ASSESSING LEGAL CHALLENGES ON THE MOBILE WEB

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ABSTRACT

This paper aims at describing the future legal challenges related to information products and services on the Mobile World Wide Web. Using a few scenarios, we describe what the most essential characteristics of the future Mobile Web will be and how information products and services will be used on it. The scenarios are built using a systematic method. As the emerging problems are very complex, we must take into account several major factors. We are not considering only technological changes and economic factors, but also societal issues and how individuals feel and behave. The scenarios enable us to identify what kinds of legal challenges will emerge. Based on the scenarios, we conclude that the legal areas that will include most challenges on the Mobile Internet are intellectual property rights, privacy, and contracts.

Keywords: Mobile Web, Information Product, Digital Rights Management (DRM)

1. INTRODUCTION

The Mobile Internet will enable many new business opportunities but they are vulnerable to legal challenges such as unauthorized use of information. Companies have learned methods to commercialize their intangible assets on digital markets. Still, it is not well known how they could extract the most value from the information they posses. [16, 18] It seems to be a major concern and a business obstacle that the entities do not yet know what kind of legal challenges they will face on the Mobile Web. For example, peer-to-peer network services are very effective for information product distribution, but recent examples (e.g. Napster) starting from the late 1999 in music and movie products suggest it to be difficult. [11] In this paper we study legal challenges on which both companies and policy makers should concentrate to avoid the worst legal barriers.

2. RESEARCH METHOD

In this study, we try to recognize upcoming legal challenges. Legal science mostly uses court cases, statutes, and their preparatory works as its sources and derives theories by analyzing them. Thus it is hardly possible to predict the future using conventional jurisprudential methods. Instead, futures research provides us with more suitable methods. Especially scenarios are useful when we want to describe how the world will be like and what kinds of legal challenges may occur. Scenarios used in other fields of science are typically quite broad. In this study, scenarios are relatively narrow: they merely describe a possible service or a use-case.

We do not claim that any of those scenarios would actually come true. Instead, they are to form a picture of possibilities and concerns that may exist in the future. Scientifically we are facing serious con-

cerns since – in terms of POPPER – we are making conjectures without immediate possibility to refutation. [13] We believe, however, that it is possible to test the validity of the scenarios later with true use cases or prototypes further derived from the scenarios.

The major problem we face is how we should create scenarios that cover possible situations adequately. If we create them randomly, we will not be able to claim that they embody important issues sufficiently. To avoid such biasing, we should be able to create the scenarios in some systematic way. For that, we need to understand the factors and their attributes that have effects on legal challenges.

By *legal challenges* we mean difficulties in legal reasoning or somehow unsatisfying outcome of the legal process. We think that specific *factors* and their *attributes* can be identified that by interacting with the existing law imply the legal challenges. The factors are *technology*, *economy*, and *society and individuals*. We summarize from literature, which *attributes* of each factor mostly seem to relate to the Mobile Internet. In the terms of futures research our attributes include also weak signals and trends. Then we create *scenarios* so that each of those attributes occurs at least in one scenario. Next, we identify legal challenges involved in scenarios. We also check the attribute list to identify legal challenges directly from them. The legal challenges are then classified by legal areas, assessed and prioritized. In conclusion we are able to form a list of legal areas that will hold significant challenges.[1]

The method has some noteworthy threats to validity. We may make mistakes in defining the factors, choose wrong attributes, create scenarios that do not represent adequately the future situations, make erroneous conclusions, identify legal challenges incorrectly or insufficiently, and finally assess and therefore prioritize the issues erroneously. Based on the careful design of the study, however, we are quite confident that these threats to validity are limited. Moreover, we are able to check that the scenarios are reasonable by discussing them with our industrial partners and other experts.

3. THE MOBILE WEB

3.1 Mobility

The sense of *mobility* depends on one's viewpoint. On a protocol level, a significant property of mobility is that the access point is not fixed. Therefore packet routing to a mobile terminal on the protocol level needs to be dynamic and may change during a communication session. This perspective does not necessarily imply that the terminal should be wireless or portable.

On the service level, however, the word *mobile* refers to users' ability to move. Therefore, to be mobile in practice, terminal devices must be wireless and portable. Our focus in this paper is mainly related to the service level. Therefore, we emphasize the wireless and portable properties of terminal devices. Some of the issues however will relate also to the protocol levels. *The Mobile Internet,* in this paper, refers to the computer network to which the end-users connect largely using mobile, wireless appliances. The *Mobile Web,* on the other hand, is the universe of information that the users are able to access through the Mobile Internet [20]. An *information product,* then again, is a set of valuable information, which is technically delineated in a form that can be controlled and transferred between entities. It may include contents, metadata and computer programs.

3.2 User Centric Viewpoint

Peer-to-peer (P2P) technologies seem to be gradually replacing client/server systems as a method for managing certain information products. New P2P services are very effective, widely available, easy to use, and reached the critical mass. It is noteworthy that P2P technologies support the user centric viewpoint of the Web. It can be illustrated as a sequence of layers around the user as in Figure 1.

[1] Olli Pitkänen presented the method in International Symposium on Research Methods (ISRM), in Las Vegas on April 3, 2002.

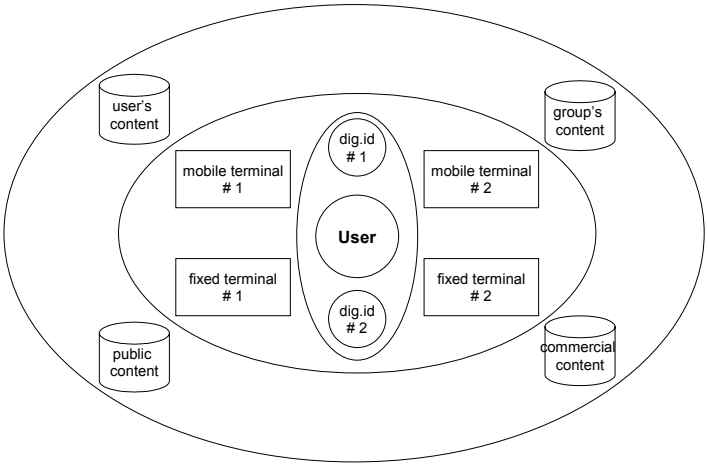

Figure 1. Illustration of the three layers closest to user in a user-centric network.

User's digital identities are on the first layer. There can be several identities, some anonymous, some rooted to user's real-world identity. On the second layer, there are terminal devices through which the user is connected to the Internet. We anticipate that it will be common to have several kinds of access devices and networks. On the third layer reside content and services. It consists of user's own content, content from different groups and communities the user participates, public content, and commercial content. A service may look and feel quite different on different devices. On the fourth layer are other users with whom the user is sharing information. Adding the fourth layer we come to a recursive picture as shown in Figure 2.

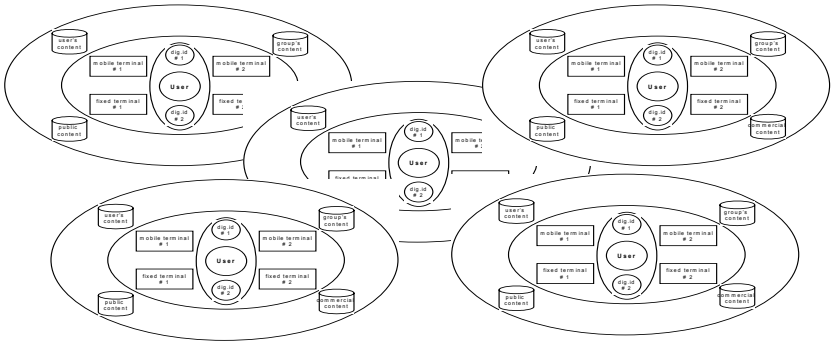

Figure 2. The user centric Internet.

Public and commercial content providers could be added to this figure as crossing layers. Therefore business value chains and different stakeholders are located on the crossings of the layers.

There can be several ways to enable P2P-communication. First, devices may be equipped with Bluetooth or alike technologies that enable ad-hoc networks for direct communication between terminals without access to the Internet. Second, the communication can happen on the Internet service level through a peer-to-peer application. Third, there can be different hybrids such as a public place where users are connected in both ways. The user centric network supports decentralized information distribution, often denoted as *superdistribution.* With use of adequate Digital Rights Management (DRM) systems, it may enable a chain of value-adding activities, while respecting the rights and restrictions imposed by content owners. [4, 14]

4. FACTORS AND ATTRIBUTES

4.1 Technology

Many interesting and important fields of technology related to computer networks are developing rapidly. A number of them are still hidden in the laboratories of universities and in the R&D departments of companies. Yet, some of the major attributes of the future technologies are already visible.

The first of them is the concept of *moving user*. Wireless and portable devices make it possible for the users to move around while they are connected to the Internet. This includes both the ability to access the Web in different places (*nomadic usage*) and the ability to use the Web while moving.

The second attribute is *context-awareness*. Context includes all the circumstances and facts that surround a particular event. If a system is aware of the context, it may adapt its behavior accordingly. Typically, context includes facts like location and proximity, user and device identity, time, history, and activity. [7] It seems that location information will be one of the most important pieces of context information. While computer networks in general have significantly released people from the boundaries of the physical world, the Mobile Internet can in turn make use of locations and gain added value of their inherent characteristics and constraints.

The third attribute is *content adaptation*. It is necessary to manipulate content information based on several reasons. They will include device features, user profiles, context information, and content's own characteristics as well as service properties.

The fourth attribute is *ubiquitous* computing. This concept extends the reach of computation and information beyond the traditional framework of a computer application running on a fixed set of hosts. The extension may be physical, breaking the ties of the wired desktop computer. Alternatively, the extension may be in scope, providing information services to the public in a form that does not require technical expertise. [8]

4.2 Economy

The fast pace of technological progress makes people often forget that the laws of economics do not change easily. [16] We try to map the key economic attributes. First we separate them in two: those describing entities and those describing their economic environment. Then we identify three major attributes in both groups.

The *dynamic capabilities* of the organization become more important. In firms, this means strong change culture through specialized scope and focus on innovative niche products and markets. TEECE has described dynamic capabilities as the ability to sense and seize new opportunities and manage intellectual assets. [19] To contrast, static capabilities focus on the efficiencies of existing procedures.

Second, the *resources* become more *intangible*. Intangibles may be turned into value not only through traditional income from licensing and sales but also from strategic positioning. Entities use more efficient licensing strategies based on detailed product differentiation. [16, 18, 19]

Third, organizational entities and internal processes become more integrated with *low hierarchy*. The lifetime of a low hierarchy may be very short as new kinds of ad-hoc hierarchies emerge for specific purposes. [1, 8, 19]

On the environment level, mainly on the markets, *network economics* and network effects are perhaps the most determinant attributes. Firms tie alliances and partnerships for strong external relations. Products and services that rely on demand side economies of scale turn out to be winning. [16]

Second, *lock-in* has become a key term in describing information economy. Most profitable products are those that can be turned into long-term services. Lock-in situations are self-feeding since the information exchange can be further tailored according to the needs of the parties. [16]

Third, the networked economy strengthens the importance of *branding*. Holder of a strong brand may also franchise or license it to enable growth in new markets. Brands break ground in the society at large. Sports, music and movies are already commodified into brands. On the other hand, existing brands do not automatically guarantee success on the digital environment. [15, 16]

4.3 Society and Individuals

Globalization is one of the most discussed attributes describing the fundamental societal change in the information age. Vaguely defined globalization is a complex set of economic, technical, cultural, and political processes taking place all over the human world. Global capitalism is taking over nation states and local political systems. The global institutional infrastructure follows the power and movements of financial capital way behind. According to SOROS, this creates a fundamental instability, which may lead to financial crises shaking societies at large. On the other hand, globalization has strengthened cultural and fundamentalist local communities that reject common values and build their own. Globalization also influences everyday life of individuals where we, following GIDDENS, have anything between cosmopolitans and fundamentals trying to live together. [1, 5, 17]

The *market culture*: all kind of social interactions are being commodified more broadly and deeply. At the level of individuals, clear monetary incentives result in the building of networks for every imaginable individual interest. Digital computer technology and computing networks lower the entry barriers for new products and services. Meanwhile at the firm level, producers of cultural products rely more on market analysis than artistic taste. Individuals in the information society seem to consume faster and get easily tired. [15]

At the level of individuals, the changing concept of *work* is affecting daily life. Concepts like networkers and flextimers [1] or e-lancers [9] reflect that change. Flexibility in the working arrangements is bringing about new work-life policies that allow employees to have more control on their jobs and personal life. Also some traditional work environments will change: more virtual offices will emerge, more employees will telecommute, and non-traditional work schedules will be the norm. [1] Described by HIMANEN, a *hacker ethic* contests what was before the basis of individuals' "protestant" duty to work. [6]

Information technology may introduce severe *challenges to political* systems. According to CASTELLS, the collapse of Soviet Union was largely due to the incapability of assimilating informationalism. [2] HIMANEN illustrates the role of information technology in the Kosovo crisis of 1999. [6] Several countries are currently trying to limit their citizen's access to the Internet for political reasons. Mobile technologies make the future even more challenging for a political system based on people's limited access to information.

As information technology affects people's lives in many ways there can be significant changes in their *minds and behavior*. At worst this can appear as an addiction but there are many other possible phenomena also. It will be seen how people react on increasing telecommuting and virtual working communities. Restructured social identities can affect how people feel about themselves. Ever increasing surveillance and ubiquitous computing change people's notion on privacy. In general, there are lots of important issues on the individual level yet to be researched.

5. SCENARIOS

5.1 General

We have created a number of scenarios, but it is unnecessary to describe all of them in this paper. We have chosen three scenarios that best illustrate the factors and attributes discussed above. The following table illustrates how the scenarios cover the attributes.

Table 1. The attribute-coverage of the scenarios.

	Factors and Attributes														
	Technology				Economy						Society and individuals				
Scenarios	Moving user	Context-awareness	Content adaptation	Ubiquitous computing	Dynamic capabilities	Intangible resources	Flat hierarchies	Network economics	Lock-in	Branding	Globalization	Market culture	Political systems	Mind and behavior	Changing work
Weather service	X	X	X			X			X						
Shared pictures				X	X	X	X	X		X	X	X	X		X
Health monitor	X	X		X		X			X		X	X		X	X

5.2 Weather Service

In this scenario, the user has a service agreement with a Mobile Internet Service Provider (MISP) including a weather service that is actually provided by a Weather Service Provider (WSP). The user moves beyond the geographical area covered by the MISP and connects to a local Access Operator. The service should adapt to the local context and give information about local weather.

Where does the adaptation take place? From the technical viewpoint, it might make most sense to adapt the weather service as near the user as possible, i.e. by the Access Operator. In addition to the users themselves, only the Access Operators know for sure their location. However, the Access Operator does not necessarily know enough about the service to make the adaptation. Therefore it may be necessary to move the adaptation of the service up to the Weather Service Provider, which on the other hand probably does not have information about the user's location.

Contracts. Who is authorized to adapt the content? It is possible that the Access Operator does not have an agreement with the user nor with the MISP or WSP. It is also possible that the context information is transferred from the Access Operator to either the MISP or WSP and they are adapting the content.

If the Access Operator does not have an agreement with the user, it is questionable whether it is allowed to disclose the end-user's location and other information. If the end-user's mobile device has information about its location, it is possible to make the end-user disclose position info directly to MISP or WSP. In that case, user's privacy is smaller an issue. However, technically it is still not optimal to adapt content that far.

The problem could be at least partially solved using metadata. For example, WSP could first send to Access Operator only metadata on what kind of information is available. Based on the metadata, the Access Operator requests information that is appropriate for the context. WSP could also send metadata describing how the information can be adapted. Legally however, it still remains questionable how the parties make sure that all the rights are respected if there do not exist appropriate contracts.

In general, it is not quite deterministic in what way information flows from a sender to a recipient on the Mobile Internet. It is not possible to precisely predict which parties will take part in the chain and therefore making agreements in advance can be difficult.

Intellectual Property Rights. Though the basic weather data is hardly subject to copyright it might be covered by database protection in some countries. The service itself and especially certain edited parts of information can be copyrighted. The more original information is included in the service, the better legal protection is achieved. The service can also be trademarked so that adaptation is not allowed with a claim it came from the original source. Some parts of the service could be patentable as well.

International Law. It can be difficult to predict which jurisdictions are involved in a transaction on the Mobile Internet although the legal interpretation of the transaction depends on the jurisdictions involved.

5.3 Shared Pictures

The second scenario is about sharing pictures between users. Imagine digital cameras with wireless Internet connection or indirect connection via e.g. Bluetooth technology. A user can allow others to access pictures inside his camera. This is done without any other services but the file sharing software in the camera and the basic network infrastructure.

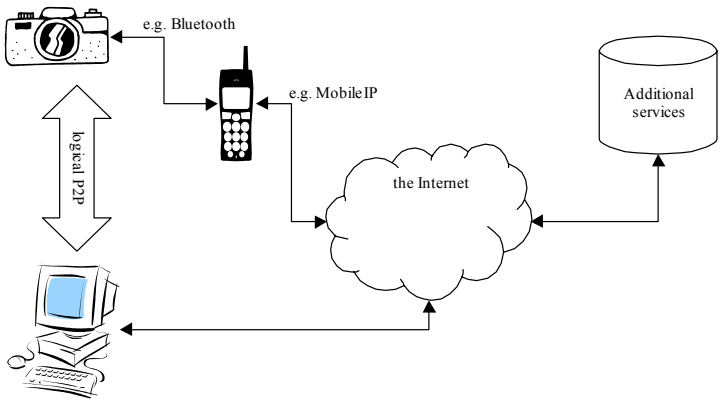

Figure 3. Digital camera and shared pictures.

Jaakko takes a trip to Mexico. He can immediately publish in his camera some of the pictures he is taking. His friend Gina can access those pictures instantly. Jaakko is interested in birds. His pictures on rare birds quickly spread on the Internet in a peer-to-peer-fashion (P2P). However, it is possible to include value-adding third party Internet services. For example, a user could order paper copies of pictures by sending them to the printing service on the Internet. Or, cameras include only limited picture editing capabilities because editing requires computing-power and sophisticated applications. Those could be accessed through the Internet using the camera as a user-interface. Business opportunities seem endless. It seems natural that this kind of mixed P2P and B2C (business-to-consumer) model will become common.

Some professional photographers may also find P2P models changing their ways to work. Imagine José is a professional photographer. He started his job as a hobby, but soon he started to commodify the pictures and now makes his living by traveling after crises around the world to take demanded news-pictures in distant locations. Occasionally he is also taking pictures on events or famous people. The Mobile Internet will change his work in many ways. He will not need a large organization or a back-office. He will be able to sell his pictures directly from his camera to the public. He may join

other photographers and form a loose group to coordinate their work and especially to build a brand for marketing purposes. The group could harmonize their infrastructure and offer the customers access to a larger number of photos using the same systems.

If José is not only a good photographer but also an idealist, he might shake the political systems. His pictures on injustices could make people to realize how they are treated poorly. The borderless Mobile Internet will be a difficult challenge for autocratic governments willing to censor the information.

Legal analysis brings forth a few issues. First, depending on the content of the pictures there can be identified several kinds of legal challenges.

- *Fine art*. A picture as such can be valuable. It may be creative and original, or it may include important information in itself. If it is original it can be copyrighted. Some jurisdictions also provide specific rights to photographers (e.g. Finnish Copyright Act 49 a §). The photographer may decide who can copy and distribute the pictures and on what conditions. Yet, sharing pictures on the Internet makes it difficult to enforce these rights.
- *Event*. It is common to restrict photographing and televising in some events, like concerts or sports competitions. That is because organizers want to get revenues by selling rights to photograph and televise to media companies. Interestingly those rights are based on contracts, not intellectual property law. Yet, if a consumer goes to an event and takes pictures, it may be difficult to show that a binding contract forbids photographing. On the other hand, if a person is able to share the pictures on the Mobile Internet directly in the event, it can be troublesome to find out who the photographer is. The legal challenge here is to manage photographing and televising rights in the new situation.
- *Intimacy*. People are willing to pay for candid photographs on celebrities. Legal challenges in this area are not different from those with current paparazzi, but they will become more serious. Extremely demanded, such as pornographic pictures form a special case. Their economic value means commercial publishers have interest to manage rights in them. In the scenario however, the photographers are not likely to sell porn pictures. Instead, sometimes pictures may be on private occasions or they can include private information, for example, on places where somebody has been or on someone's habits. The legal challenge is to make sure that no-one's moral rights and privacy are infringed.
- *Birds*. A number of pictures are documentary and related to hobbies in a way that they do not represent a great monetary value. Instead they can be important in a certain social context. For example, a picture on a rare bird can prove to ornithology community that the photographer actually saw the bird. The legal challenge is related to moral rights: the photographer should have a right to be recognized as the one who took the picture.
- *Pictures on other works*. A picture can also be a copy of another copyrighted work. Digital cameras make it very easy to copy and distribute any works of visual arts or literary works.

Second, legal challenges in this scenario can be grouped according to legal areas. In each area we further analyze the challenges from the viewpoint of different actors.

- *Copyright* issues at large are important especially to those who want to get return from information. In this scenario, the professional photographer is the most interested in copyright. It includes particularly photographers' exclusive right to make copies of pictures and the right to distribute them. Also, moral rights can be important in particular for an art photographer. Intermediaries are careful not to be liable for copyright infringements. Other actors, like device manufacturers and service providers, can find business opportunities by enabling copyright protection.
- *Privacy* is very important for private persons. In this scenario, it concerns mostly amateur photographers.

- *Labor law* affects professional photographers and their employers. In many countries, labor laws are badly outdated in respect to this kind of scenario. They are hard to apply in situations where working hours, company or group formation and other conditions are extremely flexible. Also, international issues will be significant.
- *Tax laws* face similar challenges to labor law. Traditional tax laws are hard to apply in new kind of transactions on mobile networks. It is also unclear which fisc has jurisdiction to tax certain transaction.
- *Contracts* affect everybody in this scenario. As laws are in general outdated and cannot be revised quickly enough, most legal problems must be solved in contracts. However, all actors do not know each other on the Mobile Internet. It can be even impossible to predict who will be the other parties in a certain transaction, because they can be moving and the connections are changing. Therefore challenges in contract law will affect everyone on the Mobile Internet.
- *Criminal law* is the ultimate legal protection system. Typically photographers do not face criminal law in their everyday life, but it remains the eventual legal solution.

5.4 Health Monitoring Service

People who want to be aware of the condition of their health will be able to buy a Health Monitoring Service. The basic service includes a set of wearable sensors that send information about person's vital functions through the Mobile Internet to a control center. Optionally some of the sensors can be installed inside customer's body. The service sends to customers reports and instructions how to improve their health. In the case of emergency, the service can also call an ambulance, a doctor, or other help provided it gets customer's location information. The customer could even be equipped with a dosage device so that a physician in the control center can remotely give for example insulin, vitamins and micronutrients or heart medicine when needed.

The capabilities of the service are heavily based on information. First, a lot of information is extracted from the users and stored in the service. Second, a large computerized knowledgebase is used to help the doctors to make decisions and even to automate some choices. Third, the doctors and other professionals within the service obviously use their own knowledge to help the customers. All this information can be very valuable and therefore the service operator can be interested to sell it further. Perhaps it is possible to fund the service by selling such information to other entities.

Health services have traditionally been very local. However, the service described in this scenario is not geographically limited.

This scenario represents a sample application of ubiquitous computing. New business models are also involved. Some important mental aspects should be considered, like how the users feel if some unknown person in a control center, "a big brother", even with their permission, is always monitoring them and knowing better than themselves how they are doing. This might be also an example of changing work. A doctor can be sunbathing on a beach while on duty. In an emergency, the doctor gets all the information on the patient, including the medical history and the current condition, and is able to interview the patient using a mobile terminal while still lying by the sea. [e.g. 3]

Contracts. In this scenario, just like in the previous two, contractual issues may become central.

International Law. If the service is provided globally or if a customer travels abroad while using the service, international aspects become vital. Laws concerning health services are quite different around the world.

Intellectual Property Rights. In this scenario, intellectual property rights do not protect remarkable portion of information. Data on a customer, a single advice from a physician, a control message from the control center are very important, but hardly protected by intellectual property rights. Intellectual

property rights will be more important if the service is developed towards a more mature system that not only transfers data, but stores and distributes refined information.

Privacy. Large part of the information managed in this scenario is private by its nature. People do not want to see information on their health spreading around. Therefore the system must support privacy and confidentiality extremely well. On the other hand, many companies and public agencies would be very interested in accessing those data. For example, a commercial company would be able to direct marketing quite accurately to right individuals if it knew that much about their habits and health as this system knows. Some customers might be willing to benefit from the situation while others are so concerned about their privacy that they would not dream of letting this service to sell the information. In European Union, the data protection directive has set quite strict rules, but in the USA, for example, the discussion about privacy protection has not led to comparable statutes so far.

Professional Negligence and Torts. The scenario presents a situation where physicians and other experts have a remarkable liability on people's health and life. It is extremely difficult to make this kind of a system completely reliable. In some countries, the potential damages based on medical malpractice or products liability could be enormous. In general, entities that offer expert services through the Internet may be accused of professional negligence. It is possible that the legal risks prevent this kind of services even if both the customers and potential service providers want them. In addition, many countries have strictly limited who is allowed to give medical services in their jurisdictions. A service like the one described here would conceivably conflict with these rules.

6. CONCLUSIONS

It depends profoundly on the viewpoint, which legal challenges are the most important. We have focused on four viewpoints, those of content provider, operator, device vendor, and user, because they represent satisfactorily different entities on the Mobile Internet. Based on the three scenarios analyzed in this paper, we conclude that the legal areas including most challenges on the Mobile web will be *intellectual property rights*, *privacy*, and *contracts*.

It seems that intellectual property rights, particularly copyright, will be the legal area where most of the challenges come up. That is not surprising considering that the focus of the paper is information products, and intellectual property rights often protect them. The interesting point however is that there seem to be emerging new kinds of challenges. Especially issues related to content adaptation will be significantly more challenging on the Mobile Internet than before.

Another very important legal area will be privacy. Mobility, context-awareness and, ubiquity will bring computer networks even into the most intimate places and walks of life. Challenges to privacy are much greater on the Mobile Internet than ever before.

There will be major challenges related to contracts. First, on the Mobile Internet, it is not always easy to find out, who the contracting parties are. Second, it will be sometimes difficult to state what the subject of a contract is. It can also be complicated to determine when the parties have committed to the contract. Moreover, on a mobile network it can be troublesome to decide which is the governing law and which authorities have jurisdiction over disputes.

There will be noteworthy challenges in other legal areas too. For example, international law in general will be important, because of globalization and moving users. Labor law will face challenges because of changing work. Tax laws meet challenges because of new kinds of transactions, resources, and incomes as well as moving users, globalization, and changing work. Criminal law will be challenged not only by new kind of international and computerized criminals but also because it will be very difficult to decide whether some objectionable act in the new environment is punishable according to the existing law. Constitutions can face challenges as political systems are challenged. Nevertheless, based on the scenario analysis, those other areas do not seem to bring forth as crucial challenges as the first three.

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