NoTube
Networks and Ontologies for the Transformation and Unification of Broadcasting and the Internet

FP7 – 231761

D9.5v2 Exploitation strategy v2

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EXECUTIVE SUMMARY

This deliverable outlines the results of the NoTube project and the plans of individuals and groups of NoTube partners with respect to the exploitation of these results as future products and services in the Internet TV market. It updates the initial exploitation plan of NoTube with: a specification of the expected results of the NoTube project and current partner plans for their commercialisation, detailed individual exploitation plans for some of the NoTube partners, as well as a strategy agreed by other partners to jointly seek the commercialisation of their results through further financing and technology transfer to companies.
## DOCUMENT INFORMATION

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<tr>
<td>EU Project Officer</td>
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<th>Authors (Partner)</th>
<th>Lyndon Nixon (STI)</th>
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<td>Resp. Author</td>
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| Abstract (for dissemination) | This deliverable outlines the final exploitation plan for NoTube technology in the emerging Internet TV market. |
| Keywords | content value chain, exploitation, commercialization |

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**Important information for Quality Assessors/Quality Controllers (PLEASE DELETE IN THE EC-READY VERSION)**

- Send a PDF version AND a Latex/MS-Word of the deliverable to the Quality Assessor/Quality Controller to ensure that no links are broken, pictures are correctly converted, etc.,
- ALL pictures in the deliverable must be B&W readable,
- After addressing the Quality Assessor’s comments, report back to him/her using the review form.
## Project Consortium Information

<table>
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<tr>
<th>Participant's name</th>
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<td>Vrije Universiteit Amsterdam</td>
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<td>Ron van der Heiden</td>
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<td>Institut fuer Rundfunktechnik GmbH</td>
<td></td>
<td>Christoph Dosch</td>
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<td>Atanas Kiryakov</td>
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<td>John Domingue</td>
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<td>Semantic Technology Institute International</td>
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<td>Stoneroos B.V.</td>
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<td>Thomson Grass Valley France SA</td>
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<td>Raoul Monnier</td>
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<td>TXT Polymedia SPA</td>
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<td>Sergio Gusmeroli</td>
</tr>
<tr>
<td>KT Corporation</td>
<td></td>
<td>Myoung-Wan Koo</td>
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Phone numbers and email addresses are not included.
# Table of Contents

**List of figures**  
6  

**List of tables**  
7  

**List of Acronyms**  
8  

1 **Introduction**  
9  

2 **The NoTube results**  
11  

3 **Individual NoTube exploitation plans**  
12  
3.1 Stoneroos  
12  
3.2 Ontotext  
12  
3.2.1 Evaluation/comparison with other similar services  
13  
3.2.2 Commercialization of Lupedia  
13  
3.2.3 Placing of Lupedia service  
14  
3.3 Thomson Video Networks  
14  
3.4 Polymedia  
15  
3.4.1 Expected Foreground in Notube  
15  
3.4.2 Exploitation of NoTube architecture and services  
16  
3.4.3 Exploitation of Personalised Semantic News service  
16  
3.4.4 Target Market and Sustainability  
17  
3.5 KT  
17  
3.5.1 Expected foreground from NoTube  
17  
3.5.2 Plan to sustain the foreground after NoTube (in the short term, i.e. until it sustains itself)  
18  
3.5.3 Target market for the foreground  
18  
3.5.4 Benefits for the market from this foreground  
18  
3.5.5 Projected market share  
18  

4 **NoTube as a market opportunity**  
19  

5 **Conclusion**  
20  

**References**  
20  

A **Appendix**  
22
LIST OF FIGURES
LIST OF TABLES
# List of Acronyms

<table>
<thead>
<tr>
<th>Acronym</th>
<th>Description</th>
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</thead>
<tbody>
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1. Introduction

As we noted in the first exploitation deliverable delivered nine months earlier, NoTube has the potential to provide innovative applications which will run on future Internet TV platforms (also as illustrated in the above diagram). The place for NoTube exploitation in the digital content value chain is thus that NoTube may offer new types of TV application beyond the current social TV and enhanced EPG offerings. These applications cover:
• Social Web and TV integration
• Personalised advertising and EPGs
• Personalised TV content provision
• TV content browsing by concept-based linking

Three types of actor were identified within the digital content value, which may be played by members of the NoTube consortium or external organisations in the role of customer or purchaser of the exploited result:

• The "service creator" who delivers services built on NoTube technology to the consumer
• The "system provider" who links services to consumers via networks and infrastructure, such as a telco or IPTV provider
• The "technology provider" to gives access to the NoTube technology for the creation of new services

NoTube has also potential to facilitate new data and service providers in the TV ecosystem, besides the existing non-semantic data aggegration (e.g. EPG data) and over-the-top services (e.g. a social Web API in an EPG to post a recommendation). For example, in NoTube-enabled data provision we could consider Web data aggregation (especially Semantic Web/LOD repositories and query endpoints) and enriched TV metadata. In NoTube-enabled service provision there may be space for offering user activity processing as a service or TV program recommendation as a service over the top of implemented applications. These providers can enable new applications (or services) that are delivered to Internet TV platforms.

Finally, we consider three main approaches to exploitation of results as a business model:

• Ownership and maintenance of the results, within the NoTube partner organisation(s) or as part of a spin-off thereof;
• Licensing of the results to others, with the owner playing a reduced role (e.g. hosting services on their server). Licenses can be on a fixed or scaled fee basis, revenue sharing, freemium model etc.
• Sale of the results to another organisation, with full transferral of rights and responsibilities from the original owner.

However, it is important to first agree on the ownership of different project results (and under what conditions agreed with all relevant organisations) and then for the result owners to identify potential customers for those results (and hence, based on the usual market approaches, which business model and organisational set-up may make most sense to win and keep those customers). Different partners with different types of results need to take different approaches towards the exploitation of those results, with both individual and joint partner approaches having a place in this.

Thus, nine months after the original exploitation report, with the project results more clearly identifiable and the plans for their exploitation matured, we return to our original goal: to define the results of NoTube and the means we find to exploit them.
2. The NoTube results

As NoTube comes to an end as a funded EU project, the work done crystallizes and in the last months is largely refined and prepared to be sustained following the end of the public funding. In the NoTube project meeting in September 2011, a survey was conducted with all partners with respect to the results they identify as having produced as part of NoTube, and their current intentions regarding the licensing and sharing of those results.

<table>
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<th>Lead Partner, WF</th>
<th>Type (demo, system, What is it?)</th>
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Clearly, the NoTube industry partners who are both closer to market and better positioned to directly commercialize results - Stoneroos, Ontotext, TVN, KT - have a stronger focus on protecting IPR on the results they have contributed within the NoTube project and a clearer goal to commercialize those results within their own products and services. Besides this, also the partners Open University and IRT name a NoTube result which they plan to protect and explore internally a means to commercialise, which is welcome since research institutions are usually less forthcoming in pursuing individually the commercialisation of their research results. That said, it is also clear from the survey, that the majority of named results are currently foreseen to be made openly available (under some agreed license which may place more or less restrictions on the future uptake and re-use). From the perspective of public research funding producing results which are given back to the community, we welcome that many results of NoTube will be open sourced and hence potentially can form the basis of future further development - by NoTube partners as much as other external organisations - towards both open and free applications and services as well as commercialised versions. We note that making software or services open source does not exclude commercialisation - and that the original creators of that software or service have the best position to commercialise that which they best understand and can extend or evolve.
3. Individual NoTube exploitation plans

3.1 Stoneroos

Stoneroos has explored the exploitation potential for its iFanzy PPG (personalised program guide) following the work performed in NoTube, in the context of uptake in the Turkish market together with Engin Media. Following the business model canvas approach, the following elements were defined:

- Customers: Television viewers, advertisers, content providers
- Added value: For the users: 'A personal TV guide'; For the advertisers: 'A targeted advertising platform'; For the content providers: 'A platform for promoting content'
- Partners: Engin Media, ad agencies
- Resources and work: Platform development, metadata, application development
- Channels: iFanzy website, iTunes app store, Connected TVs and STBs
- Costs and income: human resources, advertising

As a result, the following revenues are projected for the iFanzy application clients (ConnectedTV, iPhone, Web): over the first 3 years after launch, with first revenues being achieved or measured 6-9 months after launch (to allow for gathering first critical mass of users):

![Table](image)

### 3.2 Ontotext

Ontotext is a key player on the semantic annotation technology scene. The very first result of searching for 'semantic annotation' in Google (as of 14.10.2011) is an Ontotext website section.
In order to keep this competitive advantage and popularise the semantic web technologies, it is important to show different domain applications. The Lupedia service, developed as part of the NoTube project was an excellent proof of concept for SaaS (software as a service) application of our technologies.

The four main achievements in the text enrichment service are:

- 1. It uses a semantic repository for data storage, retrieval and inference chain production. The underlying repository is OWLIM - an already commercially available product of Ontotext.

- 2. The data that is used for annotation is a set of different interconnected datasets from Linked Open Data Cloud. As the datasets by themselves are publically available, their exposure in the annotation service was also unhindered. The central dataset in both LOD and our enrichment approach is DBpedia (http://dbpedia.org).

- 3. Multilinguality - The service provides semantic annotation on a number of languages. Originally we focused on DBpedia resources in English. Over time, we explored other languages and decided to extend our approach to Arabic, Bulgarian, Dutch, French, German, Italian, Korean and Turkish.

- 4. Domain tuning - the domain specific ranking rules added as final annotation layer ensure the service meets the quality requirements of the rest of NoTube services that use the text enrichment results.

3.2.1 Evaluation/ comparison with other similar services

We encountered two other public services with similar functionality, namely OpenCalais (http://www.opencalais.com/) and AlchemyAPI (http://www.alchemyapi.com), and compared the results from Lupedia with theirs. As shown on the table below the evaluation results are limited to the languages supported by the public services.

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<td>110</td>
<td>232</td>
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<tr>
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<td>320</td>
<td>313</td>
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<tr>
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<td>47.4 %</td>
<td>72.5 %</td>
<td>93.0 %</td>
<td>93.0 %</td>
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<tr>
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<td>15</td>
<td>7</td>
<td>11</td>
<td>1</td>
<td>4</td>
<td></td>
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<tr>
<td>Total entities</td>
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<td>247</td>
<td>327</td>
<td>324</td>
<td>39</td>
<td>31</td>
<td></td>
</tr>
<tr>
<td>Observer agreement</td>
<td>96.9 %</td>
<td>93.9 %</td>
<td>97.9 %</td>
<td>96.6 %</td>
<td>97.4 %</td>
<td>87.1 %</td>
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The main conclusions are that: the overall agreement in the three services is very similar; the coverage defers a lot -from about 500 entities annotated by Lupedia in the English corpus, to the 30 entities (6%) annotated by OpenCalais.

3.2.2 Commercialization of Lupedia

We foresee different usages of Lupedia similar services for various projects e.g. news annotation, Wikipedia article annotation etc. The cost for running such a service consists of:
• Setup cost - Setting up a new domain annotation service requires initial investment
• Maintenance cost
• Hardware cost
• OWLIM license

All the four types of costs depend on the domain and the size of the loaded data sets. Very huge datasets may require installation of a cluster of semantic repositories.

The pricing strategy will be pay per use on the volume information (size of the text in terms of characters).

The Lupedia service as it has been set up in NoTube is freely available at http://lupedia.ontotext.com/.

Pricing of any other domain specific setup and/or dataset extension is subject of detailed evaluation of the corresponding costs.

3.2.3 Placing of Lupedia service

The market of SaaS technologies is constantly growing, after Amazon announced their platform redesign and exposed various services incl. the Amazon Elastic Compute Cloud. The semantic technology market is also developing although the forecasts for its size vary a lot, the analysts see huge potential. The BBC launched their World Cup 2010 website section entirely based on Ontotext’s OWLIM semantic repository with great success. Our competitors mentioned in the evaluation study already monetize their annotation services setting up a very healthy business environment that is expected to develop in the following five years.

3.3 Thomson Video Networks

Expected foreground from NoTube: Automatic Personalized Ad insertion

Plan to sustain the foreground after NoTube (in the short term, i.e. until it sustains itself): TVN will use the prototype developed in NoTube to test how its customers will react to this new concept. We think that Automatic Personalized Ad insertion is mainly targeting the OTT Television market which is a very fuzzy emerging market. The IPTV market is also targeted by Personalized Ad insertion but the current advertising model is still unclear because the uncertainty on the role of the involved players (advertising company, content providers and service operator) is turning the decision making process in a very difficult task both for our customers and for us. Thus, there is no plan today to commercialize what was done in NoTube. TVN will work on an opportunistic mode, depending on the feedback received from its customers.

The target market for the foreground: Ad insertion servers. The current market size: 120 million. Expected market growth in the next 5 years: 10% per year.

Main drivers are:

• Global transition to Digital TV with more channels
• Ad insertion for VOD services
• Local Ad insertion

14 of 22
• Better targeting of the audience

Benefits for the market from this foreground: Work done in NoTube by TVN addresses 2 main drivers of the market growth: Ad insertion for VOD services and better targeting of the audience. As NoTube addresses half the drivers of market growth, we can consider that NoTube foreground could contribute to a 5% growth of the market per year.

Projected market share for the foreground exploitation
2012 – 4% 2013 – 4% 2014 – 5% 2015 – 5% 2016 – 5%

3.4 Polymedia

Polymedia is a leading company active in the European market as software vendor and integrator, specialized in Media and Channel Integration, with more than 10 years track record of successful business with Media and Telco leaders. Polymedia is a fully owned subsidiary of KIT digital INC. group, headquartered in Milan, Italy, listed on the Italian Stock Exchange, with offices in many European cities and in the US as well. Its portfolio includes products and services for Multichannel Content and Media Asset Management for broadcasters, media and telecom operators, focused on interactive new media business. Core of the offering is Polymedia Video, a complete software suite allowing to manage the whole life-cycle of rich contents and video: acquisition from heterogeneous sources, multilayer archiving and searching, multimedia editing, video transcoding and DRM protection, publishing on a variety of channels and devices (Web, WebTV, IPTV, Mobile VAS, Mobile TV, DTT and Teletext). Polymedia Video enables to reduce operating costs and to maximize the flexibility to follow the evolution of new media business needs. Media in a Box, developed in partnership with Microsoft, is the latest integrated software solution specifically designed by Polymedia to enable media companies to rapidly setup an effective online presence, managing digital products for Catch-up TV, Internet TV, Digital Content Store and video advertising on new media channels in a simple and efficient way.

3.4.1 Expected Foreground in Notube

The trend in media asset and content management solutions is to provide both professionals (B2B) and end users (B2C) with more flexible, personalized tools for interacting with content. Broadcasters and Editors demand for more powerful tools to create, annotate, aggregate, search, remix and publish their content. Users demand for personalized applications and services, tailored to their specific needs and interests. Semantic technologies have been proven to be instrumental in implementing such tools, application and services. The technical results achieved in NoTube will enrich the current Polymedia offer in the media market, then giving Polymedia a considerable competitive advantage derived from the participation in the project. The NoTube exploitation plan for Polymedia focuses on two main results: NoTube architecture (WP6) and services (WP1-5) as well as Personalised Semantic News service (WP7a)
3.4.2 Exploitation of NoTube architecture and services

By integrating NoTube semantic enabled services with Polymedia products, the company will be able to add great value to its software. The expected benefit for Broadcasters is a more flexible and efficient system to manage and publish multimedia content. Semantic annotation and enrichment of metadata allow for easier content remixing and personalization: TV Broadcasters can therefore capitalize on their content base by presenting content in a novel fashion (e.g. aggregated, filtered, and integrated with additional external sources). The results on modeling (WP1) can improve Polymedia’s software in term of adoption of standard formats and taxonomies and enable Polymedia to offer to its customer a theoretically sound content, metadata and user model as a reference point when capturing requirements and performing use case analysis. The work done on Metadata conversion (WP2) and enrichment (WP4) services can be integrated in the media asset management module, improving the connection to or transition from a customer’s legacy CMS, as also described in the NoTube architecture (WP6). Services to perform audio and video adaptation to different devices (WP2) can be integrated in the multichannel publishing module of Polymedia CMS. The design and development work carried out on user profiling and privacy protection (WP3) is a great opportunity to develop a reusable User Management module, based on open standards (e.g. OpenID, FOAF, OAuth), and pluggable into any Polymedia application, deployable both at the back end (for users base management) and the front end (login and profile management). From a software engineering perspective, the shift towards a semantic services oriented architecture (WP6) will improve some key quality attributes in Polymedia, such as modularity, modifiability, and maintainability. Service brokerage (WP5) can be instrumental in enabling the deployment of future versions of Polymedia as cloud solutions, where new services can be dynamically put on line and invoked as part of the authoring and publishing workflow. The NoTube User Portal, developed in the scope of WP6 in order to demonstrate the flexibility of the general architecture leading to the quick prototyping of Apps that integrate platform services and user personal details, is a piece of open software already providing both back-end REST-based APIs (for secure user profile access and integration) and front-end end points (for Web-based user management).

3.4.3 Exploitation of Personalised Semantic News service

The results achieved in the Personalised Semantic News services (WP7a) and the integration between Provider and Home System (WP6) represent a direct exploitation opportunity that enables Polymedia to enrich its offer in the TV domain, which is a key market for Polymedia and KIT digital. The trend to combine the web with television has grown stronger and stronger since the mid-90s, and we are now facing a number of services, the most known being Google TV, Samsung Smart TV, Netflix, Hulu, etc. that implement this combination. Another important trend is the emergence of Home Media Servers, small boxes (PCs or NAS) dedicated for storing and streaming various digital media, such as videos, music, and photos in the home environment, and permanently connected to the Internet, the TV and the Home Theater set. The work done by Polymedia in NoTube fully reflects those two trends and combines them together, focusing on a killer application (personalized news) with a technology that can be generalized to other kinds of content. The news application is an important showcase for
Polymedia, as it clearly demonstrates the benefits of semantic technologies in terms of content selection and adaptation, and it can be related to the business of Polymedia’s customers in the TV market in a very straightforward fashion. Personalised News can become a service that Polymedia is capable to provide out of the box thanks to NoTube technology.

3.4.4 Target Market and Sustainability

Polymedia customer base includes large broadcasters (Mediaset, RAI and La7, the first three Italian broadcasters, Telecinco in Spain), triple and quadruple player telecom operators (Telecom Italia, the first Italian telecom operator, FastWeb, now part of Swisscom Group, Vodafone Italia, 3 Italia and Belgacom Skynet in Belgium), editorial and publishing groups (such as De Agostini, Mondadori, Il Sole 24 ore, ADNKronos, Sport Network in Italy and the Guardian Media Group Regional in UK), advertising agencies and directories (such as Publitalia ’80 and Seat Pagine Gialle). In addition to that, Polymedia, part of KIT digital family, directly benefits from the holding company’s market strength. KIT is a leading global provider of video asset management solutions (VAMS) for multi-screen IP-based delivery and represents the largest public ‘pure-play’ in emerging global IP video market. Its revenue model is mainly based on recurring SaaS (Software As A Service) showing a strong and consistent revenue growth (eight sequential quarters of positive operating EBITDA, currently operating on a free cash-flow positive basis). Long term relationships and proactive contribution to continue innovation distinguish the cooperation of Polymedia with all its customers thus sustainability of the results is guaranteed by such a solid base. Detailed business plan and model, including cost and revenue projections for the individual exploitation of the current and derived products are part of company’s business strategy and for this reason cannot be disclosed.

3.5 KT

kt is the largest telecom company in South Korea and we aim to provide convergence services where voice and data, fixed and mobile, and communication and broadcasting services are converged. In doing so, kt focuses on identifying customers’ needs and finding a way to become a global IT leader through convergence-based innovation. In particular, kt RD Central Laboratory researches into how to bring more contents into its IPTV services and to incorporate social activities into its IPTV platform.

3.5.1 Expected foreground from NoTube

As a central research centre in kt, one of our organizational roles is to identify recent trends in IPTV and connected TV services and to guide how to discover new business models. As a non-EU resident organization, little information about EU FP7 initiatives is known to us, and generally we have limited information sources regarding European telecom and IPTV researches. Having participated to the NoTube project hence helps us better understanding FP7 projects and identifying the recent trends of social and connected TV services in Europe. This information has been a basis for developing a social and personalization services especially our IPTV NScreen and companion UI application. In addition, kt has developed a multilingual and multimodal mobile
interface through collaboration with BBC, UVA and Stoneroos. A direct technology transfer also has been happened, for example, we have purchased a BigOwllim library from OntoText AD in order to use this as a semantic repository in our IPTV search service.

3.5.2 Plan to sustain the foreground after NoTube (in the short term, i.e. until it sustains itself)

In the short term, we plan to exhibit the NoTube’s results in the kt’s Future On exhibition centre. This centre is to demonstrate our forefront technology achievement to our visitors. This exhibition aims to demonstrate various future IPTV services in Europe and our collaboration works with the NoTube’s partners. In the longer term, we are interested in exploiting research outcomes from BBC regarding social interaction to enhance our IPTV service. For example, our recently released companion mobile application has lack of social and personalization integration and hence it is necessary for us to research into what types of interactions needs further investigation.

3.5.3 Target market for the foreground

We are mostly interested in IPTV service platform and currently there are a total of 200 million IPTV customers since its first release on 2008. In the next 5 years, we expect this number to be increased by 5 times.

3.5.4 Benefits for the market from this foreground

We envisage that NoTube’s social and personalization services from BBC, Pronectics and VUA would play a significant role in bring value added to our IPTV service especially for customer lock-in purpose. By incorporating such research outcomes into our existing service, we could see huge benefits in cost saving, for example, 1-2 million dollars cost saving overall.

3.5.5 Projected market share

As we plan to exploit the NoTube’s research outcomes as value added rather than a main service, it is difficult to predict a market share change.
4. NoTube as a market opportunity

Since most of the NoTube partners are research organisations or universities, it is difficult for them to assess the current market, trends and identify the gaps and opportunities for commercialisation of their project results. Hence, as an additional service for the exploitation in NoTube, NoTube will contract an external organisation to conduct a survey of the TV and media market in order to generate for NoTube a report on the current and foreseen opportunities in the markets in which the NoTube project results may be able to offer a strong value proposition. The West Coast USA based consultants Steve Bastasini and Craig Wingate, who collaborate with STI International on business opportunities in the US under the name ’STI Americas’, were contracted for this task.

This report will be made available to the project before its end, and appended to this deliverable in a final submission.
5. Conclusion

Both individual exploitation plans and a joint exploitation plan has been developed and agreed in the project. The individual exploitation plans for some of the NoTube consortium partners are outlined in this deliverable. The joint exploitation plan is focused on acquiring future funding to sustain and evolve the NoTube research results from workpackages 1, 3 and 7 (primarily the Beancounter user profiling and content recommendation implementations). An initial attempt to acquire this funding is in preparation, in the form of a joint project proposal to the Research for the benefit of SMEs call of the EU (see http://ec.europa.eu/research/sme-techweb/index_en.cfm?pg=sme_indiv for more information about this call). This call foresees a number of RTD performers, in this case NoTube research organisations such as the VUA, IRT and Pronetics, performing research in contract to a number of European SMEs who need that research (in our case, mobile TV and hbbTV application developers). In other words, the funding would help us evolve and mature the results of the NoTube project and via technology and knowledge transfer implement them in companies who are in a position to bring the resulting products and services to market, with an agreed joint IPR on the work as agreed in the new project. We will know early 2012 if this proposal has been successful, and are open to other means to acquire funding post-NoTube. All the partners are committed to sustain the results initially after NoTube at their own cost, and to evolve them where possible within the open source community. We expect the seeds of such a community will be formed via the NoTube training event early 2012 for TV application developers. The NoTube researchers, who have already achieved a great deal within the project on TV analysis, annotation, processing and recommendation, will form strategic alliances, in whatever form is most suitable, with TV data and application companies in order to drive exploitation of NoTube results after the project end and we look forward with excitement and anticipation to what NoTube results will bring to the TV application market in the next years.
REFERENCES
A. Appendix
NoTube
Preliminary Commercialization Survey
Executive Summary

Performed by STI Americas consultants Steve Bastasini and Craig Wingate

Background:
STI Americas was engaged to perform a limited commercialization survey for the NoTube Project, providing high-level assistance in recommending an approach to strategic commercialization planning, and rapidly assessing the potential commercial interest in further exploration of opportunities to monetize the NoTube development efforts to date. In particular, this commercialization survey was initially directed towards three areas of NoTube component research and development:

1) The Beancounter approach to implicit user profiling via the user's Social Web activities (partner: Pronetics)
2) The Linked Data based recommendation services, providing long tail content recommendation (added value to existing social recommendation approaches)(partner: VUA)
3) Second screen TV content sharing (tablet-based UIs to share with others what you are watching, making recommendations, enabling remote persons to watch the same TV at the same time) (partner: BBC)

Methodology:
STIA has approached this project in four rapid phases:

1) Gathering appropriate NoTube and marketplace information: digesting Notube documentation and presentations; interviewing selected NoTube
consortium members responsible for specified development efforts; broadly researching competing, complementary, and overlapping initiatives within the broadcast industry including large corporation, startup ventures, and investment sources familiar with the sector.

2) Performing initial critical assessment and analysis of the commercial viability of the targeted NoTube developed technologies as well as the NoTube preliminary messaging in preparation for commercial outreach and interviews.

3) Initiating commercial outreach through industry contacts by initially preparing a master list of potential contacts, selecting an appropriately small sample for approach, making initial contact to determine interest and availability to participate within limited timeframe, providing summary information and education on NoTube approach and accomplishments, conducting in-depth interviews with limited number of selected participants.

4) Preparing a brief executive summary of STIA findings and industry feedback and including recommendations for next steps.

**Primary Limitations:**

- The multiple consortium members needing to be probed and interviewed.
- The volume of component technology developments to be researched and evaluated.
- The standards-based initiatives pursued by the consortium members to be understood.
- The amount of prequalification and the required education and steep learning curve required by many of the eventual survey participants.

Result of Limitations: Given the total of 100 hours contracted for this NoTube Commercialization Survey, the scope of the initial commercialization exploration needed to be realistically scaled to yield valuable results within extremely limited
timeframe. This limitation was appropriately communicated and agreed to by NoTube Project Coordinator.

**Interviews:**
The final interview short list contained individuals and companies selected from the master contact list attached as an appendix.

**Summary Findings:**
Not surprisingly, there is a significant distinction between multidisciplinary sponsored research initiatives and commercially viable monetization of those research results. Foundational and basic research goals usually are focused on widely sharing results in the hopes that societal, public sector, social, political and industrial change will occur, that results of basic research will be utilized to drive technological change, serving as an incubation environment for new products and services. However, in our opinion, sponsored research needs to be effectively coupled with industrial business insight and strategic business planning to create sustainable market impact and economic viability – products and services, market entrance strategies, business models, revenue models, and commercial partners for advancing the applied research and product development.

The future of television offers a huge opportunity. The next-phase television market is very early in developing and adopting its open standards, architectures, and interaction models. There is yet to be a dominant player or approach or open standards to shape the evolution of the industry as a whole. There still appears to be plenty of room for new players with well defined strategies, viable business models, and specific product roadmaps to achieve commercial success. Of particular interest to the companies surveyed is the potential integration of mobile and social applications to the user’s viewing experience.
There is currently convergence of multiple industry sectors and companies that will be impacted by changes in the status quo, and they vary widely in size, strength and diversity: broadcasters, cable companies, content developers, and manufacturers of related hardware including televisions, laptops, set-tops, phones, tablets, etc. The economic ecosystem of established and entrenched companies most often has economic disincentives from broadening their approach, investing in development of standards for industry interoperability, or being the first to embrace disruptive technologies. This is commonly known as the “first-mover disadvantage”. It is often significantly safer for profit-motivated companies to let others invest in building the market foundation while they save their resources to aggressively capture market share after market need has been established.

The Innovation-to-Commoditization curve is typically reliant on higher-risk innovators to develop products and prove user acceptance. This innovation phase is typically accomplished through Venture Capital investment or Industrial Sponsorship. Once the innovation has been proven the commoditization phase is typically accomplished through an established company that has the developed commoditization channels or through raising a significant capital base adequate to build new commoditization channels. There are rare exceptions to this model as product and service breakthroughs can occasionally be driven by unbridled user enthusiasm, industry standards, competitive mandates and requirements, or other catalysts.

Intellectual Property protection and management are key elements in being able to secure industrial and financial support. Protectable and exploitable Intellectual Property can effectively be utilized to generate industrial awareness and uptake from entrepreneurs and sources of capital (VCs and industrial applied research groups) to support startups and spinout ventures. One proven path to protected Intellectual Property from shared research is focused on capturing the Intellectual Capital in the form of the knowledge and know-how of participating individuals.
and industrial sponsors in the research environment in order to protect the future advances for further industrial customization and advantage.

For economic industrial viability, a transition is needed from basic research to applied research focusing on specific product and market planning, strategic business model development and product roadmap development and deployment. The research must cross the chasm from pre-competitive open research to protectable, marketable products through technology transfer. An appropriate strategy is required to get past the “black hole” or the “great divide” between R&D and product/market development. This planning requires specifics for business strategy, revenue models, product development cycles, competitive landscape analysis, strategic investment requirements, specific business applications, market-oriented expert analysis.

**NoTube-specific observations**

- The open standards work NoTube has been advancing with the W3C has high industry value though it is not a primary driver towards monetization.
- The structured approach NoTube is developing may be “at the right place at the right time”. There are many aspects of the broadcast industry and television infrastructure that are relying on dated interaction models and less than state-of-the-art technological capabilities. The industry as a whole seems to be ripe for innovation addressing information sharing, interoperability, and rich communication across devices.
- There are few companies seriously considering and addressing television metadata and structured content user benefits.
- The goal of the NoTube open source exploitation strategy appears to be to enable industry to take up and enhance the code base, embracing the NoTube “standard” within a ten year time horizon. However, history has proven that most successful open source
adoption strategies have required a stronger developer community and better outreach than has been developed by the NoTube project consortium.

- Without a significant industrial partner, an engaged open source development community, or a serious capital base, there are significant timescale challenges to bring the NoTube approach into mainstream use.

**Specific Requests for Preliminary Exploration:**

1) Contrast between the commercial opportunities in the European market and the US market.

The U.S. market and specific European markets have numerous differences, both subtle and obvious, however these are not significant factors in assessing the commercialization opportunities. The single most important requirement for investment from Venture Capital or Industrial Sponsor is the ability to protect and exploit the intellectual property. The standards-based model is typically a very long timeline to adoption. The open source model requires a stronger developer base than has currently been developed, and it typically generates service revenues which do not command the same investment interest or valuations as product or advertising revenues. The intellectual capital model seems the most likely to be effectively pursued in the near-term. Though the Venture Capital marketplace is most mature in the U.S., it could be limited by the European geographic base of most consortium participants leading to the conclusion that European funding and adoption seems more likely in Europe. However it is our belief that the most likely funding and adoption partner would be an international corporation with global operations.

2) Commercial viability of the Beancounter approach to implicit user profiling via the user's Social Web activities (partner: Pronetics)
Implicit user profiling via the User’s Social Web seemed to garner limited initial excitement. This is perhaps because of the small sample of companies approached during this abbreviated survey timeframe, or perhaps because of the number of semantic technology startups touting implicit user profiling as one of their key technology benefits. Regardless of the fact that these other companies are not utilizing the profiles for the same potential application and user benefits, the market is crowded with implicit user profile focused approaches.

3) Commercial viability of the Linked Data based recommendation services, providing long tail content recommendation (added value to existing social recommendation approaches) (partner: VUA)

There seems to be significant preliminary interest in the Linked Data based recommendation services. Specific use cases and examples are necessary to further communicate benefits and develop monetization strategies. There is definite interest in the serendipitous discovery of recommended content though lack of clarity about how to monetize the capability.

4) Commercial viability of second screen TV content sharing (tablet-based UIs to share with others what you are watching, making recommendations, enabling remote persons to watch the same TV at the same time) (partner: BBC)

Second screen content sharing seems to be the area of highest interest in our preliminary commercial exploitation discussions. There appears to be a general consensus that multiple screen content sharing is inevitably coming and there is definite need and value for creating innovative interaction modes and revenue models to take advantage of this development.
Recommendations for Commercial Exploitation:
Overview:
Successful commercial exploitation requires a significantly different mindset from sponsored research, and most often it requires different skill sets, leadership orientation, developer disciplines and expanded team expertise. Creating a groundbreaking technology is not nearly enough though oftentimes researchers, developers and academicians often believe it should be. During our rapid interviews with consortium members there have been numerous questions posed about what business structure would be best (spinout, startup, part of larger company), what kind of investor should be sought, and which technology components would be most readily adopted by commercial markets.

For an endeavor to be commercially successful, it needs to provide economic value or market advantage. The first step in transitioning basic research into commercial viability is to determine specifically and explicitly what value is being provided, to whom, in what context, and the ways in which it can be monetized. There needs to be a realistic strategy built on a reasonable business assumptions and revenue models that will capitalize on that value transfer. The business and revenue models need to be validated with experts in the marketplace. Additionally there needs to be a reasonable strategy for protection of intellectual property and competitive advantage. These factors all contribute to the foundation for the commercial product development roadmap. All of these elements are then the basis of the business plan and strategy which includes the potential investor identification.

NoTube has done remarkable, groundbreaking, innovative work, and yet, in our opinion there has been very little discipline applied to the commercialization aspects of the project. Like many of the Framework Programmes, NoTube has taken the approach of open sourcing its development through GPL or Apache license. The only stated strategy for commercial exploitation appears to be to
potentially sell expert consulting around the use of that open source code, a low-margin, low-growth business model.

We believe there is a significantly larger commercial opportunity, but it will not happen without dedicated work effort and budget here in the last two months of the project. It is evident to us from our survey that there are pockets of high interest from large multinational commercial companies in understanding the work that has been done and the potential application of NoTube’s approach and component technologies. However, in our opinion, before any successful outcomes can be realized, there is a significant amount of business strategizing, planning, validating, documenting, packaging, and outreach that would need to be accomplished.

**Recommended Steps:**
The recommended steps are basic and rather generic in nature. This is purposeful. It is our opinion that these basic steps are required to have the clear understanding and messaging necessary to successfully approach and engage funding sources, be they Venture Capital firms or industrial strategic investors.

The rapid interviews we conducted showed great intrigue and high interest on the part of our small initial sample of industry experts and potential funding sources. However, the interviews always eventually veered into business arenas where questions could not be answered due to the absence of basic commercialization strategic discussions and formulation. Potential investors and industrial partners need to understand costs, revenue models, business roll out strategies, protection of IP competitive advantage, and return on investment. It is our recommendation that the following basic steps be undertaken by individual partners who are interested in commercialization of the technology:

- Determine it is actually a goal to pursue commercial exploitation as opposed to continuing research
- Dedicate internal resources (or engage external resources) to develop strategic path towards goal
- Create strategy for NoTube Intellectual Property leverage and protection
- Perform competitive landscape analysis
- Create reasonable revenue model
- Validate model and assumptions informally in the marketplace
- Draft full business plan and abbreviated executive summary
- Create clear business messaging for the unique value proposition
- Determine the best entity structure to support strategy
- Forecast financial performance
- Identify capital requirements
- Develop pitch materials and supporting documents
- Approach potential investors, commercial partners and sponsors
- Close deal

An Example of a Possible Commercial Exploitation Strategy

This example is NOT listed in the original list of component technologies to be explored, and it is not a fully vetted idea. It is offered here merely as an example, as one of many ideas that should be explored in the initial process of identification of strategies that could serve as a basis of business plans.

The Open University, in loose collaboration with the BBC I believe, has developed the Watch’n’Buy code as an adjunct to the NoTube project to provide recommendations for products linked to the content being viewed. It is possible this could be productized as a first go-to-market offering which could be customized and rapidly deployed for the London Olympics. It could potentially leverage elements of the NoTube open source platform providing the necessary proprietary development angle to enhance the code base in a protected fashion. Revenues could be achieved through sponsorship and product sales. The BBC
could potentially leverage this strategy for revenues as well as reputational enhancement similar to its World Cup semantic technology systems.

If a plan were developed and the BBC involvement was solicited in this context, then there is a very good chance that adequate investment capital could be raised, and significant sponsorship or product revenues could be achieved in the near term and serve as a catalyst to broader future development and adoption of full NoTube platform capabilities. (Note: STIA originally brainstormed this concept with one of our investment firm survey participants. We also have highest level contacts with a global sports equipment/apparel manufacturer who has regularly been a major sponsor of the Olympics. We would be happy to be engaged to further develop this idea should the NoTube consortium require assistance.)