The quality of e-services[1]

R+D plan (Revised v0.9, draft)

Contents:

R+D plan, survey

This research deals with the usability[2] of the professional e-services.

Using the *professional* e-service, our doings may have financial, legal consequences for our livelihood. For example the social networks are mainly in the *popular*, while e-governments, e-business are in the *professional* sphere.

The professional base of our research is the 'usability' discipline. But we go beyond the usability has been elaborated worldwide in last decades. We don't expand the 'usability' notion toward 'user experience' or 'unified customer experience' but toward the 'client sovereignty' - in short e-sovereignty - instead. So this research establishes a new area of the software quality.

e-sovereignty = sovereignty of client of the professional e-services

A) The motivation

The motivation of the proposed research is that the quality of e-services around us is not sufficient for fast finding the relevant information, managing our affairs in effective way without misunderstandings and uncertainty feeling. And among the cause of the insufficiency we see the lack of proper software technologies, methodologies and standards.

B) The proposed research has two objects:

[1] Basic terms: **e-services = e-content = portal** in this paper.
Other terms see: http://www.vitalyos.hu/ICon_project/Terminology_and_Slogans.pdf

[2] Usability deals with the human side quality – namely the HCI, the Human Computer Interface – of the software, rather than the functional or technical quality.

I. At first[3] to establish the requirements of the e-sovereignty with scientific methodology. In short: what is the usable e-service like? This work needs – among others - to elaborate the ontology of the HCI as its conceptual basis.

   Our scientific approach, etc. are detailed below.

II. Afterwards[4] to plan and implement the e-service builder CMS (content management system) software technology, which complies with the previous requirements, having them built in.

C) The intended area of the result

The *intended end users* are the providers of the professional e-services, and theirs clients, managing their affairs by the e-services, e.g. the SME and the free lance experts[5]. The *immediate addressees* of this research are the service building developer firms and communities.

D) Our scope

Our scope can be expressed in different terminologies from different points of view. Unfortunately articulating the scope is inevitable without some vision of the result. Here is a simple summary:

The new e-service building technology we can characterize by the following title:

"(1)Ontology driven (2)collaborative (3)virtual office, (4)as a platform, (5)based on results of the neighboring sciences".

(3)Virtual Office:
It is a virtual place, where the service supplier offers and the clients make use of the service. These are all some kind of the office work, even if we browse and read only.

Our analysis shown that the portals, in fact, all conceals some kind of various rudimentary virtual offices.

The new HCI offers a general virtual office model, both for the service supplier and the clients. The clients using (i.e. having installed) the new HCI, can manage their affairs connected to his service supplier, if the portal of the supplier is built of the new HCI also.

Our idea replaces the portal-user relation (the client-server architecture) with the pear-to pear relations of Virtual Offices.

Here we can make our scope more precise: we prefer the OAI (Object Action Interface) rather than the AOI.

[3] See the Preparation Phase in the Milestones and financials.
[4] See the Demo, Pilot and Business Phases of the Milestones and financials.
[5] Yes, there are enormous numbers of software solution for every problem. See the 'Issue on the existence', paragraph, later.

(2)Collaborative:
The clients can manage his affairs connected to the different suppliers in his unique virtual office at the same time. The virtual offices can mount each other (see and contact without replica and copy), so a group of clients can manage their common affairs connected to the supplier(s). Moreover, the clients can define affairs – i.e. projects – common for themselves.

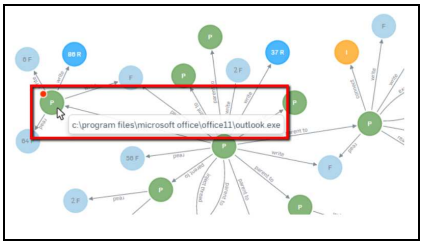
Here we can make our scope even more precise: we prefer the Object-Based Collaboration rather than Web-Based or other type of one. In case the Office objects the off-line Office tools are preferable rather than the on-line tools, in keeping with today's professional practice.

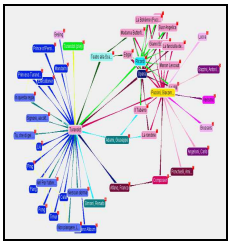
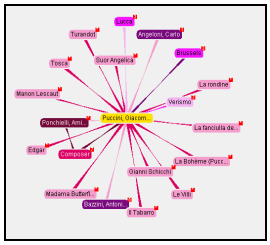
(1)Ontology driven:

The client/user would like to group his or her electronic 'goods', 'possessions' (documents, messages, etc.) according to their properties, in several ways. The tree directory structure used for 40 years is no longer enough. For this, the client must be able to define the properties of the 'goods'. (E.g. this is a project plan, the other is a filing an affair, etc.)

In addition, the client would also like to see the network of relationships between the 'goods' (e.g. one document is an explanation of another, an extract of several others, etc.). This raises the need for the client to be able define the relationships.

The ontology technologies give tools to do define properties and relationship in interactive way, and visualize them. So the layout of different 'Commanders' or 'File explorers' will be like this:



(4)As a platform:

Due to the well known principle, that the usability is not the *intrinsic* feature of the portals, we claim that the new technology must work as a platform, i.e. can be used as a part of and as a standard for the e-service building technologies[6].

- The new technology, being a platform, will be a layer, extending the (40 years old) WIMP layer placed on the top of it in the desktop.
- It replaces the desktop metaphor with the virtual space metaphor, by offering a HCI methodology of higher abstraction than the WIMP.
- Replaces the menu driven HCI with an ontology driven HCI.
- Replaces the conventional portal engine with an engine to map of the ontology (the conceptual space) on the virtual space.

[6] Cf.: the assumption of the Babel syndrome, below

(5)Based on results of the neighboring sciences:
Here are 3 examples:

- Psychology – what is the source of the security feeling, namely: the *confidentiality* and the *authenticity* feeling in the Internet?
- Mathematics (axiomatics) - the HCI-ontology needs a strict axiomatic system as its base.
- Environmental psychology - how to furnish a virtual space so that it can be used as a friendly and efficient office

More examples on the neighboring sciences can be seen below.

Annex: Fundamental Assumptions and Principles

There are some fundamental Assumptions and Concepts in the bases of this research-proposal that we don't meet in the publications in such consolidated format. These are not hypotheses to be verified by experiments, they are philosophical base of our HCI-scope. (Their names come from this research, and are yet unpublished.)

A) Assumptions.
They are the basic assertions on the world around us, and they are the source of the motivation of this research.

1) Assumption on the professionality. The interactive world can be divided into two main areas: the *popular* and the *professional* uses. The latter we refer as professional e-service or *portal*. This confirms the object of the research:

The main differentiation we have to make is the popular and the professional sphere of the use of the internet. The *popular* sphere consists of what we do in leisure time, without liability. In the *professional* sphere our doings may have financial, legal consequences for our livelihood. For example the social networks are mainly in the popular, while e-governments, e-business are in the professional sphere.

e-sovereignty = usability of professional e-services (or portals)

2) Assumption on the strictness. The sovereignty of the client depends mainly on the conceptual, linguistic, communicational correctness of the e-service. So the requirements of the e-sovereignty may not be generally derived from the experiments (except the measurements of the well investigated ergonomics). The only requirement we can establish is that the portal of the professional e-services must be elaborated with strict technical and mathematical accuracy. So should the CMS software technology.

Slogan: there is no high quality practice without well-elaborated theory.

3) Assumption on Babel syndrome. The lack of the standards. The great amount of the e-sovereignty problems comes mainly from the incompatibility of the HCI of the different portals. It is caused by lack of relevant standards and the different CMS technology and HCI-philosophy of the developer teams.

4) Assumption on innumerability (incomputability). The e-sovereignty of a portal may have so many insufficiencies that they can't be discovered by afterwards portal evaluation via checklists, or prevented by recommendations or design methodologies. E.g. consider the form filling software modules: their concealed pitfalls are always under-estimated. Generally speaking: the recent software technologies and designing methodologies can't tackle the whole "bestiary" of this great amount of the insufficiencies.

5) Assumption on the non-evolution. Market apologists say that the evolution of the HCI couldn't be made hurry by any scientific effort and investment, for it has its natural

market driven speed, as it has been in the case of other conventional products around us.

This proposal doesn't agree. On the one hand, the technical evolution had decades of the years to develop those products. The Information Sciences don't have, because the unelaborated, insecure, difficult-to-use business driven technologies will pollute our information environment. Here the responsibility of the scientific community may arise as well.

On the other hand, the market works gradually, in stepwise way. But the required technology contains indivisible parts, e.g. the ontology engine, and the virtual space engine. These can't be developed and put on the market gradually.

A corollary of the assumptions on incomputability and non-evolution is the need of standard on the interactivity. So our research must be followed by a development of a pilot CMS technology which may serve as a standard in the e-service building industry.

The e-sovereignty research is in synergy with the e-inclusion movement, but with wider scope.

6) Assumption on 80/10 rule. The great amount – say 80% - of the applications around us is built, we can estimate, in the last decade. This rate is assumed to be constant for a longtime. Our proposal doesn't assign the improvement of the recent applications, as the portal evaluation discipline does, but the future application development instead.

7) Assumption on the locality and the privacy. The technical power of the global free text search services indexing the whole chaotic 510m Km2 as it would be some kind of server of an office, or the world wide object identification services making us to think the World as a village or as an office is amazing for us. But our proposal assigns the opposite thing: we want to manage our offers in our local environment, in our virtual office. We want to keep it in order, distancing and protecting it from the impact of the chaotic 510m Km2.
"… for the whole earth is never our estate[7]"

B) Principles

They sum up the requirements of the suggested solution.

There are also some heuristic principles as proto-axioms. They will be elaborated and canonized during the research.

Principle #0 on the equivalence. The e-service is not more than we can see and understand at the screen without any guessing a riddle. So the *e-service* (of the provider) and the *portal* (used by the client) are equivalent terms. Don't Make Me Think![8]

[7] Famous poetic adage of the Hungarian poet, form the 1840's:
http://www.babelmatrix.org/works/hu/V%C3%B6r%C3%B6smarty_Mih%C3%A1ly/A_mereng%C5%91h%C3%B6z/en

[8] Book of Steve Krug on he web-design, 2006.

Principle #1 on the reality. The behavior of the virtual *interactive entities* mustn't essentially differ from that of their real world ancestors. Disobeying this principle causes cognitive difficulties for the clients, and originates the greatest part of the usability problems.

The definition of the classes of the interactive entities and their required essential features can be derived from this principle:

- **Virtual space:** space in our mind, where the *objects* we think to be, e.g. directory structure.
- **Objects**: all documents, tables, logs, folders, postboxes, mails, calendars, personal data, panels, personal ID, authorization data, fingerprints, certificates, offers and everything with different complexities containing information and *are seen at the screen*. Finally, the object of the highest complexity is the *service*.
- **Actors**: users, software agents and other active beings.
- **Tools**
  - **Moving tools**: to move the user focus in the virtual space. Similar to browsers in a measure.
  - **Operating tools**: to operate on the virtual *space* and *objects*. Widgets, stationeries.
  - **Communicating tools**: to communicate with the *actors*.
  - **Setup tools**: to configure the above tools.
- **Meta-information** of the above[9] entities: the most important entities in the professionality. Express the attributes of an entity, e.g. the owner of the file, and the relationship between entities. May not appear for avoiding the cluttered screen. They make the entities be searchable, findable, groupable.

There are entity, witch are not interactive: workstations, servers, network elements, operating systems, etc. The information about them - tables, logs, documents, panels with tools[10] to operate them - may be interactive entity, if their implementation complies with the requirements of the "good" e-services.

> *Principle #1.1 on the Virtual Office, VO.* (corollary of the #1.) We can find a set of the interactive functions, being the base of every professional e-service.
> The concept of VO seems to be the most powerful method to sup up this set of functions, i.e. for the "orchestration" of the virtual entities. More precisely: "Ontology driven collaborative virtual office, as a platform", see in the first chapter.

Principle #2 on the threeness (or the trinity). We divide the e-sovereignty discipline into three areas: *semantics*, *pragmatics* and *ergonomics*. This is the order of the importance of the areas in the professional e-services (in the everyday life, i.e. in the *popularity*, the order is reversed.)

This division has practical basics: ontology and virtual space engines already do exists. The properly designed engines can fulfill the semantics and the ergonomics requirements, respectively.

Essential principle is the security feeling[11] - mainly the authenticity feeling - of the client. All tree mentioned areas have requirements both on the security, and security feeling.

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[9] Meta-information are not entities. Meta-information of meta-information must be avoided.
[10] NB: we mustn't have any tools to operate on a non-interactive entity while using a "good" e-service. This question is connected to the Consistency Principle; see later in the papers on the implementation.

[11] Security feeling is not the security. This is an essential difference: the security is a technical discipline, including human and social factors, the security feeling is a HCI concept.

Principle #3 on the independence (related mainly to the ergonomics): The result of this research must be independent from representation (2D, 3D, augmented reality, etc), modality (visual, acoustic, mixed) and platform (desktop, Mobil, tablet), as far as possible.

Annex: The neighboring sciences

Our vision is: based on the elaborated HCI-ontology and getting some principles from the neighboring sciences we will establish a definition of the 'usable' e-services. It will be a great step toward the integrated scientific establishment of the planning of HCI. It will be a great step to make the HCI be a theoretically elaborated and accepted scientific area, of the Information Sciences as relation databases, cryptography, inter process communication, etc. are.

Some neighboring sciences whose connections with the Information Sciences are not obvious in the e-service building practice:

- **Sociology-psychology** –to analyze the nature of the *professiona*l and the *popula*r client behavior
- **Psychology**
  - What is the source of the **security feeling** namely: the *confidentiality* and the *authenticity*?
  - Does the usability increase the **creativity** and the **innovation**?[12]
- **Semantics** and related sciences
  - **Pragmatics** – science of the human communications. What is the correct dialogue like?[13] The client's security feeling depends mainly on the correct behavior of the e-service.
  - **Semiotics** – science of the construction and the comprehension of the signs
  - **Constructed linguistics** – the HCI as an 'a priori constructed language'
  - **Concept theory –** science of the genesis and the hierarchy of the concepts. Scientific background of Sematics' technologies.
- **Activity theory** – practical psychological approach of the human activities.
- **Mathematics**
  - **Axiomatism** - for corollary the *Assumptions On the Strictness* the HCI-ontology needs a strict axiomatic system as its base[14]. It also means, that from limited number of appropriate set of notions and axioms we can construct "good", ergonomic, virtual spaces.
  - **Fuzzy logic** – the human thinking is approximate rather then exact.
- **Cognitive sciences**[15] - umbrella term, containing even the e-sovereignty area also.
- **Environmental psychology**– How to elaborate a virtual 3D environment with our object that it be comprehensive and attractive?
- **Interior design** - how to furnish a virtual space so that it can be used as a friendly and efficient office

Some disciplines and ICT technologies, necessary beyond the usual, commerce SW developing tools to develop of the new technology:

- **Digital certificates** - PKI or other technologies to ensure authenticity and security classification of the objects.
- **Library science** All of this are for the categorization of our stuffs (objects) in the virtual space, for the easy to find them.
  - **Semantics'** technologies
  - **Ontology** technologies e.g. Semantic web, Thesaurus, or Theme map, etc.
  - **Categorization**, classification, etc.
  - **Object Identification** technologies e.g. DOI

[12] See e.g. B. Shneiderman: Creating Creativity: User Interfaces for Supporting Innovation, ACM Vol. 7, No. 1, 2000.
[13] See e.g. A.S.Szőllősy, G. Vitályos: Pragmatics in the usability discipline SZTAKI, IEEE, 2012
[14] See e.g. G. Vitályos: The object permanency principle in the usability discipline SZTAKI, IEEE, 2011
[15] Cognitive sciences integrate the disciplines, dealing with that "how do intelligent beings find out, what is what". More precisely: how do they build up their model of the world in their mind, and how do they find the place of a perceived thing in the model.

- **Ducumentation** methodology, standards

- **HCI** technologies
  - **Search** technologies, e.g. faceted classification and search,
  - **Knowledge visualization** technologies
  - **Internet writing** – practices and methodologies
- **Usability:** the antecedent of this research, focusing mainly on **ergonomics**
  - **Models** on the human cognitivity[16]
- **ICT design technologies and methodologies:** systemic SW design methods for HCI, mainly for the *business process description*.
- **Library sciences**, namely the *categorization* using the sciences of *Semantics* and connected to the *Semantics'* technologies.
- **E-learning technologies** The e-service has to teach itself to the client beyond performing the service. This requirement is completely disregarded by the portal building paradigms of nowadays. Rf: the duality of the HCI, the Life Long Learning.
- **Standards** Success of the dissemination of the new technology needs the compliance with the appropriate EU-standards.
- **Legal term, Codification** The e-services and their legislative environment must be in synergy.

[16] Pl. Rasmussen, Reason, etc.

Annex: Issues

Issues of the antecedent UX disciplines

The Usability (user experience, unified customer experience, in one words the UX disciplines) was a relatively neglected and unelaborated area of information sciences, information and communication technologies.

Issues: Taking the literature and the software development experiences as a basis we can sum up the reasons:

a) The lack of the market's interest. The portals around us are made by business driven development works. The client or the end user, however, can't express any requirement and protest of this type against the portals, because he has neither knowledge nor terminologies nor communication channels for that. So the market doesn't make the portal providers deal with this.

b) Time and cost limits. The limits are generally under-calculated. They can't bear the expenses of the design and test for Usability beyond the design and test for the proper functionality.

c) The difficulties of methodologies: The lack of the strict conceptual basis, terminological disorders and misunderstanding obstruct the dealing with the questions of the Usability in all its aspects: the demonstration, the discussion and the investigation.

d) The glorification of the ICT Technology. The experts of information sciences, namely system designers, programmers, being experts, are inclined to the IQ-racism, to worshipping of complexity. Theirs implicit message to the society is that the software is clever and the user is stupid so has to adapt himself to the software.

The state of the Usability: The research of the last decades has been driven by business, focusing mostly on the ergonomics, namely of the e-business, the WebShop market, concentrating at the buying process.

The discipline has innumerable practical results. There are Design For Usability methodologies, giving practical solution for some matters of detail, e.g. for the experimental optimization of the menu hierarchy. Afterwards portal evaluation methodologies based on check lists included the accessibility questions had been developed. There are automated portal checkers, e.g. that of the W3C consortium.

Criticism: these results has no strict conceptual basis, they can't tackle the problem as a whole.

Issues of the recent search, of the e-sovereignty

The issues mentioned for antecedent UX also exist here. Moreover, there are further difficulties.

a) *Issues on the scientific approach.*

> ***Issue on the interdisciplinarity.*** *The e-sovereignty is a new discipline, rather than the continuation of other, business driven ones, e.g. the usability and ergonomics. Recently no research center having profile, likes that.*
>
> *A lot of our meaning, are widely represented in the scientific papers, and investigation of our days. The Internet is full of interesting ideas and solutions. All of these make us believe that the problem is – or at least will be soon – over, and*

conceal that there are no syntheses, no complex approaches, so the problems will be reproduced, will reappear.

Issue on the despising by the sciences. *The Scientific Community appreciates "to know everything about nothing", i.e. to search the depths of some discipline. However, the e-sovereignty only needs a little and special contribution from the neighboring sciences. Moreover these contributions must be innovative, not being in the mainstream of that discipline. The e-sovereignty has "to know a little about everything".*

Issue on the software technology research. *The results of the ICT researches are not suitable for large use, are not accessible to the possible intended audience: the Scientific Community is not inclined and has no business interest to this. In accordance, the results appear as special* applications in the state of the experience*, and not as software technology i.e.* platform, for every developer*. In short: the research of suck kind contributes a tot the "Issue on the existence", see in this chapter.*

b) Issues on the business model

Issue on the software technology research. *The notions 'platform' and 'software technology' are mysterious and uninteresting things for the business decision makers. These are practically business secrets, private spheres of the ICT firms. The business generally is on applications, i.e. services.*

Issue on the glorification of the market *The differentiation between the professional and popular world is not interesting and unusual for the business driven ICT industry.*

The elaboratedness and the synthesis has not favor in the business.

c) Issues on the misunderstandings

Issue on the existence*. The world of ICT is full of excellent solutions in the software industry and excellent ideas in the research. Many objects, written in the "Expected results" chapter in the present proposal are already resolved somewhere without doubt. But they are not published in proper way: (1) no documentation, (2) no support, (3) no demo with examples, (4) no sandbox with free license to try it, (5) no public business model. In short, they are not elaborated as an e-service of software tools*[17]*. So they practically don't exist for the e-service development. (In other word: "it is easier to reinvent than to understand and get to use them".)*

Issue on the lack of the non-analogical thinking*. The e-sovereignty is not the generalization any of the preceding scientific or technical disciplines. It has no analogue conceptual ancestors, to facilitate the comprehension the matter. "What*

[17] NB: These (1)...(5) fixings can't be replaced by such popular things as the FAQ, and the forum. The free business model is also contra-indicated in the professional world, and can't compensate the lack of these fixings.

is the correct and clear communication with the client in the professional world like?" "Why does the client feel the information and the provider authentic?"

Issue on the competency. *People, out of the ICT profession, experts of the neighboring science address the deficiencies to the ICT experts. It is not known, that the root of the problems is generally out of the ICT profession in its proper sense.*

Issue on the generation gap*. There are 3 well known topics here:*

- *Topic of the analytic and synthetic approaches.*

Young people are able to solve partial tasks skillfully and enthusiastically. This is what the frequent mention of "young researchers" is about in connection with innovation. However, you have to spend a few decades in the profession, you have to reach the age of 40-50, and you need life experiences to notice: the many skillfully solved sub-tasks (i.e. the many, many internet portals/services and software tools) do not add up to a livable, friendly, into a correct virtual space, where we can handle our affairs in virtual space safely.

- *Topic of the professionality vs. popularity, as we defined above in this proposal.*

- *Topic of the linear/textual vs. parallel/visual, 2-3 or multidimensional comprehension and communication.*

Confusing them is an obstacle to clarify, what is the "good" e-service. See also the chapter "What we don't deal with".

Issue on the presentability. *It is difficult to communicate about the matter. We would need dozens of screenshots to show the deficiencies of recent portals, e-services. Moreover, we would need dozens of planned screenshots to show the required solutions. These all would constitute not a presentation for the decision makers, but a handbook for the UX specialists.*

Annex: The 2 main use cases

Native use

Current operating systems include some services as standard. A window management (WIMP platform), file management, a simple text editor, a notebook, commanders, file explorers, a browser, possibly a mail client, etc. A significant number of users can already work with these basic functions. You can use e-services, remote repositories - such as you can use Google drive.

Similarly, the new HCI platform can be considered an operating system. The properties discussed in this and the referenced papers are all basic functions in this sense. So the new platform includes a basic virtual space engine for transparent placement of our goods, an ontology engine for maintaining the conceptual web, and a pragmatics engine for managing our affairs.

Use with applications via newHCI API

Applications can be built on the basic services via APIs, which can use the basic services as the recent application use the windows management.

Annex: The expected results

Who is this research for?

To manage, to govern, and to make decisions, to perform any professional activity need professional i.e. conceptually and technically correct tools.

This research is for people spending at least a little part of their times on professional activities, they work either in private, business, science or government. This activity may have the amount to not more than the 10% of the full usage of the Internet. But its importance for the whole society is much more than 10%.

Here have to point out the older generation and the digitally impaired people as the beneficiary of this research. The principles of the e-sovereignty cover some the technology requirements of the e-inclusion.

The Assumption on the non evolutions involves the necessity of the scientific approach.

How to exploit the result newHCI technology?

Unfortunately, the discussion of the expected result can't be completely separated from the discussion of the solution. This is the symptom of the profound r+d activity. Here we have to introduce the Virtual Office concept, as an umbrella term of interactive functions we think to be need to the 'good' e-service. It can be thought to be a software tool also.

In terms of the cognitive sciences

The newHCI replaces the 'desktop metaphor' with the 'virtual office metaphor'. In the desktop metaphor the software developer – specifically the ux-designer - deals with that how and where to display the elements of information into the screen. In the latter metaphor the question is where (and with what meta-information) to put the objects in the virtual space, to be easily recognized by the user (the client). The newHCI then helps the user to work in his virtual space – i.e. to operate on his objects and to communicate with actors, without essential ux-designer effort.

In terms of business process / working process analysis

The proposed technology integrates the e-services and the personal data management tools for the clients, mainly for SOHO users.

The idea of the 'Virtual Office as a platform': it is the most important idea as a consequence of the *Assumption on the professionality*. For the definitions of the abstract *Real Office* and the *Virtual Office* see in the Terminology document.

The services in the real world are generally performed via real office work, via the facilities defined for the Real Office. We assume, that in the same way: that the e-services generally could be performed via the Virtual Office facilities – namely via the *objects and virtual spaces* and the *operations* on them and the *actors* and the *communications* with them -, if the Virtual Office of the previous sense were exist.

Consequently, the 'good' e-service must contain a Virtual Office, practically must have a Virtual Office as a platform under itself.

NB: There are dozens of products named 'office' - e.g. MS Office -, they are *applications* or *tools* (offered from cloud[18] or as EXE) for end users, i.e. clients. Moreover, there are dozens of product named or considered as 'virtual office' – e.g. Dropbox, or Google+ - they are *platforms* with primitive functionality, (offered from cloud[19]) for end users i.e. clients. Our Virtual Office term is essentially differs from those.

So our hypothetic newHCI is a special PaaS for special clientage and purpose. Its main domain independent component is the Virtual Office, containing the standard newHCI methods of the pragmatics, of the ergonomics, etc. Practically they are to be integrated as an extension into client platforms (Windows, LINUX, iAS, etc), as the file and network access technologies are.

It is essential for the client's sovereignty, that he/she see an ordered, clear and searchable document set of the supplier – e.g. of the EU – in his/her personal virtual office. Or in other words: de supplier's documents must seem to be an ordered etc. set from his/her office.

In terms of the Information Architecture

From this point of view the client needs an integrated, secure and comfortable Virtual Office, more precisely a set of furniture, so he/she can equip comfortably the Office. In the Office there are private desks for his/her private folders, and there are desks shared with all the utilized e-services for the folders of affairs with the e-service respectively.

To make this Office equipment operable, all the utilized e-service must work with the same Virtual Office methodology and the same newHCI as well. In the other hand the *actor* of the service provider (e.g. the clerk, the official of the authority, the power supplier, etc.) must see the same desk in his Virtual Office as the client.

All these things would need the standard Virtual Office and newHCI technology forming the focus of this r+d proposal.

Moreover, the client has to read documents of the affairs, has to operate on his affairs without logging in to the concerning service - even if without internet connection.

NB: the Object Permanency Principle prohibit us from duplicating the objects or other element of our virtual space. So the well known synchronizing mechanisms can't work in newHCI. ~~It causes corollaries for the platform technology.~~

In terms of the linguistics

If the e-service suppliers use the proposed well-elaborated CMS technology (the Virtual Office within themselves) it practically means, that they use the same or similar

[18] SaaS – Software as a Service
[19] PaaS – Platform as a Service

HCI. This 'standard' we can consider a HCI-language, being capable of avoiding the *Babel syndrome*[20].

This language is an 'a priori constructed' one, composed from virtual objects or symbols of them, symbols of the operations, symbols of the communications, sentences, speech acts. These elements must constitute a strict grammar, which is independent from any native language. So these research, as a matter of fact, is "The Search for the Perfect Language"[21].

In terms of the mainstream software technology

Our recent result says that such a HCI technology must have technically split in to the *client side* and the *server side*. The previous contains the service depending (domain depending) things: the business logic, the business ontology, the database, etc. may be of 2-3 or even more layers. The client side contains the technology of the Virtual Office among others. To develop e-services means the building the *server side*.

Consider the three basic working methods of the 'good' e-services, powered by a Virtual Office technology:

1) on-line (i.e. conventional client-server type) mode. Only the clients with the *client side* set up on it can connect the server and get to use the e-service.

2) 'Off line extended' mode. It is for the client can work with his affair in his virtual office without logging in to the concerning service, even if without internet connection – naturally for limited time and functionality. The Virtual Office technology

- loads some part of the *server side* software and some part of the client's *objects* and *virtual spaces* into the client's desktop
- manages the replication and the synchronization of the *objects* and the *virtual space* without disturb the HCI.
- offers the same HCI functions as in the case of on-line mode.

3) 'Private' mode. There are private affairs, without remote e-service, when we simply potter around our private desk. This is offered by the basic functionality of the Virtual Office. (Naturally, we may have our private application - business logic - powered by the Virtual Office over the desk.) The basic functionality offers among others the Activity Assistant, performing the functionality coming from the Activity Theory.

The terms 'Off line extended' and 'private' are URM's term. Naturally, this modes can - have to – work simultaneously. This kind of modes is absolutely out of the mainstream of the business driven ICT industry.

In terms of the knowledge management

Low organized sporadic information vs. highly organized ontology. The result of the search engines is an ordered set of links witch is a low organized info. The portals around us are also show low orderliness: it is frequently easier to find information of a portal via global search engine, from outside of the portal, than inside the portal via postal search tool.

[20] See the Assumptions
[21] Umberto Eco: The Search for the Perfect Language, 1997

The portals, e-services of our idea are highly organized; contain some kind of ontology to organize the managed concepts.

Annex: Simple theoretical examples

grouped by the 'Principle on the threeness'

These three areas cover the whole discipline of the e-sovereignty, in the technical/technological sense. The examples are intentionally primitive.

I. On the semantics

*What is what of what in the screen (or in the virtual space), what is its name, and what is it for? Shortly: what does it mean? The **lack of the ontology.***

The entities of the HCI must be unambiguous; the use of its notions must be strict and consistent. Their comprehension must be supported by software technologies.

- ✓ *Example: A button named "add" appears in the screen. The client must be able to see who adds what to what – even if he/she doesn't remember how he/she has got in this situation.*
- ✓ *The evergreen topic is the case of the uninformative error messages, as "Error occurred sending the message", etc. The software development technologies did not give suitable tools to the developer for making the message informative, or the developer was simply negligent.*
- ✓ *What do the e-mail address and its aliases identify? Practically nothing. Although the address is worldwide unique, one may have many addresses, and the addresses may have many aliases, without any effective worldwide or at least federative control*
- ✓ *….*

In first and the second cases the HCI-ontology and suitable knowledge visualization based on it can resolve the ambiguity. The latter case: the world wide identification of the actors, needs more research to find out a proper recommendation.

Concerned neighboring sciences: all in semantics, activity theory, mathematics

II. On the pragmatics, on the security feeling

*How do my affairs with different service providers or different actors stand? This is the most neglected area of the HCI, and would be the most important for the client's sovereignty. **The lack of the pragmatic bases**.*

*The client mustn't afraid of entrusting the e-service to manage his **objects**, and he trusts the information in the screen and the behavior of the virtual objects and actors to be authentic.*

- ✓ *Will the e-service address me, or is it waiting for my response?*
- ✓ *What consequences the recent message has for the whole communication: does it affect only to the last step or the entire dialogue so far, or is it simply some information, without any specific consequence?*
- ✓ *The client has to be able to control the data gathered from his/her behavior by the used services. (Trivial problem is the lack of the unregistration: I offer my ID, password, etc. for the portal of the service, but I can't revoke them. Moreover, the browsers keep suggesting to save them, nobody knows where, except the spywares or personality fishing malwares. Such intelligent and inscrutable tools as the browsers are the greatest enemies of the security and the client's sovereignty.) The natural solution is that the above mentioned data - namely the form we typed them into – are documents, i.e. objects so that the owner has to be able to control*

- find, see, understand, modify, move, delete, etc. – them with the object operating mechanisms of the virtual space.

- ✓ *Track change principle: the client has to see the changes of his (and other's shared) **objects** since his last session, and also the parameters – metainformations - of the changes, e.g. the actor made the change, and also the actor's authorization allowing to made this.*
- ✓ *On the authenticity feeling: Every skilful individual can create and manage a portal, and pretend to be a service or a think-tank. There are no conventions for the certification.*
- ✓ *…*

Concerned neighboring sciences: pragmatics, psychology, sociology, fuzzy logic.

III. On the ergonomics

Where are my things? *Where is the one, I've seen five minutes ago?*
The lack of the elaborated virtual space.

Keywords are: findability, recognizability, learnability. The client has to find, recognize his objects in the virtual space[22] *without effort and wasting the time. Moreover, he has to learn the path to find them again. He must also be able to manage the very same problems of the dialogues.*

- ✓ *What are really the objects? Everything in the virtual space having own role and meaning must be considered as 'object'. Documents, affairs, address books, logos, ads, etc.*
- ✓ *Where are my objects? In the physical space they are placed in a comprehensible way (except the labyrinths). Unfortunately, recent software technologies don't support any method for the software designers to construct comprehensible virtual space for the virtual objects. The only virtual space model for decades is the directory structure containing the files as objects. So the notion* 'where' *is uninterpretable in the desktop metaphor widely used in our age.*
- ✓ *How to find out, where are the objects not being in the screen?*
- ✓ *What are the properties of the objects? How to recognize them?*
- ✓ *…*

Having neither proper software technology nor standard for this situation, without extraordinary designing and programming effort the Principle 1 can't be complied by the portals around us.

Concerned neighboring sciences: cognitive sciences, interior design

[22] *in terms of the "antecedent" UX disciplines: on the screen*

Annex: What we don't deal with

1) The native language understanding and synthesis. They are too complex to fit into a HCI platform. On the other hand they are not suitable to express the things in the HCI. The HCI needs a primitive and accurate languages construction: a so called 'a priori constructed language', see the "*In terms of the linguistics*" chapter. Processing the native languages can be application over the platforms, as is nowadays.

2) Artificial Intelligence. Adaptive and learning behavior of the HCI. We don't like if a tool learns our habits, and knows about us what we even don't know.

   This kind of intelligent services will be useful, naturally, at the later phases, and under the strict client control. See the *"On the pragmatics*, *on the security feeling*" paragraph. An intelligent secretary is useful in an organized office, but increases the mess in an unorganized one.

   We don't think the AI can help to organize the new HCI.

3) World wide features of the WWW. While recent mainstream Internet is full of the services of global scope, we deal with the well elaborated and well delimited e-contents (e-services), which can be placed into and managed by personal virtual office of human scale.

   There is an exception: the communication with the on line global services of the security and identification, e.g. the DOI, the certificates, the PKI-s. This communication is placed in the 5th layer of the URM[23].

4) The technologies of the multimedia. The e-services recently deal with alphanumeric information. The multimedia files so far are attachments of the affairs.

[23] Usability Reference Model, elaborated by this research in last years

Annex: Milestones and financials

This r+d activity is rather a scientific research philosophy on the HCI, than a project. Nevertheless, for understanding the magnitude, we offer a scheduling,

Preparation phase.

1) The State of the Art. View on the HCI, focus on the e-services. Find and evaluate the useable result of the EU: on ontology, on virtual space management, if any.

2) We elaborate the HCI ontology to get a suitable hierarchy of terms. The top level of the hierarchy of terms we refer as Usability Reference Model, elaborated by this research in last years.

3) We establish the base requirements: what is the usable e-service like? Requirements of the tree main area: the semantics, the pragmatics, the virtual space.

4) We search and consolidate the 3 main technologies of the e-service building works:
- on the ontology development;
- on the virtual space building (2.5D, 3D, if any);
- we fix the requirement of the pragmatics (i.e. the security feeling).

Demo phase

5) We popularize the matter, search the sphere of the society interested in it. Make connections with the government, the business, etc. Preparing questionnaires. Beginning the marketing efforts.

6) We elaborate a demo technology.

Pilot phase. Elaboration of the business and the legislative models.

7) We search and elaborate pilot projects.

8) It is necessary to take part in the EU standard-setting works.

9) Cooperation with the legislative environment. The e-services philosophy and their environment in EU must be in synergy.

10) Establish the proprietary rights and the maintenance rules of the new technology. Methodology of the documentation, audit and training.

11) Elaborate the V0. series in the English languages.

12) We elaborate the V1. in more languages.

Business phase.

13. From this the new technology can be profitable. See the “Intended beneficiaries” paragraph in the survey.

Scheduling

Legend	**Technological activity:**		**Non-technological activity:**	

	1st year		**2nd year**		**3rd year**		**4th year**		**5th year**	
1.										
2.										
3.										
4										
5										
6										
7.										
8.										
9.										
10.										
11.										
12.										

The budget is about 1Million € / years.