shall be established. The online community shall be advertised through relevant conferences and online media like FaceBook, YouTube and others.

A positioning platform for the commercial product shall be based on the unique selling points identified in chapter 5.2. The more emotional selling points that the teenagers get an "electronic partner" to helps them through day-to-day tasks, and that HANDS is a fully integrated solution that provides help and support in all aspects of autism care-taking; both teenagers, parents, teachers and psychologists benefit from the solution.

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