

## MASTER

### Service differentiation by instant messaging : adding competitive value to the telecommunications value chain

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# **Service Differentiation by Instant Messaging**

Afstudeerverslag van Tim Wouda (s465565)

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# **SERVICE DIFFERENTIATION BY INSTANT MESSAGING**

**Adding competitive value to the telecommunications value chain**

**by**

**Timo Christiaan Wouda**

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# **SERVICE DIFFERENTIATION BY INSTANT MESSAGING**

## **Adding competitive value to the telecommunications value chain**

A dissertation, written at Swisscom Corporate Technology and submitted to  
the Faculty of Technology Management of the Eindhoven University of Technology  
in partial fulfilment of the requirements for the degree  
Master of Science in Technology and Society  
in the field of Telecommunications and Innovation Policy.

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Abstract

This dissertation examines the technological and business aspects that are related to instant messaging. Instant messaging is a rapidly emerging communications application that combines text, voice and/or image messaging with presence information. The major part of the instant messengers are based upon proprietary communications protocols. To achieve interoperability, the IETF IMPP working group defined a Common Profile for Instant Messaging (CPIM). This study examines the CPIM compatible protocols, services and their enabling technological platforms. An industry survey indexes the instant messaging service providing companies. Further analysis of these companies provides their business models. The found aspects join each other in a case study that is oriented on Swisscom business units. Strategy recommendations form the output of the case study.

Keywords

Instant messaging, standardisation, messaging protocols, industry analysis, business model, strategy.

## SUMMARY

Instant messaging is a rapidly emerging communications application that combines text, voice and/or image messaging with presence information. This research analyses how Swisscom is able to take profit of this trend. The goal of this research is:

*To draw up a business model wherein instant messaging can be used to differentiate the communications products and services of Swisscom Mobile and Bluewin.*

To be able to reach this goal, this research question has to be answered:

*Which technical and business aspects have influence on the differentiation possibilities generated by instant messaging for the next five years?*

The research question is divided into seven sub-research questions. This summary provides the most important answers to these questions:

1. Which standardisation actors play a role on the diffusion of instant messaging technology?  
The key standardisation actors in 2001 are Microsoft Networks and AOL Time Warner. In 2002, this role will shift to the IETF (including Microsoft) for the Internet and to Wireless Village for the mobile devices market.
2. What are the key technologies to enable instant messaging?  
Key instant messaging platforms are the 'always-online' technologies GPRS, UMTS and ADSL. Instant messaging and always online platforms mutually drive each other.  
  
Key instant messaging protocols are currently AIM, ICQ, Yahoo! and MSN. The future leading IM-protocol will probably be SIMPLE (CPIM) for fixed technologies and IMPS for mobile technologies.
3. With which services can instant messaging be integrated to enable additional services?  
Voice services form the most attractive additional service, followed by directory and location services.
4. Which are the existing key players of the instant messaging industry?  
This research defines four strategic groups with their key players:
  - Internet portals: AOL (31.0%), MSN (31.4%) and Yahoo! (15.7%)
  - Internet service providers: Globally AOL and in Switzerland is Sunriser and Bluewin.
  - Mobile Internet service providers: NTT-DoCoMo/AOL alliance (world-wide), Swisscom Mobile launch in Switzerland
  - Non-portal service providers:
    - Microsoft and Lotus (software providers);
    - Dialpad and PalTalk (VoIP service providers);
    - ICQ, Jabber, Odigo and Groove (other IM-service providers).
5. What are the trends and future key players on the field of instant messaging for the next five years?
  - Internet portals: Trend to free basic instant messaging service with charged premium additional services. MSN Messenger emerges fast through its implementation in MSN products.
  - Internet service providers: MSN ISP emerges. ISP relevance of supplying IM decreases.
  - Mobile Internet service providers: AOL and Yahoo are able to take the first lead with WAP based messaging. In 2002, mobile operators get the chance to take that position back with the more integrated IMPS protocol.
  - Non-portal service providers: Instant messaging becomes a commodity in collaboration software, enabling diverse communications sessions.

6. Which technical feasible business models can be applied for the integration of instant messaging with other services?
- Internet portals: Free instant messaging service via advertising;
  - Internet service providers: Compensating fee from online minutes;
  - Mobile Internet service providers: Pay per message (SMS) or online time (WAP);
  - Non-portal service providers: Product differentiation (software providers);  
Gateway fee (VoIP service providers);  
Advertising (other IM-service providers).

7. Which place in the value chain can instant messaging take to have a positive impact on the total revenue?

Swisscom Bluewin should create compatibility (e.g. IETF or alliance with AOL or MSN), use instant messaging as communications portal, provide Swiss market additional notification services (e.g. news or weather) and consider its role on the future MSN platform.

Swisscom Mobile should increase its user base by compatibility (IETF, IMPS and with its competitors diAx and Orange), provide accurate and updated location information and differentiate with additional location based services (e.g. local friend finder).

Generally, Swisscom should differentiate from other providers and telcos through messaging synergy between Bluewin and Mobile, quality of service and regarding business models for new communication trends (e.g. peer-to-peer).

Insight in the instant messaging industry is achieved by a survey of the companies in this industry. Most of this information is retrieved from the products and information on the Internet and user data is retrieved from the Internet measurements of Media Metrix. The survey results are presented in appendix B and form an important source for research questions 4, 5 and 6.

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**TABLE OF CONTENTS**

<b>SUMMARY</b>	<b>v</b>
<b>ACKNOWLEDGEMENTS</b>	<b>vii</b>
<b>TABLE OF CONTENTS</b>	<b>ix</b>
<b>1 INTRODUCTION</b>	<b>1</b>
<b>1.1 The evolution of messaging</b>	<b>1</b>
1.1.1 The beginning of messaging	1
1.1.2 The rise of 'instant' messaging	2
1.1.3 Convergence to device independent messaging	3
1.1.4 Differentiation through value added services	4
1.1.5 Swisscom and messaging	5
<b>1.2 Research goal</b>	<b>6</b>
<b>1.3 Research question</b>	<b>6</b>
<b>1.4 Research methodology and structure of the report</b>	<b>7</b>
<b>2 STANDARDISATION ACTORS</b>	<b>9</b>
<b>2.1 Research framework</b>	<b>9</b>
<b>2.2 Standardisation organisation analysis</b>	<b>9</b>
2.2.1 Official standardisation bodies	9
2.2.2 Compatibility consortia	10
2.2.3 Defacto aiming groups	13
<b>2.3 Conclusions</b>	<b>14</b>
<b>3 STANDARDS AND TECHNOLOGIES</b>	<b>15</b>
<b>3.1 Research framework</b>	<b>15</b>
3.1.1 Diffusion of innovations model	15
3.1.2 OSI Basic reference model	16
<b>3.2 Instant messaging platforms</b>	<b>19</b>
3.2.1 User device platforms	19
3.2.2 Fixed network platforms	21
3.2.3 Mobile network platforms	21
3.2.4 Mobile service platforms	23
<b>3.3 Instant messaging protocols</b>	<b>26</b>
3.3.1 Compatibility protocols	26
3.3.2 Interoperability protocols	29
3.3.3 Proprietary protocols	30
3.3.4 Overview of IM-protocols	31
<b>3.4 Instant messaging and related services</b>	<b>33</b>
3.4.1 Instant messaging and presence services	33
3.4.2 Location services	33
3.4.3 Voice services	34
3.4.4 Directory services	35
3.4.5 Overview of services	36
<b>3.5 Conclusions</b>	<b>37</b>
<b>4 INDUSTRY ANALYSIS</b>	<b>39</b>
<b>4.1 Research framework</b>	<b>39</b>
4.1.1 Five forces model	40
4.1.2 Definition of strategic groups	41
<b>4.2 Instant messaging industry analysis</b>	<b>42</b>
4.2.1 Competitive forces analysis	42
4.2.2 Strategic group analysis	51
4.2.3 Internet portals	53
4.2.4 Internet service providers	53
4.2.5 Mobile Internet service providers	53
4.2.6 Non-portal service providers	54
<b>4.3 Conclusions</b>	<b>55</b>

<b>5</b>	<b>BUSINESS MODEL ANALYSIS</b>	<b>58</b>
<b>5.1</b>	<b>Research framework</b>	<b>58</b>
5.1.1	Framework choice	58
5.1.2	Resource-Event-Agent value-added process hierarchy methodology	59
<b>5.2</b>	<b>Instant messaging business model analysis</b>	<b>60</b>
5.2.1	Internet portals	60
5.2.2	Internet service providers	61
5.2.3	Mobile Internet service providers	62
5.2.4	Non-portal service providers	64
<b>5.3</b>	<b>Conclusions</b>	<b>67</b>
<b>6</b>	<b>CASE: SWISSCOM AND INSTANT MESSAGING</b>	<b>70</b>
<b>6.1</b>	<b>Research framework</b>	<b>70</b>
6.1.1	SWOT analysis	70
6.1.2	TOWS matrix	71
<b>6.2</b>	<b>Swisscom IM-SWOT analysis</b>	<b>71</b>
6.2.1	Strengths	72
6.2.2	Weaknesses	73
6.2.3	Opportunities	74
6.2.4	Threats	75
<b>6.3</b>	<b>Aligning internal and external strategic issues</b>	<b>77</b>
<b>6.4</b>	<b>Conclusions</b>	<b>80</b>
6.4.1	Actions for Swisscom Bluewin	80
6.4.2	Actions for Swisscom Mobile	80
6.4.3	Actions for Swisscom in general	81
<b>7</b>	<b>CONCLUSIONS AND RECOMMENDATIONS</b>	<b>82</b>
<b>7.1</b>	<b>Answers to the sub-research question</b>	<b>82</b>
<b>7.2</b>	<b>Answers to the research question</b>	<b>87</b>
<b>7.3</b>	<b>Expectations and research recommendations</b>	<b>88</b>
	<b>REFERENCES</b>	<b>89</b>
	<b>GLOSSARY</b>	<b>94</b>
	<b>INDEX</b>	<b>95</b>
	<b>APPENDIX A - FIGURE DATA</b>	<b>I</b>
	<b>APPENDIX B - RESULTS OF INSTANT MESSAGING INDUSTRY SURVEY</b>	<b>III</b>

## 1 INTRODUCTION

*This chapter describes the fundamentals of the research project. As introduction, an overview of the evolution of messaging is provided. Therein, several suggestions on the next step in the messaging evolution are made. These assumptions form the motivation to the goal of this research.*

*At the end of this chapter, the reader should be able to understand the research question and have a basic understanding of the framework in which it is located.*

### 1.1 The evolution of messaging

This paragraph describes the evolution of messaging until the current situation. Secondly, it describes important developments in this industry. Finally, the positioning of Swisscom regarding messaging is described shortly. This paragraph is divided in these subparagraphs:

- The beginning of messaging;
- The rise of 'instant' messaging;
- Convergence to device independent messaging;
- Differentiation through value added services;
- Swisscom and messaging.

The purpose is to provide enough background to understand the research goal and research question at the end of this chapter.

#### 1.1.1 The beginning of messaging

By 1969, the inventions of a tight community of computer scientists and engineers joined to form the U.S. government's ARPANET. This growing multimillion-dollar network was commissioned by the defence department's Advanced Research Projects Agency (ARPA) with the aim of electronically linking major computer science labs and the military industry throughout the country. The major advantage was that this package switched network was less sensitive to the destroying of communication lines. It was by far the largest and most sophisticated network experiment in the world. It revolutionised communications and gave rise to the global Internet.

The first traffic on the network was moving smoothly by the end of 1970. The network growth exploded in the 1970s with the advent of e-mail. The ARPANET was not intended as a message system, but as resource-sharing system. That very little of its capacity was actually ever used for resource sharing was soon a fact in the tide of electronic mail.

Between 1972 and the early 1980s, e-mail was discovered by thousands of early adopters. The big rise in message traffic was to become the largest early force in the network's growth and development.

As cultural artefact, electronic mail belongs in a category somewhere between found art and lucky accidents. The ARPANET's creators did not have a grand vision for the invention of an earth-circling message-handling system. But once the first couple of dozen sites, or "nodes" on the network were operational, early users turned the system of linked computers into a tool of personal as well as professional communications. To use the ARPANET as a sophisticated mail system actually was a good hack of Ray Tomlinson. Although in technical terms the program was trivial, culturally it was revolutionary. He also introduced the @-symbol in the e-mail address to separate the username from the computer name.<sup>1</sup>

Another breakthrough of Internet inventions was the World Wide Web (WWW). This easy-to-use interface lowered the usage-barrier to find information on the Internet. The base of the WWW, hypertext, associates a word with a link that points to some other piece of information. Hypertext was already invented in 1965, but the Internet implementation arrived at 1990, called Hypertext Markup Language (HTML). From the year 1995, WWW became known to the most people. The usage of the WWW is still growing exponentially and it has been commercialised for a big part. This new type of Internet access was the source for lots of new Internet applications, like webmail.<sup>2</sup>

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<sup>1</sup> **Talking headers** - August 4, 1996 - <http://www.olografix.org/gubi/estate/libri/wizards/email.html>

<sup>2</sup> **A brief history of the Internet** - August 4, 2000 - <http://www.isoc.org/internet/history/brief.html>

E-mail has been the preferred method of communication in the corporate world since the late 1980s. It is now the communications lifeblood of companies, and a key function of consumer-oriented computer usage. It takes many forms, from free-mail on the web through a web browser, to desktop oriented e-mail products, to groupware. For most companies, it is at least as important as voice communication.<sup>3</sup>

Besides the mentioned social and technical factors of this evolution, the commercial factors became just as important. Koohestani<sup>4</sup> identifies e-business as a main factor in the evolution of messaging: "e-Business is driving the evolution of messaging, very quickly establishing that e-mail is no longer the point-to-point communication tool of the past. It now delivers enough power to become the strategic backbone of any business strategy for the future".

Consequently, e-commerce became another steering factor: "An important aspect of today's messaging infrastructure is that it provides an instant link to millions of potential customers around the world.

By combining this infrastructure with the power of e-business platforms and the applications deployed on these platforms, companies can continuously interact with customers, partners, suppliers, and employees, in ways never thought possible".<sup>3</sup>

Messaging has become one of the most rapidly growing markets in the computer industry.<sup>5</sup>

### 1.1.2 The rise of 'instant' messaging

A new kind of application is emerging on the Internet, driven by the desire of individuals to know instantly whether another individual is online, to be notified when another individual arrives online, and to send messages in 'real time'. This application is called instant messaging (IM).

The spread of instant messaging throughout the United States is beginning to rival the success experienced by e-mail and Web browsers in the mid-1990s. Until now, IM is primarily used for social communication and entertainment, and is mainly centred on having fun and building a community. Its users are mainly teenagers and students.<sup>2</sup>

IM occupies a very interesting niche between e-mail and telephony, taking the best of both worlds. E-mails tend to keep a more formal tone, while an IM conversation tends to keep things informal and dialog based. You know when you can have an immediate conversation with someone and expect an immediate response. This 'presence' feature also makes it the ideal foundation for voice-based Internet services.

IM is moving in the enterprise space at a very fast pace, as it can easily enhance communication among team members in disparate locations. In fact, it isn't always practical or cost-effective to use a telephone, especially for brief exchanges, i.e. when checking the status of a project or confirming receipt of a package. Additionally, while e-mail and bulletin boards work well, neither is in real time. E-mail users on the same server may enjoy nearly instant delivery, but messages sent outside the Local Area Network (LAN) can sometimes take a long time to arrive. The use of IM in the enterprise becomes particularly appealing when cost or instant feedback is a consideration.<sup>2</sup> Businesses recognise the value of IM also for tightening relationships with customers.<sup>6</sup> It creates consumer stickiness and is useful for building customer databases (Card et al., 1998)

The expectations for instant messaging are high:

The future of instant messaging is linked to open access and interoperability. Instant messaging will be a business-critical application much like the telephone is today.<sup>7</sup> As voice recognition and text-to-speech technology improves, instant messaging will be seamlessly integrated with voice messaging, leading to an exponential growth of users. Mobile Insights believes that instant messaging will become a key element of unified messaging. Business people today may have a business phone and home phone number with voice mail, several email accounts, mobile phone, fax number and now an instant messaging number.<sup>8</sup>

<sup>3</sup> Rich instant messaging white paper - [http://www.ecritek.com/products/p\\_whitepaper.htm](http://www.ecritek.com/products/p_whitepaper.htm)

<sup>4</sup> How e-business is driving the evolution of messaging - January 2000 - [http://www.delanotech.com/newsletter/back\\_issues/Jan2k/futureofmessaging.asp](http://www.delanotech.com/newsletter/back_issues/Jan2k/futureofmessaging.asp)

<sup>5</sup> Messaging report for the University of Michigan Medical Center - September 21, 1994 - <http://zaprunder.pds.med.umich.edu/users/rez/Wilson994doc.html>

<sup>6</sup> Instant messaging: It's not just for teens - <http://www.microtimes.com/206/ecompaone206a.html>

<sup>7</sup> Is there room in your cubicle for instant messaging? - <http://netconference.about.com/Internet/netconference/library/weekly/aa032900a.htm>

<sup>8</sup> Wireless instant messaging: A 'killer app' - July 28, 1999 - [http://www.tegic.com/pressreleases/pr\\_mobileinsights\\_instantmsg.html](http://www.tegic.com/pressreleases/pr_mobileinsights_instantmsg.html)

In this report, Instant Messaging (IM) is defined as:

*"A communications service that enables instantly sending identifiable units of data to a recipient. It contains a presence feature indicating the ability of other selected users to receive the data immediately"*

Most of the currently used definitions of instant messaging are focussed on 'small text message' based conversations. This research rather focuses on 'small identifiable units of data' in general. This is chosen firstly, since it gives the ability to use other kinds of data (e.g. voice) and hence enables more services. Secondly, the Internet standardisation organisation IETF uses a similar definition for an instant message in their Instant Messaging and Presence Protocol: "An identifiable unit of data, of small size, to be sent to an instant inbox" (Day et al., 2000<sup>9</sup>). The term 'instantly sending data' refers to the direct delivery to a recipients computer.

### 1.1.3 Convergence to device independent messaging

Data and Internet connection services for mobile devices have been experiencing explosive growth over the last few years, moving from desktops to mobile phones, and very recently to handheld devices. As more and more professionals spend a significant portion of their time away from their office, the ability to receive messages and to communicate through mobile devices becomes critical.<sup>2</sup>

Successful technologies for mobile data services and messaging are technologies that can easily adapt to existing popular infrastructures and an expanded subscriber base, with no extra costs for users and operators. Mobile phones have been the platform of choice because of their broad usage and the existence of supporting standards. Short Message Service (SMS) in Europe and i-mode in Japan have therefore been very successful. The Wireless Application Protocol (WAP) offers the ability to view small WAP-pages on a mobile device similarly to web-pages on a desktop. In addition, General Packet Radio Service (GPRS) will facilitate instant connections, whereby information can be sent or received immediately as the need arises. This is why GPRS users are sometimes referred to be as being 'always connected'. Immediacy is one of the advantages of GPRS when compared to circuit switched data. High immediacy is a very important feature for time critical applications.<sup>9</sup>

As the first SMS messages started flowing through the mobile networks in Europe a few years ago, the need to bridge the Internet with the mobile networks became apparent. Users started asking to browse the Internet and receive e-mail on their handsets. In order to port most of the Internet functions available on today's desktop to the mobile world in an orderly manner, the WAP standard was put together. Today, with the newly deployed WAP enabled phones, one can surf the WWW, receive e-mail, and execute transactions such as stock trading or m-commerce (mobile commerce).

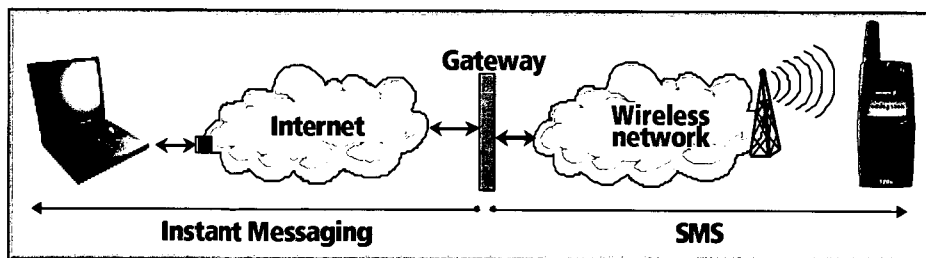


Figure 1-1 The messaging gap between the Internet and the mobile network

One application that still needs to bridge the gap is the instant messaging application. Today, there is no overall used system to instantly send a SMS message from a mobile phone to a desktop IM-user. While traditional IM lacks the connection to the mobile networks, SMS lacks two useful features: 'presence detection and availability' as well as 'real time communication'. Combining the best of both worlds into Mobile Instant Messaging is what major Internet Service Providers (ISP), portals as well network operators are seeking to do. This can be done by a gateway between these two worlds (see Figure 1-1).

<sup>9</sup> An introduction to the general packet radio service - January, 2000 - <http://www.gsmworld.com/technology/yes2gprs.html>

The joint-venture between the mobile Internet application service provider @Mobile and the Net company Tribal Voice was one of the first trying to close the IM-gap.<sup>10</sup> They developed a WIM-implementation for a mobile phone, which is also able to communicate with computers.<sup>11</sup> The Dutch company Fenestrae invented a technology which bridges the gap between SMS and WAP. It enables messaging and information transfers like calendar updates using their servers.<sup>12</sup>

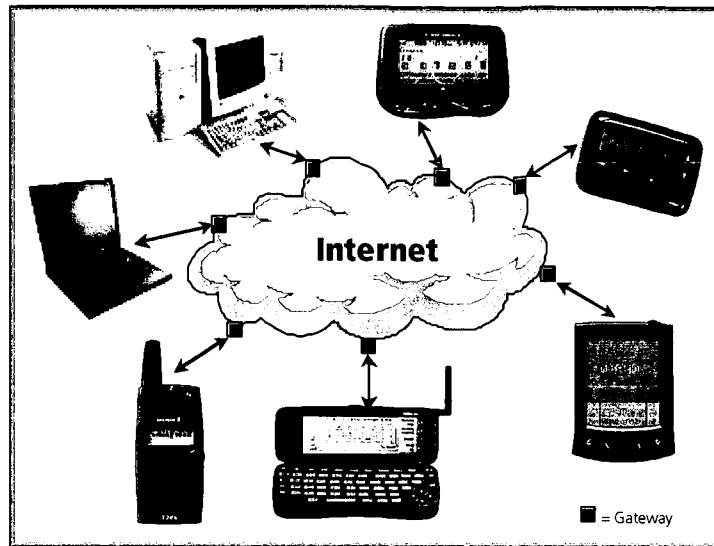


Figure 1-2 Device independent messaging

Although the several types of devices may have different gateways, the service should be the same (see Figure 1-2). In the instant messaging world of the near future, IP voice will be commonplace and whether a call is Internet based or telephone based will be largely transparent to the call receiver.<sup>13</sup>

AT&T developed a simple prototype of this interoperability, in which an IP-instant messaging session can be directly changed into a phone call (Fairbrother et al, 1999). But the convergence opportunities reach much further than that. While many popular instant messaging solutions work exclusively on the Internet, it is also possible to integrate it directly within existing and emerging telecommunication infrastructures. This means tight integration with their management systems, billing system, voice switches and any other services that service operators can make available to users. Systems like OZ/Ericsson's iPulse have the goal to create a clear and simple connection between the traditional Signalling System 7 (SS7) based telephone networks and new Internet based communication channels.<sup>14</sup> The SS7 standard defines the procedures and protocols by which network elements in the Public Switched Telephone Network exchange information over a digital signalling network to effect mobile and fixed call setup, routing and control. The message transfer part of this standard also allows sending of (instant) messages over this control channel.<sup>15</sup> This is used for sending SMS messages.

#### 1.1.4 Differentiation through value added services

In forecasting the evolution of value added mobile services, it is good to observe the evolution of more mature mobile communications markets. In the case of Sweden, growth and penetration rates should be stabilised by now. Consumption per line and customer turnover have become the chief concerns. This is where value added mobile services come into their own as a means of attracting new customers, providing a differentiated service, holding on to existing customers and fostering greater consumption per line. The daily-intensifying competition favours the appearance of new services to cover users' needs and differentiate the company from its competitors (Julián et al., 1997).

<sup>10</sup> Instant messaging moves to cell phones - February 23, 2000 - <http://news.cnet.com/news/0-1004-202-1556076.html>

<sup>11</sup> Software.com to acquire @mobile.com - March 9, 2000 - <http://www.software.com/news/pressreleases/pr2k0309atmobile.html>

<sup>12</sup> Fenestrae mobile data server 2.5 connects ... - February 20, 2001 - [http://www.fenestrae.nl/press/press\\_main.asp](http://www.fenestrae.nl/press/press_main.asp)

<sup>13</sup> Jeff Pulver at Instant Messaging '99 - November 17, 1999 - [http://www.isp-planet.com/technology/instant\\_messaging.html](http://www.isp-planet.com/technology/instant_messaging.html)

<sup>14</sup> iPulse™ - <http://www.oz.com/Products/ipulse.asp>

<sup>15</sup> Common channel signaling system No. 7 - <http://members.nbci.com/amirabbas/ss7/>

Jonathan Rosenberg<sup>16</sup> declared that differentiation can be reached by integrating the value added services<sup>17</sup>:

"True converged features are about integrating Web, e-mail, presence, chat, and instant messaging with voice. This integration allows these other IP applications to become integral components of new voice services. These kinds of services, fundamentally, cannot be done in the circuit-switched world. They provide something new, something different, something of value for service providers and their customers.

Converged services and applications also open the door to service provider differentiation by taking advantage of what we may call 'Rosenberg's Law'.

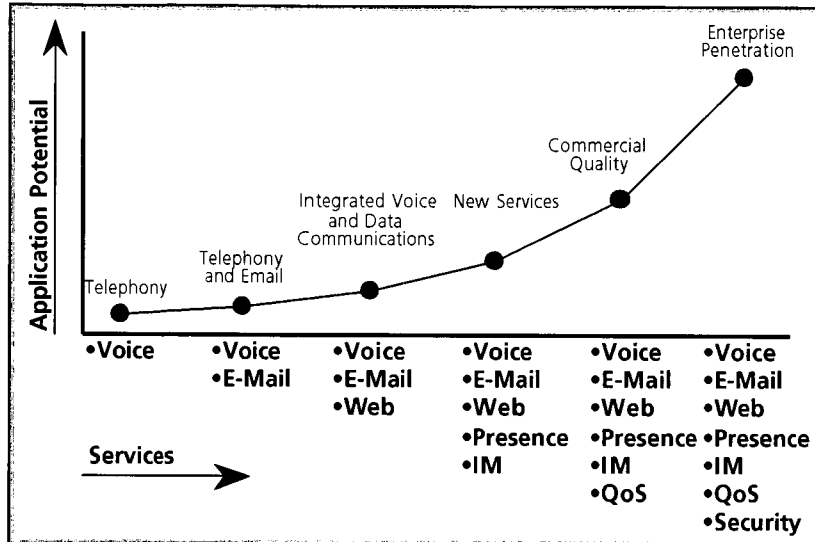


Figure 1-3 Rosenberg's Law: Differentiating services creates an exponential growth in application potential

This theorem holds that the set of features and services that a service provider can deliver increases exponentially with the number of applications (such as Web, e-mail, and voice) that are combined to provide them (see Figure 1-3). For example, take transfer, add Web, and you have got two service variants. Add e-mail, and you have got four. With such a large set of services, it's a fertile ground for differentiation."

### 1.1.5 Swisscom and messaging

At January 1<sup>st</sup>, 1998, Swiss Telecom PTT and the Swiss Post were separated into fully independent companies. Swiss Telecom PTT appeared as Swisscom AG at the stock exchange, with the Swiss Confederation as its sole shareholder. At the same time, the Swiss telecommunications market was opened to full competition with the implementation of the Swiss Law on Telecommunications of 1997. This liberalisation of the market has been carried out on the schedule and in the manner set forth by the European Union, although Switzerland is not a member of the EU. Since then, a large number of competitors have entered the Swiss market, with the strongest competition in international voice telephony and services to large business customers. In mobile telephony, national GSM-licenses were also granted to two competitors, Orange and DiAx. In addition to measures promoting competition, the Law on Telecommunications includes a transition provision requiring Swisscom to continue to provide certain basic telecommunications services (universal service) throughout Switzerland until December 31, 2002 (Peer, 2000).

With revenues of CHF 14.1 billion in 2000 and with a headcount of around 20,604 employees by the end of 2000, Swisscom is Switzerland's leading telecommunications provider. This innovative, customer-driven and competitive company provides comprehensive solutions in mobile and fixed-line voice and data communications to both residential and business customers.

Swisscom provides a complete range of leading-edge data services ranging from leased lines to integrated solutions for business customers. It provides 3.38 million PSTN channels and 1.78 million ISDN channels in Switzerland. Switzerland has one of the highest ISDN-access densities by international comparison. Swisscom introduced broadband ADSL-connections in 2000.

<sup>16</sup> Jonathan Rosenberg is a researcher on the field of voice over IP and presence. He plays a major role in the SIP and IMPP standards development

<sup>17</sup> **Parched for services? Here, try a SIP** - May 2000 - [http://www.trncnet.com/articles/comsol/0500/0500ays\\_rosenberg.htm](http://www.trncnet.com/articles/comsol/0500/0500ays_rosenberg.htm)

Swisscom Mobile increased its customer base with 900,000 new customers to 3.17 million in the year 2000. Swisscom Mobile network has a stable market share of 68% and geographically covers 98% of the populated area. Swisscom has signed 250 roaming contracts making it the global leader in international roaming. More than 5 million SMS messages are sent every day on Swisscom Mobile's Natel. Swisscom is awarded one of the four Swiss 15-year UMTS licenses, auctioned for the rather low price of CHF 50 million. The other players that achieved a license are Orange, Telefonica and dSpeed (formerly diAx/sunrise, bought by Tele Danmark). The rollout of the UMTS-network is planned for 2002.

Swisscom Bluewin, Switzerland's leading Internet service provider, is the largest online portal for residential customers. Bluewin had 549,000 active users by the end of 2000. Bluewin provides an instant messaging platform for its subscribers that is called BlueMessenger. This messenger also enables SMS-message sending to mobile phones.

Swisscom's strategy aims to retain market leadership in Switzerland and to expand internationally with Debitel. Debitel intends to enter the UMTS-market in alliance with Mannesmann Mobilfunk. Further, Debitel had a 6 million mobile subscribers, 383 fixed line subscribers and 2.2 million international subscribers by the end of 2000.

## 1.2 Research goal

The goal of the exploration programmes of Swisscom Corporate Technology is:

"With its exploration programmes, Corporate Technology is exploring telecommunication technologies and new service possibilities with a long-term view of 2-5 years. Furthermore, the expertise built up in the course of this activity enables active support of business innovation projects." This research project started as part of the exploration programme Advanced and Value-Added Communications Services.

As the introduction mentioned, it is important for a company to differentiate itself with value-added services. As such the differentiation is a part of a business model. With this research, the business units should obtain help in the creation of their business models. To reach that, instant messaging is analysed as a differentiator that distinguishes Swisscom's products and Services from the competition. Such a differentiator might therefor add value to the telecommunications value chain.

The focus of this research lies on the business units Swisscom Mobile and Bluewin in particular. However, opportunities for other business units are mentioned as well as they appear.

Research goal:

*"To draw up a business model wherein instant messaging can be used to differentiate the communications products and services of Swisscom Mobile and Bluewin."*

'Business model' rather describes the business opportunities of instant messaging for Swisscom rather than an implementation business case.

'Communications products' comprises all the products of Swisscom Mobile and Bluewin, which means mobile as well as fixed telephony products.

## 1.3 Research question

The technology of instant messaging is going through several developments. As long as the IM-standards are under development, the leading companies are still competing with their proprietary standards for the first position. Besides, the fixed and mobile IM-technologies are converging to each other. The question is whether IM can have a positive influence on the generated revenue of Swisscom and in which way.

Technical and business aspects form the major independent variables of this research. The social aspects are important as well, but are not investigated in particular in this research.

Research question:

*"Which technical and business aspects have influence on the differentiation possibilities generated by instant messaging for the next five years?"*



'Differentiation possibilities' refers to feasible opportunities that add value to the existing communications services.

This research question is divided into seven sub-questions:

1. Which standardisation actors play a role on the diffusion of instant messaging technology?  
*A description of the instant messaging standards and the main actors of these standards (see chapter 2).*
2. What are the key technologies to enable instant messaging?  
*A description of the technologies and protocols that enable instant messaging (see chapter 3).*
3. With which services can instant messaging be integrated to enable additional services?  
*A description of related services and their underlying technologies that enable further differentiation of the instant messaging service (see chapter 3).*
4. Which are the existing key players of the instant messaging industry?  
*A sector analysis of the instant messaging industry (see chapter 4).*
5. What are the trends and future key players on the field of instant messaging for the next five years?  
*A trends-based forecast of the instant messaging industry, including services related to instant messaging (see chapter 4).*
6. Which technical feasible business models can be applied for the integration of instant messaging with other services?  
*An analysis of existing business models on the field of instant messaging (see chapter 5).*
7. Which place in the value chain can instant messaging take to have a positive impact on the total revenue?  
*A proposal for a place in the value chain (including the most promising IM-services) will be made using the results of the previous sub-questions (see chapter 6).*

#### 1.4 Research methodology and structure of the report

The research methodology and the structure of the report are explained together, since they are directly related with each other.

This research project has an explorative nature to explore the involved technical and business aspects. These aspects are found by sequentially answering the sub-research questions. These questions therefore form the guide through this research. Every chapter answers one or more research questions. This research is based on a constellation of research frameworks instead of one research framework. The several analyses join each other in the created framework of Figure 1-1.

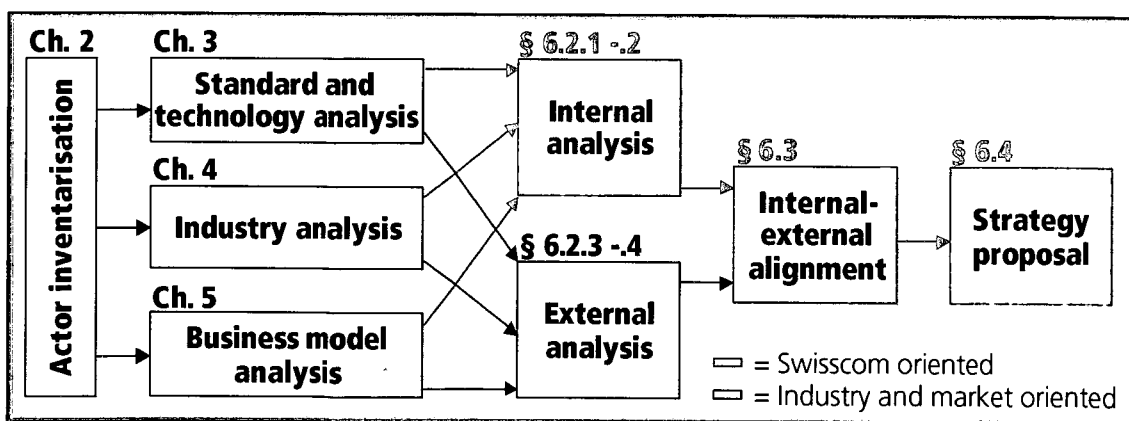


Figure 1-4 Constellation of research analyses that are used in this report

The basic analyses take place in the chapters two, three, four and five. Chapter six has an integrating role, where the previous analyses join each other. It does not provide any new information, but tries to

align the found technical and business aspects into a strategy proposal. This method is explained further in §6.1.

Information is gathered by means of literature study, the Internet and by internal expert interviews at Swisscom. Since the research topic is from the present-day (and the future), the Internet plays a major role for retrieving recent data.

Important abbreviations are explained in the glossary on page 94 and exact data that is used to create figures can be found in Appendix A.

## 2 STANDARDISATION ACTORS

*This chapter describes the standards enable instant messaging. The first research question will be answered:*

1. *Which standardisation actors play a role on the diffusion of instant messaging technology?*

*At the end of this chapter, the reader should have a global understanding of the standards that are involved with instant messaging.*

### 2.1 Research framework

To enable communications products to communicate properly, they have to be mutual compatible with each other. Their diffusion can take off when the communications technology is standardised. This standard can be proprietary or open-community.

Standards are essential for instant messaging since it is a communications technology. This chapter analyses which standards are involved with instant messaging and what role they play.

Since it is often not preferable for users and manufacturers to use a wide range of different proprietary standards, official standardisation bodies have been set up. Recent trend shows that such official activities are becoming apart from current market activities. Hence consortia activities and defacto standardisation actions are getting more conspicuous.

To distinguish between the standardisation actors, the classification framework of Yamada is used<sup>18</sup>:

- **Official standardisation bodies** are standardisation organisations that are promoted by governments and corporations. Their results are publicised as de jure standards. These organisations generally have long standardisation processes;
- **Compatibility consortia (or fora)** are standardisation consortia of corporations. They publish their results within relatively shorter time, often aiming to become defacto standards;
- **Defacto aiming groups** are corporate organisations aiming for a better defacto standard position in the shortest time.

### 2.2 Standardisation organisation analysis

This paragraph focuses on the standards that are involved with instant messaging technology and are of influence on the Swiss market.

#### 2.2.1 Official standardisation bodies

Three international standardisation organisations regarding telecommunications are located in Geneva: ITU (International Telecommunication Union), IEC (International Electrotechnical Commission), and ISO (International Organisation for standardisation). Important European standardisation bodies in telecommunications are ETSI and CENELEC. For instant messaging ETSI, ISO and ITU are relevant and described below.

#### ETSI

The European Telecommunications Standards Institute (ETSI) is a non-profit organisation, whose mission is to produce telecommunications standards that will be used for decades to come throughout Europe and beyond. ETSI represents administrations, network operators, manufacturers, service providers, e-research bodies and users.<sup>19</sup> ETSI is also an organisational partner of international projects, such as the third generation mobile telephony project 3GPP.

#### ETSI TIPHON

Recognising the urgent need for common solutions, the ETSI has established Telecommunications and Internet Protocol Harmonisation Over Networks project (TIPHON ).

<sup>18</sup> **Technical competition and global standard** - March 2000 - <http://www.nti.co.jp/~kobakan/contents/globalstandard.html>

<sup>19</sup> **General information** - <http://www.etsi.org/>

The project's objective is to support the market for voice communication and related voice band communication between users. It will ensure that users connected to IP based networks can communicate with users in switched circuit networks and vice versa. As well as between users in circuit switched networks, where IP-based networks are used for connection/trunking between the networks involved. The support comes in the production of technical specifications and reports.

Given the universal nature of IP networks, the prime goal is to produce global standards. As ETSI is essentially an European body, it recognises that co-operation with relevant groupings in ITU-T and IETF is necessary. ETSI specifically believes that it has a role in opinion leadership and in helping to build consensus between all the major market players.<sup>20</sup>

ETSI TIPHON is relevant for this research, because it has the intention to close the Internet/switched-network gap, which is also a big issue for device independent instant messaging. Furthermore, Voice over IP (their main focus) is a technology that has good opportunities to be integrated with IM.<sup>21</sup>

## ISO

The International Organisation for Standardisation (ISO) is a world-wide federation of national standards bodies from some 130 countries, one from each country.

ISO is a non-governmental organisation established in 1947. The mission of ISO is to promote the development of standardisation and related activities in the world with a view to facilitating the international exchange of goods and services, and to developing co-operation in the spheres of intellectual, scientific, technological and economic activity. ISO's work results in international agreements, which are published as International Standards.<sup>22</sup> ISO often co-operates with the International Engineering Consortium (IEC), e.g. in the Joint Technical Committee (JTC 1), and with the ITU.

ISO is relevant in the context of this research, while it is the fundament of several design processes. ISO's SGML, for example, is the basis for many markup-languages like HTML and XML, and ISO's OSI is a basis for lots of protocols making communications possible nowadays.

## ITU-T

The International Telecommunication Union (ITU) is an intergovernmental organisation through which public and private organisations develop telecommunications. The ITU was founded in 1865 and became a United Nations agency in 1947. It is responsible for adopting international treaties, regulations and standards governing telecommunications.

By January 2001, the World Telecommunication Standardisation Assembly will start a fast-track approval process for the adoption of standards that do not have policy and regulatory implications. This way the ITU is able to approve sufficiently mature standards already in two months. With this process, the ITU standardisation process (which used to be slow) becomes attractive for fast developing standards like Internet protocols.<sup>23</sup> ITU-T will allow closer co-operation and collaboration with other standardisation bodies (ISO/IEC, IETF, etc.) with pragmatic arrangements for both sides (cross-referencing respective standards, cross-participation, exchange of information, safeguard of the respective role and interest).<sup>24</sup> The ITU is the major international standardisation organisation in the telecommunications field. They have standardised the multimedia conferencing protocol H.323, which might be used in combination with instant messaging.

### 2.2.2 Compatibility consortia

Compatibility consortia or fora are often seen as the standardisation organisations that best practice market-driven standardisation. Their standards function to define a level of compatibility, and therefore can be considered compatibility standards (Krechmer, 2000). Reasons to explain the success of consortia-driven standardisation are:

- Consortia have the ability to keep pace with rapid market change;
- Official standardisation bodies need extra time to achieve the consensus necessary for the acceptance of developed standards.

<sup>20</sup> **Telecommunications and Internet protocol harmonization over networks - ETSI project - Tiphon** - <http://www.etsi.org/tiphon/>

<sup>21</sup> **The IETF Internet telephony architecture and protocols** - <http://computer.org/Internet/telephony/w3schrosen.htm>

<sup>22</sup> **Introduction to ISO** - <http://www.iso.ch/infoe/intro.htm>

<sup>23</sup> **Report on the outcome of the Assembly** - October 6, 2000 - <http://www.itu.int/newsroom/press/documents/wtsa2000rep.htm>

<sup>24</sup> **Review of ITU-T** - [http://www.itu.int/ITU-T/info/files/itu-t\\_review.pdf](http://www.itu.int/ITU-T/info/files/itu-t_review.pdf)

This paragraph describes the consortia that are relevant for instant messaging. There are big differences in maturity of these consortia. IETF, for example, is called 'recognised standardisation development organisation' for its general acceptance, while IMUnified has not even yet published a document. The following consortia will be highlighted: ECMA, IETF, IMUnified, PAM, Parlay, Softswitch and W3C.

### ECMA

ECMA is an international industry association founded in 1961 and dedicated to the standardisation of information and communication systems.<sup>25</sup>

Its aims of ECMA are to:

- develop, in co-operation with the appropriate National, European and International organisations Standards and Technical Reports in order to facilitate and standardise the use of ICT systems;
- encourage the correct use of Standards by influencing the environment in which they are applied;
- promulgate the various Standards that ECMA produces.

To this end, all ECMA Standards and Technical Reports are made available free of charge and copyright to all interested parties without restriction.

In the coming years ECMA sees important challenges for information technology and telecommunication standardisation, especially in the areas multimedia computing, high capacity storage media, high speed telecommunications, software engineering, IT security and application portability.

ECMA is also involved with supporting Voice over IP over several types of standards. For that purpose they review protocols like SIP, H.323 en Megaco.

### IETF

The Internet Engineering Task Force (IETF) is a large open international community of network designers, operators, vendors, and researchers concerned with the evolution of the Internet architecture and the smooth operation of the Internet. It is open to any interested individual.

The enormous success of the Internet has forced the existing official standardisation development bodies to recognise the standardisation efforts of the IETF. In turn, the recognition of the IETF, considered a consortia by standardisation development organisations, is opening the way for the recognition of other consortia by the official standardisation bodies (Krechmer, 2000).

The actual technical work of the IETF is done in its working groups, which are organised by topic into several areas (e.g. routing, transport, security, etc.). Much of the work is handled via mailing lists.<sup>26</sup>

A working group will enter the standardisation process (see Figure 2-1) with an 'Internet-draft'. Before the relevant working group recommends it for action, these documents are discussed for at least two weeks and no more than six months. The Internet Engineering Steering Group (IESG) then decides whether to approve the action.

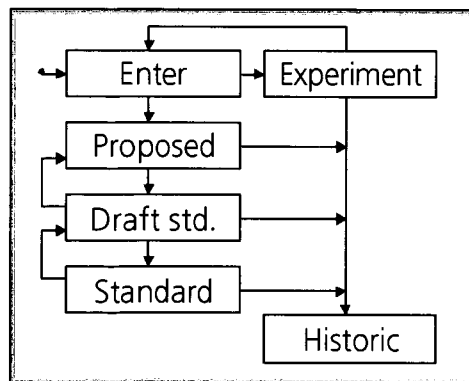


Figure 2-1 IETF standardisation process

On approval, the specification is published as an 'proposed standard'. Its progress along the standards track is now governed by time limits, as well as by the debates on the standard in the relevant mailing list and at IETF meetings. All proposed standards must remain at that level for at least six months. In order to be promoted to 'draft standard', the specification is considered by the IESG in the same way as the Internet-draft was. Draft standards are left under review for at least four months before they can be

<sup>25</sup> ECMA - Standardizing information and communication systems - <http://www.ecma.ch/>

<sup>26</sup> Overview of the IETF - <http://www.ietf.org/overview.html>

considered for promotion to 'Internet standard'. At the point that the draft standard has become an Internet standard, the specifications get a Request for Comments number (RFC). It is important, however, to stress that although all Internet standards are found in RFCs, not all RFCs are standards (Bradner, 1996).

In the context of instant messaging, the IETF set up a working group to develop an Instant Messaging and Presence Protocol (see §3.3.1). Other related IETF work is the Session Initiation Protocol and the Media Gateway Control Protocol.

### **IMUnified**

IMUnified is a coalition of leading technology and instant messaging companies. It has been created to provide functional interoperability, enabling its members' Internet users to communicate freely with each other. IMUnified strives to reach open standards-based interoperability for instant messaging as long as the IETF has not finished their standardisation process. Their Instant Messaging Interoperability Protocol is meant to be a temporary solution as long as the IETF IMPP standard is evolving (see §3.3.2).

### **PAM Forum**

The PAM Forum is an independent non-profit consortium with members from the voice, data and mobile networking, services and applications community. It is open to accept new industry members. The members are dedicated to establish and promote Presence and Availability Management (PAM) as an industry standard. PAM is a new, open software platform specification essential to creating advanced communications and messaging services that operate seamlessly across various telephony and Internet Protocol technologies. This specification consists of a set of Application Programming Interfaces (API) designed to allow communications systems to share authorised information about subscribers' identity, presence and availability securely across telephony and IP technologies.<sup>27</sup>

PAM can retrieve the presence information from protocols like IMPP and SIP. It typically ties static user information with dynamic information about those devices. It provides user control of how they are to be available to others over those devices based on personal preferences and/or enterprise policy.<sup>28</sup>

Instant messaging can play a role in the provision of presence information to PAM. On the other side, PAM forms an entrance for the use of instant messaging as communications service.

### **Parlay**

Parlay is a consortium that develops an API, enabling services to be delivered across different types of networks.

Parlay enables secure public access to core capabilities inherent in telecommunications and data networks. The Parlay APIs are open, technology and network independent, and extensible. The APIs provide secure and open access to the capabilities of a wide range of today's communication networks, while being sufficiently adaptable to address similar capabilities in future networks. The purpose of these APIs is to present a single standardised, abstracted and simplified way to control communications networks.<sup>29</sup> Since these APIs intended for use by application developers and since a messaging API is under development, Parlay might be an interesting platform for implementing instant messaging.

### **Softswitch**

The Softswitch consortium supports rapid advancement of application developments for evolving IP networks, which support both voice and multimedia communications. The consortium promotes worldwide compatibility and interoperability between IP networks and the PSTN. Since VoIP can be an extension of instant messaging, Softswitch gateways are related to this subject as well.<sup>30</sup>

### **W3C**

As the Internet has grown and become more pervasive, the work of the IETF has been supplemented by specialist quasi-standards organisations. Predominant amongst these is the World Wide Web Consortium (W3C). The function of W3C is to develop common protocols for the evolution of the World Wide Web, but this function does not sit squarely within the Internet. The core transport protocols of the web

<sup>27</sup> What is the PAM forum? - [http://www.pamforum.org/learn\\_more/whatis\\_pam\\_forum.html](http://www.pamforum.org/learn_more/whatis_pam_forum.html)

<sup>28</sup> PAM specifications in relation to standard protocols - [http://www.pamforum.org/learn\\_more/pam\\_and\\_protocols.html](http://www.pamforum.org/learn_more/pam_and_protocols.html)

<sup>29</sup> The Parlay Group specifications - <http://www.parlay.org/specs/index.asp>

<sup>30</sup> International Softswitch consortium - <http://www.softswitch.org/>

are Internet protocols and are therefore developed in collaboration with the IETF. The document presentation standards are more widely applicable and co-operated with ISO, since these standards are closely related to ISO's SGML.

The processes used by W3C reflect its position between traditional standards organisations and the IETF. Although the W3C welcomes public comments on its work through various mailing lists, it is a membership organisation and the bulk of its work is conducted in working groups and activities which are open only to members. In this respect, the W3C is closer to the ITU than to the IETF (Abramatic et al., 1999). The W3C is relevant to instant messaging, since W3C-protocols like MIME and XML play an important role on top of the instant messaging protocol stack.

### **Wireless Village**

Wireless Village as an industry consortium from Ericsson, Motorola and Nokia. This consortium is set up to create mobile Instant Messaging and Presence Services (IMPS). Since the members are all leading players in the mobile phone industry, its impact might be large.<sup>31</sup>

Since this initiative has been set up by the end of April 2001, it is only investigated slightly in this report.

### **2.2.3 Defacto aiming groups**

A defacto standard is a standard that has been endorsed by industry or government, but not officially approved by an accredited standards body such as IETF, ITU or ISO. All the currently leading instant messengers are based on proprietary protocols.

### **AOL Time Warner**

As initiator of instant messaging, America Online (AOL) has had a monopolistic position in the instant messaging industry with its products AIM and ICQ. AOL's protocols are closed for other companies and they are not yet willing to co-operate with the standardisation developments of the IETF. This way, AOL has been able to keep its dominance on the market high. Future development will have to prove whether the monopolistic position is strong enough to resist the standardisation efforts. In the year 2000, trade-protection organisations have analysed this company and their position in the instant messaging industry carefully due to the merger between AOL and Time Warner (see §0 and 4.2.1).

### **Microsoft Networks**

The world competitor of AOL Time Warner, Microsoft Networks (MSN), has had a lot of experience with defacto standards (e.g. Windows). However, in the instant messaging industry they were a late entrant and are now actively occupied with the IETF IMPP standard. So far, the instant messaging protocol of MSN has been proprietary as well, but this will change by the end of 2001 when they implement the new IETF standard (see §0 and 4.2.1).

### **JAIN**

The JAIN initiative, led by Sun Microsystems, defines a set of industry defined API's. Their mechanism for resolving incompatibility problems is through developing standard API's based on Java between platforms, such as SS7 protocol stacks and the applications running on them. Their widespread support gives them the prospects to be widely adopted as a defacto standard. JAIN enables a significant reduction in time and expense to offer new services. The objectives of JAIN lie in the line with those of Parlay. Close co-operation between these two organisation has led to alignment between the technology neutral Parlay APIs, and the Java technology specific JAIN service provider APIs (Schwartz, 2000). This platform might just like Parlay enable instant messaging service development.

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<sup>31</sup> **Wireless Village - The mobile IMPS initiative** - <http://www.wireless-village.org/>

### 2.3 Conclusions

This chapter provides the answers of the research question:

#### **Which standardisation actors play a role on the diffusion of instant messaging technology?**

The most important standardisation actors are:

- IETF consortium, because it has several working groups that are developing an Internet instant messaging standard;
- IMUnified consortium, because it developed an instant messaging interoperability specification that already enables interoperability between the existing proprietary messengers;
- PAM forum, because it develops an interoperability specification for the management of presence information (e.g. for unified messaging);
- W3C consortium, because it defined the MIME- and XML-protocols that are used within several instant messaging protocols;
- Wireless Village initiative, because the support of the three leading mobile phone manufacturers enable a quick diffusion of this Mobile instant messaging standard;
- AOL Time Warner and Microsoft, because they have large user shares in the instant messaging market and they have the power to push their technologies.

This list shows that compatibility consortia are emerging. There are no official standardisation bodies directly involved with instant messaging. However, on the field of PSTN/Internet interoperation and the related Voice over IP services, ETSI Tiphon and ITU-T play an important role.



### 3 STANDARDS AND TECHNOLOGIES

*This chapter describes the standards and technologies that enable instant messaging. It answers these research questions:*

2. *What are the key technologies to enable instant messaging?*
3. *With which services can instant messaging be integrated to enable additional services?*

*At the end of this chapter, the reader should have a global understanding of the technological framework in which instant messaging is placed.*

#### 3.1 Research framework

The enabling of instant messaging involves lots of technologies and standards. Structuring in categories is preferred to achieve a clear view of them. A possibility to describe communication technologies is to classify them according to the protocol stack. For this research that kind of structuring would be too detailed. A generic model for this, the OSI basic reference model, is introduced anyway to give some technological background on communication principles (see §3.1.2).

In this research a structuring matrix is designed between the technology and its 'innovation attributes'. The innovation attributes were defined by Rogers (1995) and are described in §3.1.1. Since this structuring is only used for describing the technologies and not for an in depth analysis, the modelling method is only explained briefly.

Instant messaging is a device independent technology that is mainly implemented on application level (see §3.1.2). It can involve many technologies of the computer and telecommunications industry. Therefore the describing analyses of this chapter are divided in three categories:

- **Instant messaging platforms** are the technologies that enable the execution of instant messaging on a basic level (see §3.2). This involves the hardware platforms (e.g. PC and mobile phone), the access platforms (e.g. GSM and UMTS) and the generic service platforms (e.g. WAP and i-mode);
- **Instant messaging protocols** are the specifications that enable instant messengers to communicate with each other (see §3.3). They are required to enable compatibility or interoperability. The protocols need the instant messaging platforms in order to function properly;
- **Instant messaging and related services** are the services on a top-level that can be enabled using instant messaging (see §3.4). These services make use of instant messaging protocols and possibly other protocols to enable integrated services.

#### 3.1.1 Diffusion of innovations model

##### Innovation attributes

A common and sufficient manner of structuring the attributes of an innovation is described by Rogers (Rogers, 1995). He defines an innovation as "an idea, practice, or object that is perceived as new by an individual or other unit of adoption". Instant messaging can be perceived as an innovation, since the major adoption of instant messaging and related technologies is still to come and the standardisation of the instant messaging progress is still under development. The attributes of an innovation, as perceived by the members of a social system, determine its rate of adoption.

These attributes are:

- **Relative advantage** is the degree to which an innovation is perceived as better than the idea it supersedes. The degree of relative advantage may be measured in economic terms, but social prestige, convenience, and satisfaction are also important factors. It does not matter so much if an innovation has a great deal of objective advantage. What does matter is whether an individual perceives the innovation as advantageous. The greater the perceived relative advantage of an innovation, the more rapid its rate of adoption will be.
- **Compatibility** is the degree to which an innovation is perceived as being consistent with the existing values, past experiences, and needs of potential adopters. An idea that is incompatible with the values and norms of a social system will not be adopted as rapidly as an innovation that is compatible. The

adoption of an incompatible innovation often requires the prior adoption of a new value system, which is a relatively slow process.

- **Complexity** is the degree to which an innovation is perceived as difficult to understand and use. Some innovations are readily understood by most members of a social system; others are more complicated and will be adopted more slowly. New ideas that are simpler to understand are adopted more rapidly than innovations that require the adopter to develop new skills and understandings.
- **Trialability** is the degree to which an innovation may be experimented with on a limited basis. New ideas that can be tried on the instalment plan will generally be adopted more quickly than innovations that are not divisible. An innovation that can be tried represents less uncertainty to the individual who is considering it for adoption, who can learn by doing.
- **Observability** is the degree to which the results of an innovation are visible to others. The easier it is for individuals to see the results of an innovation, the more likely they are to adopt it. Such visibility stimulates peer discussion of a new idea, as friends and neighbours of an adopter often request innovation-evaluation information about it.

Rogers uses the general attribute 'relative advantages' to indicate whether an innovation is better than others, however he does not distinguish the negative aspects in general. These 'drawbacks' are important as well to get a clear view of the relevant issues regarding instant messaging. For this reason this attribute is used as well and defined by taking the opposite of relative advantage:

- **Drawback** is the degree to which an innovation is perceived as worse than the idea it supersedes. The degree of drawback may be measured in economic terms, but social prestige, convenience, and satisfaction are also important factors. It does not matter so much if an innovation has a great deal of objective disadvantage. What does matter is whether an individual perceives the innovation as disadvantageous. The greater the perceived drawbacks of an innovation, the less rapid its rate of adoption will be.

In summary, innovations that are perceived by individuals as having greater relative advantage, compatibility, trialability, observability, and less drawbacks and complexity will be adopted more rapidly than other innovations.

This rate of adoption is relevant for the possible business models of instant messaging as well. The six attributes are used to structure the attributes of the actors.

Trialability and observability are only described for user technologies. For technologies that are 'further away' from the common user (e.g. the protocols), these attributes are less relevant and are not described.

### 3.1.2 OSI Basic reference model

The Open Systems Interconnection (OSI) basic reference model provides a common basis for the coordination of standards development for the purpose of systems interconnection. It allows existing standards to be placed into perspective within the overall reference model as well. It also identifies areas for developing and improving standards and provides a common reference for maintaining consistency among all related standards. The ITU developed the model jointly with ISO/IEC (ITU-T, 1994).

The model is based upon a 7-layer network hierarchy. Each layer contains individual services that are provided to the above layer. Ideally, in a well defined implementation, layer services shield other layers from implementation details and permits greater flexibility in maintaining individual software layers. This way subsequent modification and installation is greatly enhanced.

Figure 3-1 shows how the communications are structured when communicating between two open systems. Physically the communication takes place between the layers, but a layer on the source side seems to have direct contact with the destination side. It often takes more data links to reach the destination. For that purpose relay systems route the data in the right direction.

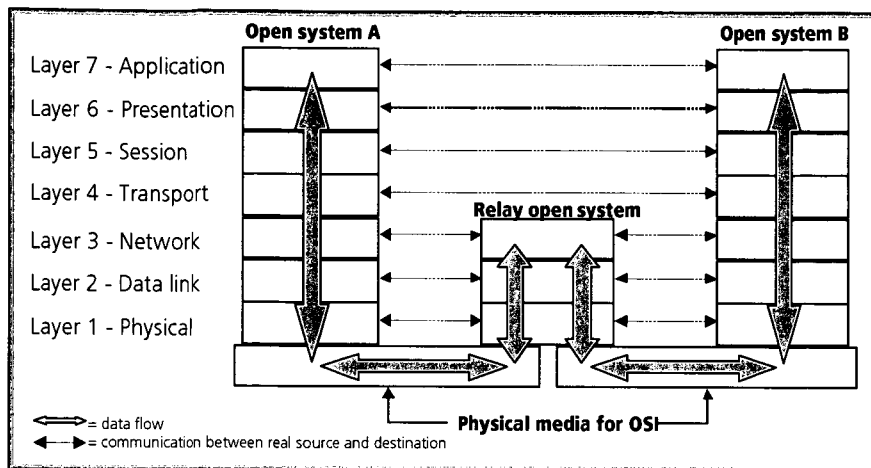


Figure 3-1 Communications via the OSI Basic reference model

This model has been the basis for communications protocols of telecommunications companies. However, the Internet is based on the TCP/IP model that only uses five layers, since the session and presentation layer are left away (see Figure 3-2). The function of the session layer in the OSI model, takes place in the TCP layer. Additional session and presentation layer functionality can be implemented on the application layer. The physical layer and the data-link layer are not specified in the TCP/IP model. IP is a flexible protocol that can be applied on several kinds of data-link layers. It is even possible to skip the data-link layer, for example when the throughput quality of the physical layer is very good (Tanenbaum, 1999, p.36-46).

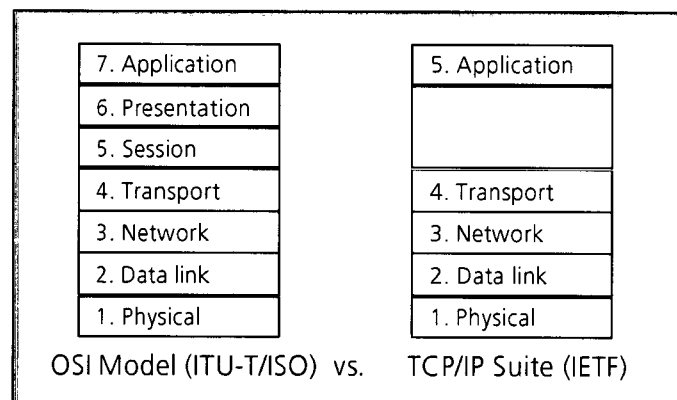


Figure 3-2 Protocol stack of OSI-model vs. TCP/IP suite

The functions of the several layers in the OSI-model are:

### Application layer

The application layer contains all those functions which imply communication between open systems that are not already performed by the lower layers. These include functions performed by programs as well as functions performed by human beings.

This layer is concerned with the support of an end-user application process. It satisfies data/information transfers such as the data base access.

### Presentation layer

The Presentation Layer performs functions to enable computers to communicate with the same syntax (read: language). Examples of these functions are: The specific functions to help accomplish the presentation-services are data compression and data encryption.

### Session layer

The session layer is the user's transparent interface to the network. The layer manages the 'current' connection (or session) to the network.

Note: In packet-switched networks a full-time network connection does not exist, even though it might seem so. On TCP/IP networks this functionality is implemented in the transport layer.

### **Transport layer**

The transport layer is an intermediate layer that higher layers use to communicate to the network layer. This layer hides the complexities of low-level networking communication from the higher levels. In connectionless networks, the transport layer is the lowest layer providing a connection oriented connection. Examples are the Transfer Control Protocol (TCP) and the User Datagram Protocol (UDP)

### **Network layer**

The network layer is responsible for routing packets of data across the network. In connectionless networks, the data is divided into packets. Each packet will be addressed and sent out of this layer. Examples of the network layer are the Internet Protocol (IP) and Asynchronous Transfer Mode (ATM).

### **Data link layer**

The data link layer provides low-level error detection and correction. When, for example, a packet is corrupted this layer is responsible for re-transmitting the packet. Examples are transmission protocols like Synchronous Digital Hierarchy (SDH).

### **Physical layer**

The physical layer is the interface between the medium and the device. The layer transmits bits (ones and zeros) and defines how the data is transmitted over the network, what control signals are used and the mechanical properties of the network.

### 3.2 Instant messaging platforms

There are several platforms that enable instant messaging. The most common manner until now has been the personal computer. However, with the emergence of powerful mobile technologies, new IM-platforms come into sight. This paragraph will highlight the different hardware platforms. Because the mobile platform is developing very fast and giving new opportunities at the moment, it is described further regarding its access platforms and its service platforms. The main items of this paragraph are therefore:

- User device platforms;
- Fixed network platforms;
- Mobile network platforms;
- Mobile service platforms

#### 3.2.1 User device platforms

It is possible to use instant messaging on several types of devices. This paragraph gives an overview of these different devices (hardware platforms):

- PC (Personal Computer);
- PDA (Personal Digital Assistant)/pocket PC;
- Mobile phone;
- TV set top box;
- Game console.

#### PC

The most used instant messaging platform at the moment is the personal computer. It formed the origin for the IM-service and its widely connection to the Internet fastened the diffusion. Due to a lack of standardisation efforts, there appeared lots of proprietary instant messaging applications.

The big players on this field are: AIM<sup>32</sup>, ICQ<sup>33</sup>, MSN Messenger<sup>34</sup>, Yahoo! Messenger<sup>35</sup> and Jabber<sup>36</sup>. Most of them are developed for the Windows 98/ME/NT/2000 platform, but often used systems like AIM, ICQ and Yahoo are usually also developed for Macintosh and UNIX. These instant messaging applications are usually not preinstalled and therefore need some computer knowledge. Another development is HTML-based instant messaging (e.g. Bantu<sup>37</sup>), which is independent of the hardware platform.

For extra service, several PC-based instant messengers (e.g. ICQ 2000b) have included the ability to send messages to SMS using their IM-interface (without knowing the online states of the destined GSM). Due to their extensibility, some messengers achieve a complexity that makes finding basic functions (e.g. chat) hard.

An instant messaging application can form a portal to additional services, such as voice over IP, directory services and location services (see §3.4).

#### PDA / RIM BlackBerry / PocketPC

Personal Digital Assistant (PDA) is a collective name for all small mobile electronic devices that enable mobile services like a calendar and an address database. Initially, these stand-alone devices were not able to communicate to the outside world. Direct access to a mobile network or indirect access via a mobile phone is already possible for several devices (e.g. Palm, Handspring Visor and iPAQ). Some manufacturers have their own network (e.g. Palm.Net) and offer a gateway to the Internet. Due to the relative big computing power of these small devices, the step to instant messaging is a very small one.

The PDA as well as the PocketPC have screens which are big enough for a user friendly buddy list and reading bigger messages. The advantage of the input-functionality is device 'and' user dependent. These devices often use a pen to touch virtual keys or write characters using text recognition. The pocket PC have a more convenient text-input, while they usually have a complete keyboard. A combination of these two types is found in the BlackBerry devices of Research In Motion (RIM). These have the size of a

<sup>32</sup> AOL AIM - <http://www.aol.com/aim/>

<sup>33</sup> ICQ - <http://www.icq.com/>

<sup>34</sup> MSN Messenger - <http://messenger.msn.com/>

<sup>35</sup> Yahoo! Messenger - <http://messenger.yahoo.com/>

<sup>36</sup> Jabber central - <http://jabbercentral.com/>

<sup>37</sup> Bantu - <http://www.bantu.com/>

PDA, but include a fixed keyboard. AOL and Yahoo offer instant messaging subscriptions for these devices (see §5.2.3).

The several PDA-brands initially had different proprietary operating systems that made it hard for other applications to access the platform. Lots of current PDA's, however, run Windows CE and give access to the CE-versions of AOL and ICQ. Instant messengers are also available for Palm. Devices that support WAP are able to use the WAP version of instant messengers.

### Mobile phone

Besides using a mobile phone to let a PDA be able to chat, it is also possible to chat on the mobile phones themselves when they are Internet enabled. Most people in Europe are already used to the SMS-messaging system, however it is not an instant messaging application. SMS seemed to fulfil a need, even though its user interface is very inconvenient. This gives good hope for instant messaging applications on mobile phones. Especially when they become 'always online' in the future. Because there are several developments on this mobile access field, §3.2.3 will explain it further. Instant messaging can already be enabled by using proprietary solutions of IM-companies. They often use WAP or i-mode (see Mobile service platforms, §3.2.4).

### TV set-top boxes

Other developments regarding instant messaging are under development for TV set-top boxes and game consoles. The set-top-box, used for services like pay-per-view, now has the ability to use a return-channel. This brought the enhanced interactive functionality to the TV-world. New set-top-boxes will enable instant messaging, e.g. using Microsoft's TVPAK.<sup>38</sup> Besides the set-top-box, a monthly fee of \$24.95 is required at WebTV. WebTV included a MSN Messenger compatible instant messenger.<sup>39</sup> Since Swisscom has no focus on this technology, it is not discussed further.

### Game console

The new generation game consoles have combined their huge processing power with communication capabilities and are taking over lots of PC-functionality. Sony, for example, made an alliance with AOL internet access for its Playstation 2. The step to instant messaging is therefore just a small one. Besides the three players with a high market penetration on this market (Sony, Nintendo and Sega), also Microsoft joined the market with a powerful game console using communication capabilities.<sup>40</sup> Since Swisscom has no focus on this technology, it is not discussed further.

### Overview of user device platforms

Table 3-1 gives an overview of important issues of the several hardware platforms.

Attribute	PC	PDA/pocketPC	Mobile phone	TV set top box	Game console
Relative advantages	big screen good txt input lots of users combine services	big screen mobile	mobile	big screen combine services mobile keyboard	big screen combine services mobile keyboard
Drawbacks	not pre-installed	not pre-installed expensive	small screen	not mobile privacy in room	not mobile privacy in room
Compatibility	aim, icq, jabber, msn, yahoo	aim, icq, yahoo, wap	aim, yahoo, wap	msn	msn
Complexity	not preinstalled easy usage	good screen harder usage	logon required hard text input	not much features and keyboard make usage easy	Power of console allows easy to very advanced services
Triallability	free software need to install	expensive need to install	WAP enabled GSM expensive use	STB required + subscription fee	expensive subscription fee
Observability	clear usage	less clear usage	not clear usage	Clear usage	Clear usage

Table 3-1 Instant messaging innovation attributes of hardware platforms

The by far most used platform for instant messaging is the personal computer. Mobile technologies like PDA, PocketPC, RIM and mobile phone are emerging. Their mobile user-unfriendly interfaces seem to be

<sup>38</sup> Microsoft TVPAK software adopted for STB solution - December 1, 1999 - [http://www-us.semiconductors.com/publications/content/file\\_470.html](http://www-us.semiconductors.com/publications/content/file_470.html)

<sup>39</sup> Exciting new features for summer 2000! - <http://www.webtv.com/products/summer2000.html>

<sup>40</sup> Microsoft unveils X-Box game console - March 10, 2000 - <http://www.maccentral.com/news/0003/10.xbox.shtml>

acceptable, since they enable instant availability everywhere. These mobile devices enable sending instant messages when a computer is not available. The developments of the TV set top box and the game console also look promising, but there is not yet enough known of this

Although there is no instant messaging standard yet, there does exist a proprietary compatibility between the platforms. AOL's AIM for example can be used on Windows 98/ME/NT/2000, Macintosh, UNIX, Palm, WindowsCE and on specific mobile phones. Since AOL also has big user base, it gives a good lead for mobile early adopters.

### 3.2.2 Fixed network platforms

These platforms are generally known. For this reason, this paragraph will only mention them shortly. The currently most used fixed network platforms are:

#### - PSTN

This is the normal Public Switched Telephony Network. It already provides Internet access for a long time by using a modem dial-in. Current modems achieve a speed of 56kbps (compressed);

#### - ISDN

This Integrated Services Digital Network enhanced the telephone lines with digital functionalities, like more telephone numbers per line and number recognition. It has a speed of 64kbps (uncompressed) or 128kbps (using two channels);

#### - ADSL

ADSL is the newest extension of the normal telephone line. By using a new transmission technique, speeds up to 1.5 Mbps (downstream) can be achieved.

#### - CABLE

The TV-cable can be used for communication as well, when the infrastructure is adjusted to allow bi-directional traffic. Speeds currently go up to 512 kbps (downstream).

#### - Power line

A new technique to use the electricity power line for communications. This technology is able to provide data access with speeds over 1 Mbps (downstream). It also requires a major change in the original infrastructure.

### 3.2.3 Mobile network platforms

To enable new services on the mobile phone, several developments on the mobile access platforms are planned. The current second generation European mobile telephony (GSM), will develop to the third generation technology (UMTS). In between HSCSD, GPRS and EDGE will form temporal solutions to enhance the network. This paragraph will sequentially describe the mobile network platforms:

- GSM (Global System for Mobile communications);
- HSCSD(High Speed Circuit Switched Data);
- GPRS (General Packet Radio Services);
- EDGE (Enhanced Data rates for GSM Evolution);
- UMTS (Universal Mobile Telecommunications System);
- WLAN (Wireless Local Area Network) and WMAN (Wireless Metropolitan Area Network).

#### GSM

The currently used mobile telephony system in Europe is GSM. The basic GSM-system is only able to make circuit switched connections of a limited bandwidth (9.6 kbps, when using the normal error handling method). For voice communications this is enough, but it forms a bottleneck for sending bigger amounts of data (e.g. multimedia).

The circuit switched connections cause the system to set up a connection for every event (e.g. sending an instant message using WAP).

#### HSCSD

HSCSD enables faster circuit switched connections over GSM by combining several timeslots for a communications session. This can be 4 timeslots of 9.6 kbps at maximum, which will create a maximum bandwidth of 38.4 kbps. When the used timeslots are 14.4 kbps (less error correction), the bandwidth can increase to 57.6 kbps. These faster circuit switched connections are useful for applications like video communication. For sending instant messages and updating presence information HSCSD is less useful, because it occupies the telephone line to stay online and it can cost lots of money (when not having a

flat-rate connection). HSCSD is provided to all Swisscom users that have a HSCSD compatible mobile phone.

### **GPRS**

Another enhancement of the data communication is GPRS. It is a packet switched system which allows the mobile station to send packet data to the base station. This base station is directly connected to an IP-backbone, which is connected to the Internet via a gateway. The GSM design is already prepared for this enhancement. Depending on the number of available timeslots, an user can reach a maximum data speed of 115.2 kbps. Besides its higher speed, GPRS also allows the always online feature (pay for data transmission). The used mobile stations however should support GPRS and its simultaneous usage with voice data. When this usage is enabled, it forms a good platform for instant messaging. Messages themselves are very small and therefore won't cost much money, while the user can stay online on an IN-system using a presence feature (Lin et al., 2001).

### **EDGE**

With EDGE (Enhanced Data rates for GSM Evolution) the data rate can be increased further. It enables a higher data rate between the mobile station and the base station by using the 8-PSK modulation technique. Since EDGE can not send data with high power, it should be used in small cells like city's and other busy points. GPRS using EDGE is called Enhanced GPRS (EGPRS) and HSCSD using GPRS is called Enhanced HSCSD (EHSCSD). The basic rate for both services is 48 kbps instead of 9.6 or 14.4 kbps. EGPRS can achieve a speed of 384 kbps this way. The speed of EHSCSD can reach 144 kbps. The mobile station has to support the mentioned standards. EDGE requires huge investments in base stations, due to its different physical transmission. For this reason investing is only interesting for an telecom operator when it is not planning to provide UMTS.

For instant messaging, the advantage of EDGE over GPRS will be low on the short term. This is caused by the low required data rate for instant messaging. This higher data rate might be used IM-based broadband services (Lin et al., 2001, p. 85).

### **UMTS**

The final planned development is the introduction of UMTS in 2002. This third generation mobile system is developed by ETSI within the ITU's IMT-2000 framework. UMTS has the support of many major telecommunications operators and manufacturers, because it represents a unique opportunity to create a mass market for highly personalised and user friendly mobile access to the information society.

The radio access scheme uses CDMA, which uses a complete frequency spectrum range per channel. Theoretically, it can provide data speeds of up to 2 Mbps, enabling portable videophones. The coming years however, the speed is not expected to exceed 384 kbps due to a shortage of base stations. To increase the speed, smaller cells are required, which on its turn cause more cells to be created. UMTS also supports the always online feature. The UMTS mobile stations will initially support GSM, GPRS and EDGE as well to be downwards compatible for regions where UMTS is not yet introduced.

Since the network and licenses of UMTS require huge investments of the telecommunications operators<sup>41</sup>, the usage prices can be expected to be relative high. UMTS needs a strong killer application to let users adopt the new technology. Although the initial speeds of UMTS will be comparable with GPRS, it will be a good platform for instant messaging, since it contains 'always online' functionality.

### **WLAN and WMAN**

Wireless area networks are computer networks through the air. The Wireless Local Area Networks (WLAN) are already emerging in the offices and have a maximum range of about 200m (per access point). Its maximum speed is currently 11 Mbps and will increase next year to 40 Mbps. Its bigger brother Wireless Metropolitan Area Networks (WMAN) is able to cover a whole city. WLAN and WMAN complement each other. E.g. high speed access in the airport and slow access (max. 100 kbps on the streets). WLAN can also form a complement to UMTS, although WMAN is rather a competing technology of UMTS.<sup>42</sup> Since WLAN and WMAN are currently not yet provided by the operators, this study won't describe them further.

<sup>41</sup> Market Week in review for the week ended August 25, 2000 - <http://www2.seic.com/amg/news/insight/mwir8-25.asp>

<sup>42</sup> Introduction to Wireless LANs - 1999 - <http://acrowave.com/data/WirelessLANintro.pdf>



### Overview of mobile network platforms

The development between GSM and UMTS shows besides the increasing speed (see Table 3-2) also the enabling of packet switched transmission. Especially this development is of major importance for instant messaging. It will allow instant messages, availability and presence information to be send without having to establish a connection. This instant character is the power of instant messaging.

Year	Technology	Circuit switched		Packet switched	
		Service	Rate (kbps)	Service	Rate (kbps)
<2000	GSM	GSM	9.6	-	-
~2000	GSM	HSCSD	4 x 9.6 = 38.4	-	-
~2001	GSM	HSCSD	4 x 14.4 = 57.6	GPRS	8 x 14.4 = 115.2
~2002	EDGE	EHSCSD	3 x 48.0 = 144.0	EGPRS	8 x 48.0 = 384.0
>2002	UMTS		2000.0		2000.0

Table 3-2 Maximum data rates of mobile network platforms

Instant messaging can already be implemented on the GSM (e.g. using WAP), but the 'always on' feature available firstly at GPRS will create the required momentum of mobile IM. Ericsson even estimates mobile Internet to have 500 million users in 2003, which will be mostly packet switched connected.<sup>43</sup> Table 3-3 shows the issues of the several technologies.

Attribute	GSM	HSCSD	GPRS	EDGE	UMTS
Relative advantages	already available	faster than GSM	better bandwidth always on	high bandwidth always on	high bandwidth always on
Drawbacks	not always on low bandwidth	not always on new GSM required	not yet available new GSM required	not yet available	not yet available expensive
Compatibility	European std roaming access	comp. with GSM need special MS	comp. with GSM need special MS	other send std. need special MS	worldwide std. downw. comp.
Complexity	network exists	netw. changes	extra data netw.	new radio interface needed	new techn.

Table 3-3 Instant messaging innovation attributes of mobile network platforms

### 3.2.4 Mobile service platforms

On top of the mentioned mobile data access services, a service platform can be created to enable different applications. The currently used mobile service platforms are:

- cHTML(compact Hypertext Markup Language);
- WML (Wireless Markup Language);
- HDML (Handheld Device Markup Language);
- MML (Mobile Markup Language).

cHTML is the markup language of the Japanese i-mode. WML is the markup language of WAP, which has become the default mobile Internet access method in Europe. HDML is the precursor markup language of WML and is now on its return. MML is a markup language which is used at the Japanese company Sky-web for its J-phone. MML, however, is not yet used in other continents. Since only cHTML and WML are (being) implemented in Europe, these are the only service platforms that are described further. The SMS messaging platform is described as well, since it is the currently most used (non-IM) text messaging service.

#### SMS

SMS was created as part of the GSM Phase 1 standard. The first short message is believed to have been sent in December 1992 from a personal computer to a mobile phone on the Vodafone GSM network in the UK. Each short message is up to 160 characters in length when Latin alphabets are used, and 70 characters in length when non-Latin alphabets such as Arabic and Chinese are used.<sup>44</sup> The messages are always sent via a SMS messaging centre and is thus a store and forward service.

SMS is very popular in Europe and SMS usage rates continue to grow to record levels month after month, which can be attributed to (Longueuil, 2000):

<sup>43</sup> Ericsson, Microsoft in wireless alliance - August 7, 2000 - [http://www.cellular.co.za/news\\_2000/news-08072000\\_ericsson\\_microsoft\\_alliance.htm](http://www.cellular.co.za/news_2000/news-08072000_ericsson_microsoft_alliance.htm)

- No charge for incoming messages;
- Prepaid plans for youth;
- Thorough GSM coverage (including rural);
- The unobtrusive nature of the SMS format compared to voice calls (useful in both the classroom and the boardroom);
- Deployment of the software toolkit (STK) for creating enhanced services (e.g. banking), Cross-carrier/network interoperability permitted;
- SMS's status as the first online (as opposed to landline Internet) access for many Europeans.

The strong growth of SMS usage in Europe has been about pent-up demand for simple two-way text messaging, rather than clever marketing or technology enhancements on the part of the carriers. Ninety to 95% of SMS traffic is social text messaging, largely because of very high mobile phone penetration in the teen segment (enabled by prepaid services). Teens drive SMS usage, although the enterprise market is also now beginning to embrace the technology. Additional SMS drivers include early two-way availability and limited paging penetration (approximately 3% today), but no two-way mobile e-mail services.

SMS is not an instant messaging service, since it does not have a presence feature. However, it is possible to initiate a group conversation. Since users have to pay for every message it is not likely that they will create long chat sessions.<sup>44</sup> SMS-messages can be sent and received during a telephone communication session, since it uses the signalling channel.

SMS is initiated as a character messaging service and does not allow image sending. However, there are proprietary graphic systems, which are SMS based services, like Club Nokia.<sup>45</sup> The follow up of SMS are Enhanced Messaging Service (EMS) and Multimedia Messaging Service (MMS). EMS (allowing image and sound sending) and MMS (allowing video sending) both are not yet planned to integrate presence.<sup>46</sup>

## WAP

The Wireless Markup Language (WML) is the top layer of the Wireless Application Protocol (WAP). WML forms a flexible protocol, derived from XML, to create additional services like instant messaging. It allows, for example, WAP enabled mobile phones to browse WML-Internet pages. Its newest version also allows these pages (cards) to be pushed. The penetration of WAP mobile phones is still very low, however the expectations of the WAP penetration into the mobile phone market for the next years is predicted to be 8% in 2000, 22% in 2001, 50% in 2002 and 85% in 2003 (Durlacher Research Ltd.<sup>47</sup>).

When having an WAP-phone, it is easy to start the (proprietary) instant messaging application. You only have to log on to the instant messaging server and your buddy list will appear. An experiment to use ICQ on top of WML has finished successfully. WAPhead works with IBM to launch this WAPicq-service. AOL developed a mobile instant messaging for AIM as well, but it does not use an accredited protocol like WAP and is therefore depending on the support of the carrier.<sup>48</sup>

The WAP-connections are still very slow and unstable at the moment. As soon as the GPRS is enabled, this speed will increase and pay-per-data-packet will become possible instead of pay-per-time.<sup>49</sup> This pay-per-packet will allow the 'always on' feature, which lowers the usage barrier to chat. The inconvenient character input and the small screen are other drawbacks, which might be solved in the future (e.g. by including complete keyboards). The functions currently available with WML are very limited. New versions of the protocol (and WAP-browsers) will extend this feature-set.

Swisscom Mobile makes use of WAP for its community service 'friendZone' (or 'Z'). This service includes presence and location information and shows when and where the user's friends are with their mobile phone. It also enables a user to make contact with a stranger in his neighbourhood. This service is launched by the end of May 2001.

<sup>44</sup> An introduction to the short message service - July, 2000 - [http://www.gsmworld.com/technology/sms\\_success.html](http://www.gsmworld.com/technology/sms_success.html)

<sup>45</sup> Club Nokia - <http://www.nokia.com/phones/clubnokia.html>

<sup>46</sup> Next messaging: An introduction to SMS, EMS and MMS - <http://www.nextmessaging.com/>

<sup>47</sup> Professional WAP - July 3, 2000 - <http://www.networkcomputing.com/netdesign/1113wapfull.html>

<sup>48</sup> AIM service for mobile phones - <http://www.aol.com/aim/mobile/index.htm>

<sup>49</sup> Rich instant messaging for GPRS - October 24, 2000 - <http://www.ecrio.com/news/gprs102600.htm>

### i-mode

A competing markup language of WML is cHTML or compact HTML which is used with i-mode phones. -This markup language is based on HTML and that it is basically intended for packet switched networks. The biggest difference is that cHTML has much more graphical power.

The Japanese i-mode provider NTT DoCoMo has tied up with the gaming provider SEGA to develop mobile online games. NTT DoCoMo own a share of 15% in the Dutch KPN Mobile. NTT DoCoMo, KPN and the Italian TIM have collaborate to introduce i-mode in Europe. This is the first development of i-mode outside Japan. cHTML is designed for always-on packet-switched phones and is therefor a good basis for instant messaging.

There does not exist an overall instant messaging standard for i-mode as well. Proprietary instant messengers, such as FunMail, combine the graphics with the messaging capabilities.<sup>50</sup> Their system converts certain words or signs into an image on the recipients screen. Besides it is also possible to send messages to SMS or WAP phones.

### Overview of mobile service platforms

These mobile services are summarised in Table 3-4. SMS is mentioned however it is not an instant messaging technology, since it is the current most used mobile messaging service.

Attribute	SMS	WAP	i-mode
Relative advantages	lots of users	enables several applications works on circuit switched as well as packet switched	enables many applications many graphical abilities
Drawbacks	user unfriendly no presence feature (not IM)	user unfriendly	not yet available in Europe
Compatibility	comp. with every GSM	no IM-standard	no IM-standard, not yet used in Europe, Have an alliance with AOL
Complexity	usage not clear on first sight, but fast to learn	user has to log on, but screen interface is easy to understand	user has to log on, but interface is easy and comfortable to use
Trialability	every user can try it with their phone	Most people do not yet have a WAP phone and have to invest before trying	Most people do not yet have an i-mode phone and have to invest before trying The 'always-on' feature lowers the usage barrier
Observability	it is easy to show the usage, although it is not a clear user-interface	the buddy list is visible the way it is known	the buddy list is visible the way it is known

Table 3-4 Instant messaging innovation attributes of mobile service platforms

Although cHTML is similar to HTML and easier to use for web designers, XML is considered to be the Internet language of the future as HTML has limited capabilities. Similarly HTML will slowly convert itself to XML based standard. Also, WAP has quite a lot of industry backing with giants like Motorola, Nokia, IBM, Intel, Microsoft, Ericsson, etc. backing the technology. In the future the two could join to work out a new standard that would be compatible. A step in this direction could be the fact that NTT has become a very senior member of the WAP forum. The next version of WAP could be a combination of the two. Therefor a new standard might emerge makes them compatible. This is good for technology as well as mobile users.<sup>51</sup>

Instant messaging on WAP-phones becomes interesting when the 'always-online' feature is available and when the speed will be enhanced. It is still uncertain how i-mode will develop in Europe. When it will be widely adopted it might form an important instant messaging enabling service.

<sup>50</sup> FunMail announces animated instant messages for Japanese cell phones - September 18, 2000 - [http://www.funmail.com/corp/news/pr\\_000918.html](http://www.funmail.com/corp/news/pr_000918.html)

<sup>51</sup> WAP vs i-mode: the big fight - November 11, 2000 - <http://www.voicendata.com/content/convergence/technology/100111101.asp>

### 3.3 Instant messaging protocols

"IM is about as advanced now as the telephone system was in 1885, since members of different IM networks cannot communicate with each other" (Radjou et al., 2000). To reach interoperability / compatibility the instant messaging protocol needs to be standardised.

In chapter two, the key standardisation actors were already analysed. This paragraph the key protocols of these actors regarding instant messaging. It is divided in three types of protocol groups:

- Compatibility IM-protocols;
- Interoperability IM-protocols;
- Proprietary IM-protocols.

#### 3.3.1 Compatibility protocols

Most developments take place within the IETF, where four working groups are occupied with the development of instant messaging specifications:

- CPIM Common Profile for Instant Messaging, the specification of IMPP that should enable IM-compatibility between the several IETF IM-protocols;
- SIMPLE SIP for Instant Messaging and Presence Leveraging, a CPIM compliant protocol;
- APEX Application Exchange protocol, a CPIM compliant protocol;
- PRIM Presence and Instant Messaging protocol, a CPIM compliant protocol.

Besides the industry consortium Wireless Village started with the development of the mobile instant messaging protocol IMPS.

#### CPIM

The IETF Instant Messaging and Presence Protocol (IMPP) working group was initiated to develop an overall instant messaging specification. The goal of this specification is to address the need for notification in a secure, reliable and scaleable fashion across a loosely coupled constellation of servers.

The IMPP working group initially specified basic definitions and requirements for the protocol (Day et al., 2000<sup>a</sup> & 2000<sup>b</sup>). Based on these requirements, nine protocol-proposals were submitted to the IMPP working group. The proposals were categorised in four groups, depending on their underlying protocol:<sup>52</sup>

1. SIP based: Rosenberg et al.;
2. Block based: IMXP;
3. Long-live TCP between client and server: Jabber, SIMP, PITP/IMTP, PePP, OneIM, RSVP-PP;
4. HTTP based: RVP.

Since complete consensus about one single protocol specification was not reached, the IMPP working group decided on August 18, 2000 to continue with the first three groups (Crocker et al., 2000<sup>3</sup>). Every group developed a protocol conforming the agreed specifications.

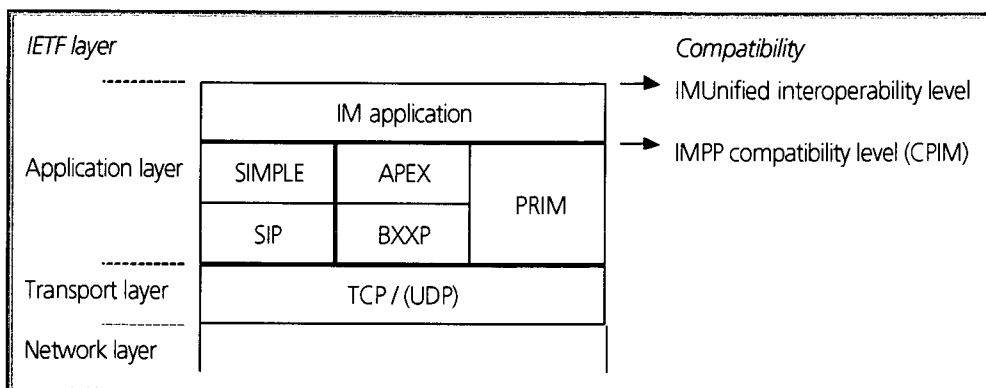


Figure 3-3A simplified view of the instant messaging protocol stacks

The resuming protocol groups with their new names are (as shown in Figure 3-3):

- SIMPLE This group develops an IMPP-protocol based on SIP;
- APEX This group develops an IMPP-protocol based on the block-based BEEP convergence layer;
- PRIM This group develops an IMPP-protocol based on 'long-live TCP connections'.

The role of the IMPP working group changed into the development of IM-compatibility specifications. These documents specify the standard format of the message, which is called "a Common Profile for Instant Messaging (CPIM)" (Crocker et al., 2000<sup>b</sup>; Atkins & Klyne, 2001). This specified presence and instant messaging format should be understood by all IETF IM-protocols (Atkins & Klyne, 2001).

After these documents have been published as RFCs by May 2001, the IMPP working group will shut down.<sup>53</sup>

### **SIMPLE**

The SIMPLE (SIP for Instant Messaging and Presence Leveraging) working group focuses on the application of the Session Initiation Protocol (SIP) to the suite of instant messaging and presence services. Both SIP and SIMPLE are initiated by Jonathan Rosenberg.

The active SIMPLE working group members are Cisco, Columbia University, Dynamicsoft, Level(3) and Microsoft.

The deliveries of this working group are:

1. A proposed standard SIP extension documenting the transport of instant messages in SIP (Rosenberg<sup>b</sup> et al., 2001<sup>b</sup>). The extension documents the mappings from its operations to CPIM. The group submitted their extension for instant messaging to the IESG in March 2001.<sup>54</sup>
2. One or more proposed standard SIP extensions documenting a subscription and notification service within SIP (Rosenberg<sup>b</sup> et al., 2001<sup>a</sup>). The extension documents the mappings from its operations to CPIM. The group submitted their extension for presence in May 2001.<sup>54</sup>

SIP is developed for establishing communications sessions (initially Voice over IP). It has a generic character, which means that it can be applied on any type of communications. SIMPLE distinguishes between the presence protocol and the instant messaging protocol. The presence information can be used for any kind of communication, which makes SIP a good platform for convergence. SIMPLE uses MIME for its messaging extension and MIME+XML for its presence extension. The transport layer protocol can be TCP, UDP and even SCTP. However, TCP is recommended for messages larger than 1,184 bytes.

Several specifications are proposed to let SIP interoperate with circuit switched networks like PSTN and ISDN. A main issue is the signalling compatibility with Signalling System 7 (SS7).<sup>55</sup> The SIP support of SS7 makes SIMPLE an interesting option for communications with Intelligent Networks, like PC-to-phone communications.

### **APEX**

The APEX (Application Exchange) working group specifies protocols and data formats that define a relaying mesh service for loosely-coupled Internet applications. Further, they specify services to provide access control and rendezvous-by-subscription. Finally, the working group specifies CPIM-compliant application services for text-based instant messaging and for online presence, based on the APEX service.

The active APEX working group members are Qualcomm, Invisible Worlds, Content Technologies Limited and Brandenburg Consulting. The group will submit the APEX core, APEX text messaging and APEX presence specifications to the IESG as standards track publications in May 2001.<sup>56</sup>

APEX is an extensible, asynchronous message relaying service for application layer programs. It is based on the Blocks Extensible Exchange Protocol (BEEP). APEX and BEEP both use the XML-format. On top of the APEX core, several kinds of services can be build (Rose et al., 2001<sup>a</sup>). Every service contains an endpoint with application or a relay (see Figure 3-4).

<sup>52</sup> Protocol recommendations from IMPP chairs - July 13, 2000 - [http://www.imppwg.org/activities/recommendation\\_from\\_chairs.html](http://www.imppwg.org/activities/recommendation_from_chairs.html)

<sup>53</sup> Instant messaging and presence protocol charter - March 30, 2001 - <http://www.ietf.org/html.charters/impp-charter.html>

<sup>54</sup> SIP for instant messaging and presence leveraging charter - March 30, 2001 - <http://www.ietf.org/html.charters/simple-charter.html>

<sup>55</sup> SIP drafts: PSTN interworking - [http://www.cs.columbia.edu/~hgs/sip/drafts\\_pstn.html](http://www.cs.columbia.edu/~hgs/sip/drafts_pstn.html)

<sup>56</sup> Application exchange charter - March 30, 2001 - <http://www.ietf.org/html.charters/apex-charter.html>

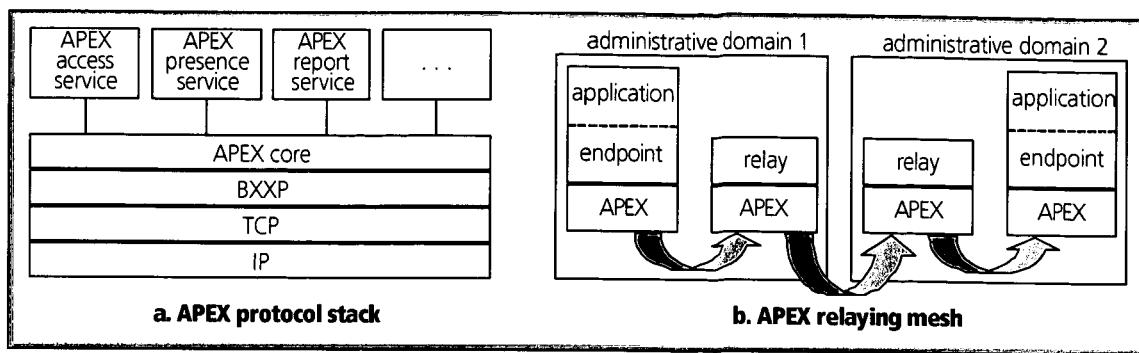


Figure 3-4 APEX protocol stack and relay meshing

Examples of such services are the APEX presence service and the APEX access service (Rose et al., 2001<sup>b</sup> & 2001<sup>c</sup>). APEX forms a lightweight protocol with minimal core functionality. Extra functionality can be built in the form of services.

BEEP (also known as BXXP) is a convergence protocol, which is planned to carry APEX over a variety of platforms. For now the only supported transport layer is TCP (Rose, 2001<sup>b</sup>). BEEP is a peer-to-peer application protocol framework for connection-oriented, asynchronous, request-response interactions. This particular subset supports a large class of Internet applications and provides solutions to common design issues for them, including: framing, segmentation, structuring, and multiplexing of messages, along with authentication and privacy (Rose, 2001<sup>a</sup>).

### PRIM

The PRIM (Presence and Instant Messaging) working group specifies the protocols and data formats for the PRIM services using a minimalist approach without adding implementation complexities. This group is initiated by the IMPP working group to combine the proposals of PePP, PITP/IMTP, OneIM and SIMP. These proposals had enough in common to continue as one protocol. The active PRIM working group members are Fujitsu, MIT, Network Projects, The MITRE Corporation and Vayusphere. The group will submit a set of CPIM compliant PRIM specifications to the IESG as standards track publications in June 2001.<sup>57</sup>

PRIM uses a client-server architecture. A user agent only communicates with servers in its home domain, and only servers can communicate with other servers. These servers may be located in different domains (Mazzoldi et al., 2001). The communications within this architecture will be described in these specifications:

1. An inter-domain server-server protocol specification for the presence and instant messaging services, which map the CPIM specification being developed by the IMPP working group over TCP. This specification defines protocols for subscription/notification and instant messaging;
2. A client-server protocol specification for the presence service. This specification defines a protocol to subscribe to a presence entity, to send a change notification to a watcher, and to control the presence information;
3. A client-server protocol specification for the instant messaging service. This specification defines a protocol to send and receive instant messages between a client and a server.

PRIM is based on 'long-live TCP connections between client and server'. TCP provides a sufficiently reliable transport infrastructure that is required by both instant messaging and presence services. PRIM is meant as a lightweight protocol that is easy to adopt by most of the current instant messaging service providers. The protocol is restricted to convey data for presence information and send text-based messages.

It brings the following advantages:

- Overhead is reduced, because authentication is performed once, at the beginning of the connection. This is important, for example, when presence information notifications occur frequently;
- Connections are firewall friendly, because user agents initiate connections from inside a firewall that can carry notifications or messages initiated from the outside.

<sup>57</sup> Presence and instant messaging protocol charter - April, 2001 - <http://www.ietf.org/html.charters/prim-charter.html>

The feature of 'polite blocking' is considered very important for presence services. This protocol contains a mechanism for selective presence information publication as well as in-band access control.

### **IMPS**

This mobile Instant Messaging and Presence Service (IMPS) is under development by the consortium Wireless Village. This consortium includes the members Ericsson, Motorola and Nokia. Since the development of the IMPS-protocol just started, a information about specifications is not yet available.

Wireless Village only indicated that it will build on these existing technologies where possible. As examples they mention CPiM, MIME (for registering the format of the messages), XML (to represent the protocol data), SMS, MMS, GPRS and SIP.<sup>58</sup>

### **3.3.2 Interoperability protocols**

The IETF instant messaging protocol requires a lot of time to develop its specifications and achieve consensus. Therefor several initiatives were started to achieve interoperability on the short term. The most important of these are:

- IMUnified, initiated by an industry consortium;
- Jabber, an open source developers consortium.

#### **IMUnified**

IMUnified is an industry consortium that has been set up to achieve interoperability until the IETF IMPP-protocols are finished. The initiators of this consortium are AT&T, Excite@home, Microsoft, Odigo, Phone.com, Prodigy, and Yahoo!.<sup>59</sup> IMUnified built their specification upon technologies already used by several coalition members to enable their Internet users to communicate freely with each other. Subsequently, its efforts are focused on the implementation of deeper interoperability, incorporating the emerging specifications of the IETF standardisation process. The ultimate vision of IMUnified is "To enable all users of instant messaging services to communicate freely with each other in the same simple and seamless manner they have come to expect from phone and e-mail based communications." In addition, the coalition is fully committed to protecting users' privacy and security in the implementation of interoperable instant messaging.<sup>60</sup>

To enable quick interoperability, IMUnified has chosen to specify how existing protocols can be linked to each other. This means that users will have to subscribe to the several instant messaging systems they wish to communicate with. IMUnified announced their first technical specifications by the end of August 2000. These specifications are implemented in instant messengers since December 2000. This way Microsoft and Yahoo! have already reached interoperability with each other.

#### **Jabber**

Jabber is an open source developers consortium. The Jabber project is a powerful, XML-based technology for real-time presence and messaging applications. The Jabber project was founded by Jeremy Miller in early 1998. He created an open platform that interoperates with major IM services (such as ICQ, MSN, and Yahoo) and is able to participate in IRC-sessions. Jabber was one of the initial IETF IMPP proposals, but was not chosen as IMPP-source. This IETF submitted Internet draft describes version 1.4 of the Jabber server (Saint-Andre, 2001<sup>a</sup>).

Jabber has a client-server architecture that is similar in many ways to that of e-mail. The community of public Jabber servers are growing fast throughout the world. The 35,000<sup>th</sup> server installation was surpassed by April 2001. The availability of this free server software makes it interesting for companies that like to use an IM-service without giving it access to the Internet community. Most of Jabber's complexity resides on the server, which enables easy creation of Jabber clients. These clients are available or under development for several operating systems and devices, like Unix, Windows 2000/ME/CE, Newton, pagers and mobile phones. This allows transparent interoperability between these devices. The Jabber platform has end-to-end encryption and any information that can be expressed as XML can be routed (Saint-Andre, 2001<sup>b</sup>).

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<sup>58</sup> **Wireless Village - White paper** - <http://www.wireless-village.org/wireless-village-white-paper-v1.pdf>

<sup>59</sup> **IMUnified press release** - August 31, 2000 - <http://www.imunified.org/>

<sup>60</sup> **Leading instant messaging companies form IMUnified** - July 25, 2000 - <http://www.microsoft.com/presspass/press/2000/Jul00/IMUnifiedPr.asp>

### 3.3.3 Proprietary protocols

The described interoperability/compatibility protocols form a lead to future compatibility. For now, however, the major part of the instant messaging industry is based on one of these four proprietary protocols:

- AIM, developed by AOL;
- ICQ, developed by Mirabilis and bought by AOL;
- MSN, developed by Microsoft;
- Yahoo, developed by Yahoo.

#### AIM/Oscar

AOL provided text messaging to its users since 1989. By November 1996, AOL added the presence feature to it in the form of a 'buddy list'. Instant messaging, as defined in §1.1.2, was born. A year later, the AOL Instant Messenger (AIM) was also provided for free to the Internet community. AIM a proprietary protocol that has been developed by AOL and is officially called Oscar. AOL Time Warner has a very protective usage policy regarding its AIM-service. Access to the service is only allowed by license. Messengers with such a license are Lycos Instant Messenger, Netscape Instant Messenger, AOL Instant Messenger and AOL Mobile Communicator.

The AIM/Oscar protocol is not officially published, but these initiatives gave more insight in it:

- By March 1999, AOL released the open source code of the TiK client, an AIM related client, and of the TOC protocol, a subset of the AIM/Oscar protocol. The TOC-protocol makes the connection with a TOC server, which connects to the AIM/Oscar server. AOL pulled back the open source initiative and blocked the TOC access to its servers by July 1999, due to the MSN Messenger launch.<sup>61</sup>
- AOL submitted an Internet draft to the IMPP working group that treated interoperability with the AIM protocol. This draft misses any detail and was not chosen for further IMPP development. However, it gives insight in the client-server architecture of AIM (Aoki & Wick, 2000).
- An approximation of the AIM/Oscar protocol specification is retrieved by reverse engineering.<sup>62</sup> This specification is unofficial, but messengers like FAIM seem to work good with it. AOL has only put effort in blocking competitive companies like Microsoft, AT&T, Odigo & Jabber.

#### ICQ

Mirabilis was founded in July 1996 by four young Israeli programmers to introduce a new way of communication over the Internet. They launched its ICQ (pronounce as 'I seek you') messenger on November 15, 1996. In June 1998, AOL bought Mirabilis for 287 million dollar and continued with supporting ICQ besides their AIM service.

ICQ is based on a peer-to-peer structure that only uses the ICQ servers for updating and retrieving presence information. This makes it harder to block non-ICQ messengers that use the service and might be a reason why AOL has not blocked these messengers as it did with AIM. It is also the reason why ICQ is very insecure and unsafe. This caused a huge community of hackers to create hacking tools for the ICQ platform. Their backwards engineering work has given a good approximation of the ICQ protocol.<sup>63</sup> However ICQ is an unsafe application/service, it is an innovative instant messenger that introduced most of the additional services first (like VoIP).

#### MSN

Microsoft released a commercial instant messaging product in July of 1999 called MSN Messenger Service. Instant messaging is integrated in Microsoft Exchange server as well. Further, Windows ME/XP and Office XP have instant messaging integrated. These developments have caused the enormous growth of the MSN instant messaging service. One and a half year after launch MSN Messenger has become the most used instant messaging service and still shows a huge growth.

The MSN Messenger service is based on a client server architecture, where a client can only contact its home server. The core instant messaging and presence functionality of MSN Messenger is described in an Internet draft that Microsoft submitted to the IETF IMPP working group. While this protocol does not

<sup>61</sup> AOL jilts open source - August 16, 1999 - <http://www.zdnet.co.uk/news/1999/32/ns-9312.html>

<sup>62</sup> AIM/Oscar protocol specification - <http://aimdoc.sourceforge.net/OSCARdoc/>

<sup>63</sup> The ICQ hacking page - <http://www.algonet.se/%7Ehenisak/icq/>



meet many of the requirements of the IMPP working group, it provided background information on their existing Instant Messaging implementations (Movva & Lai, 1999).

Microsoft Exchange 2000 Server uses an instant messaging service based on the RVP wire protocol. The RVP protocol has been submitted to the IETF IMPP working group as well in the final protocol selection phase. That Internet draft was not chosen by IMPP, but is still provided by Microsoft as a reference for third-party developers whose products need to interoperate with Exchange Instant Messaging. The protocol is based on a XML over HTML architecture (Osborne et al., 2000).

Microsoft plays an important role in the development of the IETF SIMPLE protocol (see §3.3.1). New Microsoft applications that integrate instant messaging (like Windows XP) use SIMPLE. Moreover, Microsoft a developers platform, HailStorm, that enables developers to make instant messaging-based applications

### Yahoo

Yahoo! launched their Yahoo! Messenger on July 1999. Since then, the usage has grown very strong and made Yahoo Messenger part of the four leading messengers. Support for other platforms like mobile phones, PDA's and RIM (eLink Fortified) has been added. The messaging protocol is not documented and therefore not much is known about it. Jabber, Everybuddy and other multi-platform messengers have made their programs Yahoo-compatible by using the 'libyahoo' library.<sup>64</sup>

### 3.3.4 Overview of IM-protocols

There are a lot of developments going on in the instant messaging protocol world. The most important development is the IETF standardisation of SIMPLE, APEX and PRIM, which are all protocols based on the CPIM message format. Differences between these IETF protocols lie in the field of their architecture. Interoperability can be reached on the short term using IMUnified and Jabber, where Jabber is documented much better due to its open source community. The innovation attributes of the compatibility and the interoperability protocols are summarised in Table 3-5.

Attribute	CPIM	SIMPLE	APEX	PRIM	IMUnified	Jabber
Relative advantages	General accepted message format	Enables general sessions e.g. text/voice/video Switched net compatibility	Small client Flexible transport protocol due to XML	Small client Easy to adapt in current PC-applications	Available	Available Open source
Drawbacks	No AIM support Available by: May 2001	No AIM support Available by: May 2001	No AIM support Available by: May 2001	No AIM support Available by: June 2001	No AIM support Multiple registrations No IETF standard	No AIM support Multiple registrations No IETF standard
Compatibility	SIMPLE APEX PRIM	CPIM SIP	CPIM XML	CPIM	client interoper. MSN, Yahoo CPIM	server interoper. MSN, Yahoo, ICQ CPIM XML
Complexity	tech depending architecture Kept as simple as possible	client-server architecture Gives a good basis for communication convergence, but is rather extensive to implement.	peer-to-peer architecture Kept as simple as possible	client-server architecture Kept as simple as possible	tech depends on architecture Made easy to implement No documentation published	client-server architecture Rather simple client, complexity in server Documented very good

Table 3-5 Instant messaging innovation attributes of the compatibility and interoperability protocols

<sup>64</sup> libyahoo - Summary - <http://sourceforge.net/projects/libyahoo>

The current instant messaging industry, however, still mainly consists out of four leading proprietary messaging protocols. AIM and ICQ have been leading this sector since the beginning, but MSN and Yahoo showed a bigger growth in the year 2000. The strategic position of Microsoft is so strong that it has become a serious threat for AOL. The innovation attributes of these messaging protocols are summarised in with a developers perspective Table 3-6.

Attribute	AIM/Oscar	ICQ	MSN	Yahoo
Relative advantages	Installed with ISP-software multi-platform: (RIM, Mobile, Win, Mac, WinCE, Java)	Many features multi-platform: (Win, Mac, Palm, WinCE, Java)	Part of Windows multi-platform: (Mobile, Win, Mac)	multi-platform: (RIM, Mobile, Win, Mac, Palm, WinCE, Java)
Drawbacks	AOL is active with blocking unlicensed AIM-messengers	Very insecure		
Compatibility	maybe IMPP support	maybe IMPP support	IMPP (SIMPLE) and IMUnified support	IMPP and IMUnified support
Complexity	client-server	peer-to-peer complex protocol, due to the many features	client-server Documented via IETF	?

Table 3-6 Innovation attributes of the leading instant messaging protocols

The communications flow of instant messaging usually works as follows (see Figure 3-5). A client registers to the presence and authentication server. Other clients get updated about this client's presence. The source client itself obtains the presence information of the users on its contact list.

After this authentication procedure, the client is able to send messages to other clients. The manner of doing this differs per protocol. There are distinguished two major categories:

- peer-to-peer connections. The source client has got the IP numbers of his available contacts with the presence update. Using this IP number, the source client is able to reach the destination client at once. This approach is used by ICQ and by APEX. Instant messaging file transfers are in general peer-to-peer.
- client-server connections. Every message is sent via one or more message servers before it reaches the destination client. Direct connections are not possible this way. It allows more secure connections, since only message from the server have to be accepted. This approach is used by AIM, MSN, PRIM and SIMPLE.

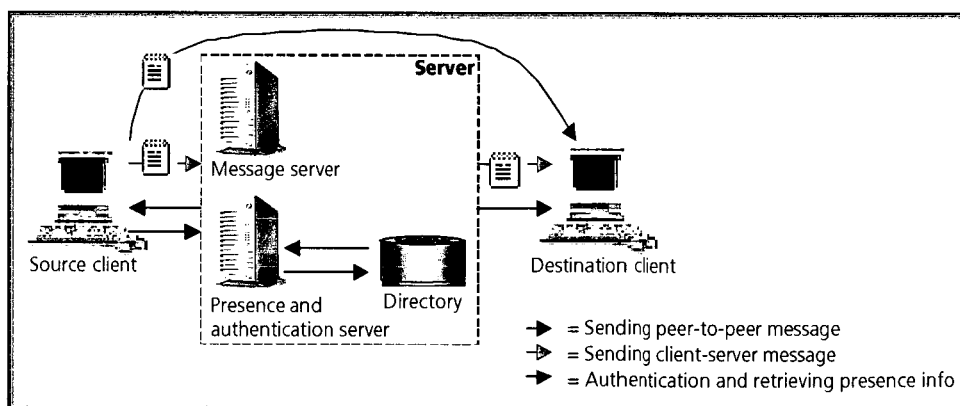


Figure 3-5 Instant messaging architecture

### 3.4 Instant messaging and related services

The application that the customer uses can be built from several services. The law of Rosenberg (see §1.1.4) already mentioned the importance of differentiated services. His theory can be summarised as 'Several individual services might all have some potential, but the real potential lies in the combination of services'. For this reason, it is interesting to combine instant messaging with additional services. This paragraph describes these combination possibilities of:

- Instant messaging and presence services;
- Location services;
- Voice services;
- Directory services.

#### 3.4.1 Instant messaging and presence services

In our definition, instant messaging includes presence (and availability) as well. Especially this presence and availability information make instant messaging unique compared to other messaging services. It allows users to anticipate on other users' current status, before sending a message. When the requested person is offline, it might be useful to contact another person who for example is able to answer a question directly. The so called 'buddy-list' or contact list can also form a lead to other services like audio/video conferencing or file sharing.

The messaging and presence services can be used separately as well as combined. Messaging, for example, can be used without presence for notification. The presence feature can be used as an indicator without the messaging service. An example is a new website called InstantWork<sup>65</sup>, which uses presence information of AIM, ICQ, MSN Messenger and Yahoo to find employees online instantly to perform a project on the short term, like programming. It is an example of a new application in response of the emergence of freelance programmers and made possible with instant messaging.

#### Instant messaging and presence protocols

The instant messaging industry is a big mixture of mostly proprietary protocols, which has seriously hampered interoperability. Furthermore, most of these protocols tightly couple presence and IM, due to the way in which the service is offered (Rosenberg<sup>b</sup> et al., 2000). The IMPP working group is developing a standard for instant messaging and presence information. For this development, several proposals are made for different base platforms (see also §3.3.1).

The group agreed to use MIME and XML. End-to-end authentication and encryption will be supported through gateways using MIME security techniques (Crocker et al., 2000<sup>b</sup>).

For interoperability on the short term, the industry has combined their efforts in IMUnified, which is developing an interoperability specification (see §3.3.2).

Another industry initiative is the Presence and Availability Management forum (PAM). This forum develops and promotes an ad hoc presence and availability industry standard. This specification enables software vendors and service providers to bring personalised and interoperable communications services to the market (see §2.2.2).

Instant messaging seems to fulfil a communications need, somewhere between telephony and email. In August alone were send and received world-wide about nine billion short messages. Besides, it can be used as a portal to other services, like Voice over IP.

When the protocol is finally defined, it can take about two weeks of work to let the current protocols interoperate with each other, since the technology is rather easy.<sup>66</sup>

#### 3.4.2 Location services

The Internet world and the world of mobile communications have already intersected, with many of us accessing web-based information using our mobile phones. However, the intersection of these two worlds has not yet led to the convergence of the presence and availability information from the Internet world with the location information of the mobile world.

<sup>65</sup> Instant Work - <http://www.instantwork.com/>

<sup>66</sup> Jabber developers mailing list - 27 October 2000 - <http://mailman.jabber.org/pipermail/jdev/2000-October/003406.html>

Location based services are expected to grow fast. The journal *Mobile Internet*, for example, made the forecast that it will grow from almost nothing at the moment to nine billion dollar in 2005.<sup>67</sup>

In the late 1990's, we had two very separate worlds of Mobile and Internet. On the mobile side, carriers or operators have long had the ability to do 'location updates' to tell which cell a subscriber is in. Roaming is one application that uses this information.

Now, mobile operators are deploying infrastructure that gives them detailed location or position information. This infrastructure includes position determination equipment (e.g. technologies such as triangulation and GPS) and 'location servers'. These servers integrate location information with applications and web-based content such as maps or restaurant listing. An important requirement for these location servers is their ability to 'bridge the gap' between different location technologies.<sup>68</sup>

Location based services can form a strong combination with presence and availability services. It enables location based commerce and empowers unified messaging (Rosenberg<sup>9</sup> and Zimmer, 2000). The manner of retrieving location information as well as the communication between location services is not yet standardised.

### Location interoperability

The Location Interoperability Forum (LIF), initiated by the leading mobile equipment manufacturers Motorola, Ericsson and Nokia, is promoting interoperability among mobile positioning systems. Its emphasis is on positioning technologies and system solutions related to mobile commerce and information retrieval.<sup>69</sup>

### 3.4.3 Voice services

The reason why new voice standards are being developed is because of the growing popularity of Voice over IP (VoIP). Although regular phones are relatively inexpensive due to their simple technology, they are fixed to a specific switch at a central switching location. IP phones and devices, on the other hand, are not fixed to a specific switch, so they must contain processors that enable them to function and be intelligent on their own, independent from a central switching location. This makes the terminal (phone or device) more complex, and therefore, more expensive. However, with the rise of computers and advanced mobile devices, the required processing power is often already available.

Voice services have good possibilities to be combined with instant messaging services due to the contact list initiation. AOL has already made this combination in their new ICQ2000b messenger. The contact list is an important feature for both services. It makes it more easy to initiate voice conferencing and with the usage of VoIP gateways, the road to the switched networks is paved as well.<sup>70</sup>

Besides the interoperability issues, the Quality of Service (QoS) of the communication is of major importance. Broadcasting of video over the Internet still lacks the quality needs and even voice over the Internet does not compare favourably to the PSTN. Several specifications try to solve this, such as Int-Serv/RSVP and DiffServ (Xiao & Ni, 1999).

### Voice over IP protocols

These are the existing several competing protocols on the field of Voice over IP:

- **H.323** — The H.323 standard was written by the ITU and is based on H.320. H.320 was designed for very smart videoconferencing terminals costing many thousands of dollars that run over an inflexible switched network. The H.323 variant is a suite of codec protocols made for the IP network for smart terminals, allowing more functionality than the network initially gives. This protocol is supported by organisations who believe in smart terminals. These are vendors of end stations, such as Microsoft and Intel, and telephony vendors who do not have a strong IP-backbone presence such as Lucent, Ascend, NorTel and Siemens.<sup>71</sup>

<sup>67</sup> **Mobile Internet - Strategy analytics** - November 17, 2000

<sup>68</sup> **Presence and instant messaging report** - October 18, 2000 - <http://www.instantmessaging.org/pimreports102000.htm>

<sup>69</sup> **Location inter-operability forum** - <http://www.locationforum.org/>

<sup>70</sup> **WAP-ICQ conference** - April 19, 1999 - Abegglen, T. & Riordan, H.

<sup>71</sup> **Where to now, standards?** - [http://161.58.151.216/articles/110898\\_WhereToNowStds\\_AA.html](http://161.58.151.216/articles/110898_WhereToNowStds_AA.html)

- **SIP** — SIP is a text-based protocol, similar to HTTP and SMTP, for initiating interactive communication sessions between users. Such sessions include voice, video, chat, interactive games, and virtual reality (Handley et al., 2000). SIP is able to foster interoperability between IP and PSTN networks at the end device level. SIP made an alliance with MGCP, which is comprised of organisations who truly believe that simple and low cost terminals are very important. These are the equipment providers of gateways, who want to build very large scalable gateways, and the service providers, who want a solution that will generate revenue for them (since the intelligent network services is a source of income). The alliance includes academics, IN providers like BellCore, large gateway providers like Cisco and service providers like MCI, Level 3 and the Cable TV industry. The SIP protocol is also very interesting for mobile devices, since it does not require so much processing power at the terminal side.<sup>71</sup>
- **MGCP / SGCP** — The Media Gateway Control Protocol (MGCP), developed by Telcordia and Level 3 Communications, is one of a few proposed control and signal standards to compete with the older H.323 standard for the conversion of audio signals carried on telephone switched circuits to data packets carried over the Internet or other packet networks. MGCP defines a protocol between the smart media gateway controller and the dumb media gateways. It is intended to foster interoperability between IP and PSTN networks at the edge of the packet network. The MGCP is meant to simplify standards for this new technology by eliminating the need for complex, processor-intensive IP telephony devices, thus simplifying and lowering the cost of these terminals (Arango et al., 1999).
- **Megaco / H.248** — The Megaco protocol is the standard for allowing a media gateway controller to control media gateways. H.248 represents a joint co-operative effort between the ITU and the IETF. Prior to this effort, there were a number of competing protocols, including MGCP and MDCP. This protocol is considered complementary to H.323 and SIP, in that a media gateway controller will control media gateways using H.248, but will communicate between one another via H.323 or SIP.<sup>72</sup>

The protocols H.323 and SIP both have a strong background, which means that it does not seem easy to sort out one of them. For this reason, both protocols will probably coexist, where both will be (or already are) enabled to communicate with the other standard. MGCP and the recent Megaco protocol will be an extra help in enabling the protocols to communicate with each other. In all cases, the quality of service has to be improved to achieve a comfortable level of communication.

### 3.4.4 Directory services

A directory service can be used as a stand alone service, e.g. for requesting a phone number or email-address. However, it can be even more powerful when combined with location and/or presence services. It allows a sender to automatically retrieve a phone number, instant messaging ID or email-address of a recipient corresponding to its current availability status and/or location. The directory access opens new opportunities for services. Especially, when combined with location and/or presence services.

#### Directory service protocols

- **LDAP** — An important protocol to publish a database is the Lightweight Directory Access Protocol (LDAP). LDAP is based on a set of protocols and is able to function as well on a connection oriented as a connection-less protocol. As an open, vendor-neutral standard, LDAP provides an extendable architecture for centralised storage and management of information that needs to be available for today's distributed systems and services.

After a fast start, it can be assumed that LDAP has become the de facto access method for directory information, much the same as the Domain Name System (DNS) is used for IP address look-up on almost any system on an intranet and on the Internet. LDAP is currently supported in most network operating systems, groupware and even shrink-wrapped network applications.<sup>73</sup>

- **DEN** — An extension to LDAP can be reached by a Directory Enabled Network (DEN). DEN is a network where user profiles, applications and network services are integrated through a common information model that stores network state and exposes network information. This information then enables bandwidth utilisation to be optimised. It enables policy-based management, it provides a single point of administration of all network resources. All this serves to lower total cost of ownership, and improves the services that end-users can rely on regardless of their physical location. DEN uses LDAP to access, manage, and manipulate directory information.<sup>74</sup>

<sup>72</sup> **H.248 information site** - <http://www.packetizer.com/iptel/h248/>

<sup>73</sup> **Understanding LDAP** - June 1998 - <http://www.redbooks.ibm.com/redbooks/SG244986.html>

<sup>74</sup> **Directory Enabled Networks** - December 3, 1998 - <http://www.tml.hut.fi/Studies/Tik-110.300/1998/Essays/den.html>

### 3.4.5 Overview of services

This paragraph discussed the most promising services and their issues. Table 3-7 presents an overview of the several services.

Characteristic	IM & presence service	Location service	Voice service	Directory service
Relative advantages	Fulfils need Portal to other services	Combine opportunities	Combine opportunities	Combine opportunities
Drawbacks	No common IM standard yet	No standard for retrieving location info	SIP & H.323 coexist Quality of Service	
Compatibility	no common standard mobile/Internet gap	no common standard mobile/Internet gap	no common standard mobile/Internet gap	standard exists
Complexity	easy technology, but different standards (also IMPP) make this service look complex	depends on chosen system	use lots of different protocols	standards are well described

Table 3-7 Instant messaging innovation attributes of related services

All the services are potential services to be joined together by the application service provider. The instant messaging service can be used as a portal to the other services. The presence, availability, location and directory services form a powerful combination, which is used as well by unified messaging. Voice based service might be attractive as well when the quality of service improves.

However, all of these services have to cope with interoperability problems. Standardisation organisations and consortia are already working on this issue for a while, but it will take time to let the IP and PSTN integrate fully.

### 3.5 Conclusions

This chapter answers two research questions as described below:

#### What are the key technologies to enable instant messaging?

Instant messaging platforms:

- Windows on a PC is by far the leading platform for enabling instant messaging. Key enablers are 'always-online' access platforms like ADSL and Cable;
- Mobile phones already enable instant messaging using WAP. This still slow and expensive circuit switched connection protocol will become more attractive when always-online packet-switched access is provided, like GPRS and UMTS;
- New PDA's and PocketPC's enable wireless connections and make mobile instant messaging more user-friendly. For intensive messaging, they are preferable above mobile phones. IM-products are available for Windows CE, Palm and RIM. Especially RIM is good for messaging due to its fixed keyboard;

Instant messaging protocols:

- Compatibility protocols:
  - IETF CPIM, the Common Profile for Instant Messaging that enables compatibility(target: Q2 2001);
  - IETF APEX protocol, a small XML structured CPIM compliant protocol based on BEEP (target: Q2 2001);
  - IETF PRIM protocol, a small CPIM compliant protocol based on long-lived TCP (target: Q3 2001);
  - IETF SIMPLE protocol, a SIP based CPIM compliant protocol enabling all kinds of communications sessions. SIMPLE has a strong position due to its broad support by Microsoft (target: Q2 2001);
  - IMPS, the mobile instant messaging protocol from Wireless Village (target: Q4 2001). IMPS has a strong position due to its support of Ericsson, Nokia and Motorola.
- Interoperability protocols:
  - IMUnified, a specification that makes current proprietary instant messengers interoperable. The specification is not published, but available for new participating companies. IMUnified is only a short term solution and already supported by Yahoo and MSN;
  - Jabber, an open source specification that enables interoperability with ICQ, Yahoo and MSN.
- Proprietary protocols:
  - MSN, AIM, ICQ and Yahoo!

#### With which services can instant messaging be integrated to enable additional services?

The main services with combining opportunities are:

- Location services
 

Location services enhance the presence and availability information with location information. Leading location technologies are based on cell-ID and GPS. The Location Interoperability Forum has been set up to reach interoperability between the several location technologies;
- Voice services
 

Usage of Voice over IP has emerged, although the quality of service is still low. VoIP can be enabled by an instant messaging contact list (e.g. integrated in the new MSN platform). Therefor instant messaging can drive the diffusion of voice services.

The main voice over IP supporting protocols are:

  - H.323, the multimedia conferencing protocol of the ITU;
  - SIP, the session initiation protocol of the IETF;
  - MGCP/SGCP, a gateway protocol, which can be used between H.323 and SIP;
  - Megaco/H.248, a gateway protocol, which can be used between H.323 and SIP.
- Directory services
 

Directory services can be integrated with the presence information of instant messaging. The directory service can be enhanced from a information service to a communication enabling service. The directory can also form the converging factor between different devices when it knows the communications profile of users (e.g. device depending availability). Current important directory technologies are LDAP and DEN.





## 4 INDUSTRY ANALYSIS

*This chapter gives an analysis of the current and the expected future instant messaging industry. Therefore these research sub-questions will be answered:*

*4. Which are the existing key players of the instant messaging industry?*

*5. What are the trends and future key players on the field of instant messaging for the next five years?*

*At the end of this chapter, the reader should understand which companies play an important role in the instant messaging industry and how they are related to each other. The reader should have developed consensus over future developments in the instant messaging industry and consequently the future players in this industry.*

### 4.1 Research framework

To be able to analyse the instant messaging industry, this industry has to be defined first. This is done from the viewpoint of Swisscom. Since Swisscom is a telecommunications service provider, the service provider also forms the most interesting part for this company. With this in mind, the 'instant messaging industry' in this research is defined as:

Instant messaging industry:

*"The group of companies that provide instant messaging to their users as a complete communications service, including the provision of a client application and the usage of a presence server."*

The dependent variable of this research is "the differentiation possibilities generated by instant messaging". Porter (1985) was the first to suggest differentiation (together with cost leadership and focus) to achieve a 'competitive advantage'. In the same publication he introduced the idea of a 'value chain' as a basic tool for analysing the sources of competitive advantage. In the fifteen years of this model's existence, several different approaches have been made by other researchers to reach competitive advantage. Hoffman's examination of these models makes clear that they are drawn up for specific market segments or do not focus on differentiation (Hoffman, 2000).

In "Competitive strategy: Techniques for analyzing industries and competitors" Porter (1980) provides a comprehensive framework to help a company analyse its industry/sector as a whole, to understand its competitors and its own position and to translate this analysis into a specific business strategy. Besides the general analysis it also provides approaches for specific markets, like emerging markets. It can also be applied to 'the free pricing model', which is often applied at the moment to goods with low or no variable costs, like software (Busa et al., 1999). The books 'Competitive advantage' and 'Competitive strategy' complement each other. This positioning method has the drawbacks that it does not observe social and political issues, it focuses mainly on large companies, it is strongly based on numbers and calculations and it is taken from only one perspective (Mintzberg, 1999, p. 133-145). Strategy should not be only based on Porters' analysis for these reasons.

This analysis framework of competitive strategy is chosen for this research, since it:

- gives a complete set of tools to go through a complete industry analysis;
- forms a lead to positioning in the value chain, which is part of the next chapters;
- provides ways of predicting the evolution of an industry, which also forms a part of this research;
- supports emerging industries of which the instant messaging industry is one;
- supports 'free pricing models', which are currently often applied for instant messaging;
- is one of the best known and accepted models for analysing the industry and therefore provides an easier interpretation of the used method.

The analysis is divided into two parts:

- Analysing the instant messaging market as a whole;
- Analysing the differences within the instant messaging market.

### 4.1.1 Five forces model

A first issue of analysis to understand the industry in which a company competes. Porter identified five basic competitive forces that determine the state of competition, as shown in Figure 4-1.

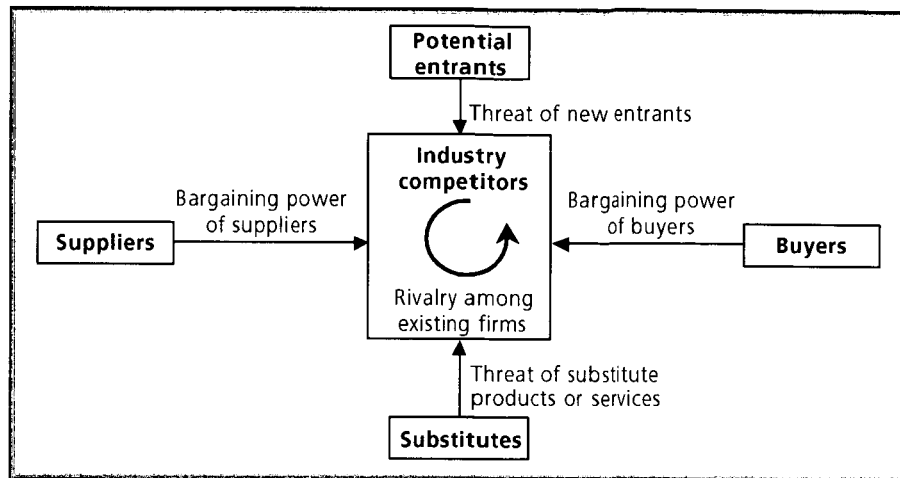


Figure 4-1 The five forces driving industry competition

The key structural features of an industry determine the strength of the competitive forces and hence the profitability of that market (Porter, 1980). Next sub-paragraphs describe which structural features are important for the instant messaging industry.

#### Threat of entry

New entrants to an industry bring new capacity, the desire to gain market share, and often substantial resources. The threat of this entry into an industry depends on the barriers to entry that are present, coupled with the reaction from existing competitors that the entrants can expect. If barriers are high and/or the newcomer can expect sharp retaliation from entrenched competitors, the threat of entry is low.

The major structural features that raise market barriers to market entry by new entrants are (Porter, 1980, p. 7-17):

- Economies of scale;
- Product differentiation;
- Capital requirements;
- Switching costs
- Access to distribution channels;
- Cost disadvantages independent of scale;
- Government policy.

#### Intensity of rivalry among existing competitors

Rivalry among existing competitors takes the familiar form of jockeying for position, using tactics like price competition, advertising battles, product introductions and increased customer service or warranties. Rivalry occurs because one or more competitors either feels the pressure or sees the opportunity to improve position. In most industries, competitive moves by one company have noticeable effects on its competitors and thus may incite retaliation or efforts to counter the move. Therefore companies are mutually dependent. This pattern of action and reaction may or may not leave the initiating company or industry as whole better off. If move and countermoves escalate, then all companies in the industry may suffer and be worse off than before.

Intensive rivalry is the result of these interacting structural factors (Porter, 1980, p. 17-22):

- Numerous or equally balanced competitors;
- Slow industry growth;
- High fixed or storage costs;

- Lack of differentiation or switching costs;
- Capacity augmented in large increments;
- Diverse competitors;
- High strategic stakes;
- High exit barriers.

### **Pressure from substitute products**

All companies in an industry are competing, in a broad sense, with industries producing substitute products. Substitutes limit the potential returns of an industry by placing a ceiling on the prices that companies in the industry can profitably charge.

Substitute products that deserve the most attention are those that (Porter, 1980, p. 23-24):

- are subjects to trends improving their price-performance trade-off with the industry's product;
- are produced by industries earning high profits.

### **Bargaining power of buyers**

Buyers compete with the industry by forcing down prices, bargaining for higher quality or more services, and playing competitors against each other. This all appears at the expense of the industry profitability.

A buyer group is powerful if the following circumstances hold true (Porter, 1980, p. 24-27):

- It is concentrated or purchases large volumes relative to seller sales;
- The products it purchases from the industry represent a significant fraction of the buyer's costs or purchases;
- The products it purchases from the industry are standard or undifferentiated;
- It faces few switching costs;
- It earns low profits;
- Buyers pose a credible threat of backward integration;
- The industry's product is unimportant to the quality of the buyers' products or services;
- The buyer has full information.

### **Bargaining power of suppliers**

Suppliers can exert bargaining power over participants in an industry by threatening to raise prices or reduce the quality of purchased goods and services. Powerful suppliers can thereby squeeze profitability out of an industry unable to recover cost increases in its own prices. The conditions making suppliers powerful tend to mirror those making buyers powerful

A supplier group is powerful if the following apply (Porter, 1980, p. 27-29):

- It is dominated by a few companies and is more concentrated than the industry it sells to;
- It is not obliged to contend with other substitute products for sale to the industry;
- The industry is not an important customer of the supplier group;
- The suppliers' product is an important input to the buyer's business;
- The supplier group's products are differentiated or it has built up switching costs;
- The supplier group poses a credible threat of forward integration.

## **4.1.2 Definition of strategic groups**

Industry structural analysis can be used at a greater depth than the industry as a whole. In many industries, companies have adopted very different competitive strategies and have achieved differing levels of market share. Some companies persistently outperform others in terms of rate of return on investment capital. This part extends the concepts of structural analysis to explain differences in the performance of companies in the same industry. At the same time it provides a framework for guiding the choice of competitive strategy, which will be used by the development of the business model as well (Porter, 1985, p. 126-127).

For this analysis it is essential to distinguish the different strategic groups that exist within an industry. Porter defines a strategic group as "the group of companies in an industry following the same or a similar strategy along the strategic dimensions" (Porter, 1980, p. 129). Strategic dimensions relate to both fundamental options and the important segments of an industry. An industry normally has companies with a number of different though internally consistent combinations of dimensions. Companies will thus choose one segment or a combination of segments, on the basis of which they try to build a

competitive advantage. The strategic dimensions of a particular company should usually form an internally consistent set.

## 4.2 Instant messaging industry analysis

The instant messaging industry is analysed in two steps. Firstly the instant messaging industry is analysed as a whole and secondly the differences within the instant messaging industry are analysed.

### 4.2.1 Competitive forces analysis

#### Threat of entry

New entrants to the instant messaging industry might encounter these entry barriers.

- *Economy of scale* - The instant messaging industry is an economy of scale in the sense that it does not require much investments when the number of users increases. An entrant can take profit out of existing communications infrastructure. This is also the case for mobile instant messaging, using protocols like WAP. The instant messaging service provider only has to provide instant messaging and presence servers and has to provide the application. The rest of the infrastructure (usually the Internet) can generally be used immediately.
- *Product differentiation* - When a new entrant has no brand identification and customer loyalties, differentiation creates a barrier by forcing entrants to spend heavily to overcome existing custom loyalties. This barrier is rather high in the instant messaging industry. The current leading proprietary messengers from AOL only provide access to their standards by license. The leading players all have a rather high differentiation of their instant messaging products.
- *Capital requirements* - The capital requirements for the infrastructure and applications is rather low. However, the required marketing investment can be high when the entrant does not have direct access to the customers (e.g. by means of a portal).
- *Access to distribution channels* - An entrant can gain market acceptance of its product by instruments like price-breaks, advertising and co-operation with a distribution channel. Price breaks are almost impossible, since instant messengers are already available for free. General advertising would create huge costs when the user group is not specific. For these reasons the access to a distribution channel is of major importance to reach a big market. A portal forms the most likely way to reach the customers for promoting instant messaging. The world-leaders and the world-challengers AOL, Yahoo and MSN (See Figure 4-2) already provide instant messaging applications to their portal-visitors. Together they supply the major part of the instant messaging market.

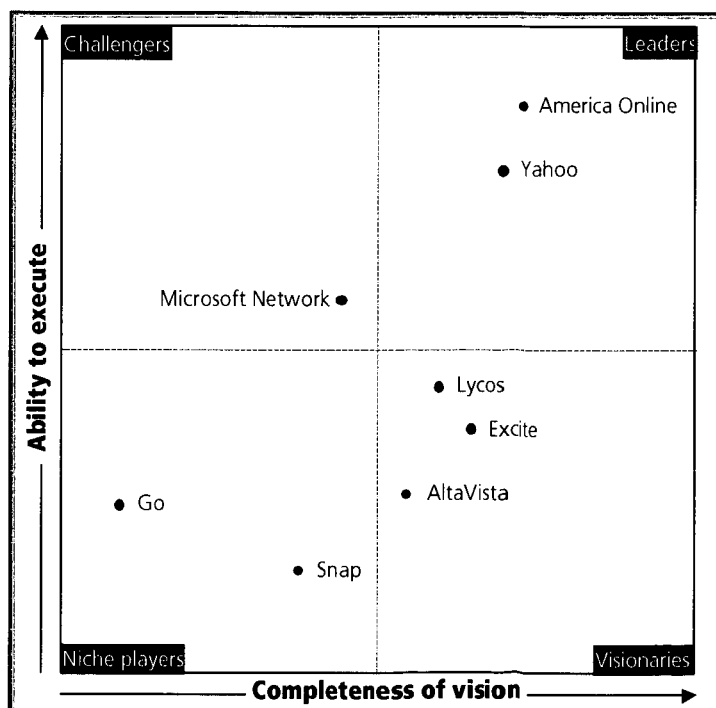


Figure 4-2 Strategic positions of leading portals (Smith et al., 2000)

- *Switching costs* - These one-time costs face the buyer of switching from one supplier's product to another's. These costs do not concern the residential buyer, since they obtain instant messenger clients for free. Business-related instant messaging services often require a purchase or subscription. That market, however, is also under pressure of free instant messengers that support business solutions. The switching costs for the buyer are rather non-financial, due to the fact that the user might lose old contacts on proprietary incompatible systems.
- *Cost disadvantages independent of scale* - A big disadvantage independent of scale is the existence of proprietary standards. The two proprietary standards of America Online (AIM and ICQ) together are pretended to have a 90% market share (see 'High industry growth' at page 44). To be able to use their AIM standard, a license is required. It is not hard for a company to make their own instant messaging applications, for example using open source software of the Jabber platform. But when it is not compatible with a leading patented defacto standard it will miss the required critical mass of users. When the CPIM based standards finish the standard tracks by the end of 2001 and AOL is going to support it, these cost disadvantages will disappear.
- *Government policy* - The only instant messaging specific regulations by government are made by the Federal Communications Commission (FCC) of the United States. It requires AOL to open up their IM-standard, when they want to integrate video services (see 'Unbalanced competition at page 43). In general, several governments promote start-ups in the ICT field to push these developments in their country. Both issues lower the entry barrier of new entrants. If government decides to stimulate such innovations, it would seem important to clear away barriers that impede the development, according to Teece (Teece, 1986, p.304). Privacy is also an issue of the government, but not investigated in this research.

### **Intensity of rivalry among existing competitors**

Rivalry occurs because one or more competitors either feels the pressure or sees the opportunity to improve position. In most industries, competitive moves by one company have noticeable effects on its competitors and thus are mutually dependent.

The intensity of rivalry results out of these interacting structural factors:

- *Unbalanced competition* - The instant messaging industry counts about 25 world players that are dominated by the market leader AOL. America Online performs a (free) price leadership with their instant messengers AIM and ICQ, which they can afford through their other incomes. Other companies seem not able to compete to this dominance and are slowly getting out of focus. CMGion announced to its 8 million PowWow users that their service, which they bought from Tribal Voice, will terminate:

"Please be advised that PowWow will no longer be supported as of January 19, 2001. The PowWow instant messaging product, services and communities will not be available following that date. Please take the time to find a new service before January 19, 2001, to ensure no disruption in your instant messaging, chat and community services. Thank you for using CMGion's PowWow instant messaging product and services."

One of the reasons that they supply for this decision is: "Given the barriers associated with AOL's market dominance, the company cannot continue to support it from a business perspective". Their other IM-service iCaster has also shut down. Both the originating companies, Tribal Voice and iCast, were two of the nine initiators of the IMUnified consortium to reach interoperability

The merger between America Online and Time Warner increased the discussion about their instant messaging monopoly.<sup>75</sup> This merger is accepted by the European Commission<sup>76</sup> of the European Union (EU) and the Federal Trade Commission (FTC)<sup>77</sup> of the United States on December 14, 2000. The Federal Communications Commission (FCC) of the United States, approved this merger with conditions on January 11, 2001. FCC commissioner Ms. Tristani has fought for opening-up AOL's instant messaging to the competition. The final merger conditions include this instant messaging requirement:

"Given AOL Time Warner's likely domination of the potentially competitive business of new, IM-based services, especially advanced, IM-based high-speed services (AIHS) applications such as videoconferencing, the Commission concluded that a condition to prevent that merger-specific harm was merited. AOL Time Warner may not offer an AIHS application that includes the transmission and reception, utilizing a names and presence directory (NPD) over the Internet Protocol path of AOL Time Warner broadband facilities, of one- or two-way streaming video communication using NPD protocols – includ-

<sup>75</sup> **AOL yields little on IM** - June 18, 2000 - <http://www.zdnet.com/zdnn/stories/news/0,4586,2589541,00.html>

<sup>76</sup> **Commission gives conditional approval to AOL/Time Warner merger** - October 11, 2000 - <http://europa.eu.int/>

<sup>77</sup> **FTC approves AOL/Time Warner merger with conditions** - December 14, 2000 - <http://www.ftc.gov/opa/2000/12/aol.htm>

ing live images or tape – that are new features, functions, and enhancements beyond those offered in current offerings such as AIM 4.1 or ICQ 2000b, unless and until AOL Time Warner has successfully demonstrated it has complied with one of the following grounds for relief..." (Furchtgott-Roth & Powell, 2001).

The following grounds for relief are three options in which AOL Time Warner can file a petition. This petition should prove server-to-server interoperability or prove that the mentioned advanced services are no longer of public interest, convenience or necessity.

The FCC statement does not require interoperability on all the current services of AIM and ICQ, which includes text and audio conferencing, file sharing, email-services, directory services, etc. It only concerns videoconferencing using name and presence directory on 'their' broadband communications facilities. These video services are with the current lacking quality of service not yet important. Further, the requirements expire in five years, which means that AOL Time Warner can start proprietary standard video services by January 12, 2006.

For these reasons, the statement is of no use for the current industry, but it indicates that the FCC recognises competition problems in the instant messaging industry.

The unbalanced competition of AOL Time Warner keeps the intensity of rivalry very high for all the other companies.

- *High industry growth* - The number of users seems to be a very confident asset for instant messaging companies. These numbers are hardly provided by the companies and if so, the data often seems to be invalid. AOL in particular publishes user data that is not indicating actual usage, but indicates registered users. Due to this fact, comparisons with wrong data has been made in the media (see Figure 4-3). These comparisons caused AOL to be positioned as a strong monopolist and was a lead to invoke governmental organisations to analyse this industry (as described above).

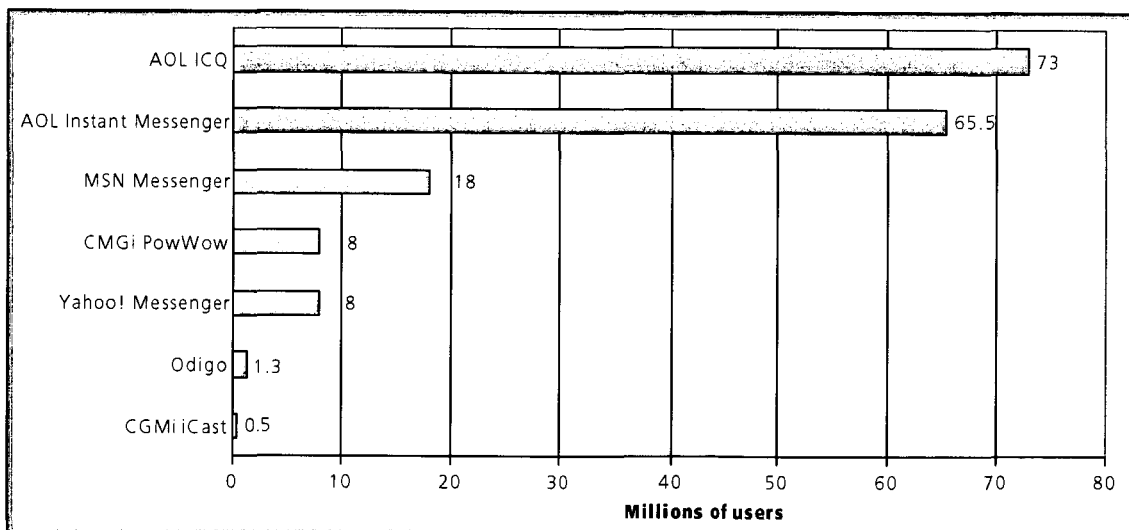


Figure 4-3 The number of registered users of the major IM-providers as published by Wall Street Journal<sup>78</sup>

The published registered user numbers often includes all the user registrations since the beginning of the service. This includes users that registered several times (e.g. new computer installation) or stopped using the service. To get a real impression of the instant messaging usage, the FCC based their investigation for the AOL Time Warner merger on Media Metrix data. Media Metrix provides statistical data about actual instant messaging users, which they define as "different individuals that accessed the instant messaging application within one month" (see Figure 4-4).<sup>79</sup>

<sup>78</sup> **FCC wants AOL to open IM** - September 13, 2000 - The Wall Street Journal

<sup>79</sup> Media Metrix facts as published via Microsoft and via: **Ex parte letter from AOL/Time Warner to the FCC concerning instant messaging** - December 9, 2000 - <http://www.fcc.gov/CSB/aoltw/imletter.pdf>

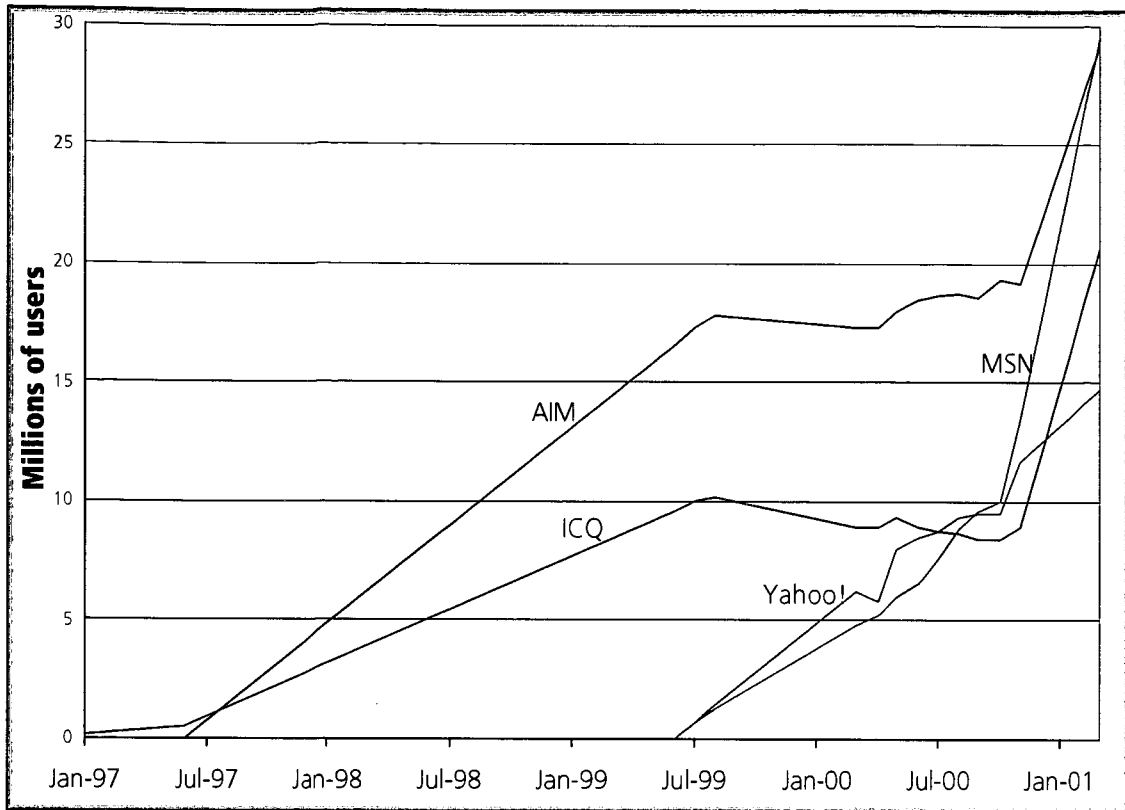


Figure 4-4 Actual user growth development of the IM market leaders (based on Media Metrix data)

When observing this graph, the initial domination of AOL (AIM and ICQ) is clear. However, since February 2001, Microsoft Messenger has achieved the largest user base and is still shows the fastest growth. AOL's market share among the leaders has declined from 100% in June 1999 to 53% in February 2001.

The Media Metrix measurement of February 2001 showed that almost half of Microsoft users came outside the United States compared to only 15 percent of AOL users. These means that the European market share of Microsoft is even higher.

A commonly accepted method for determining the user value of a communications network is Metcalfe's Law. The law indicates that the user value (u) equals to the square of the network size (n):

$$u = n^2$$

This unscientific law, however, has been neglected by Metcalfe himself in his statement "user equipped to communicate with 50 million other users might not have all that much to talk about with each of them ... systematic network value rolls after some N".

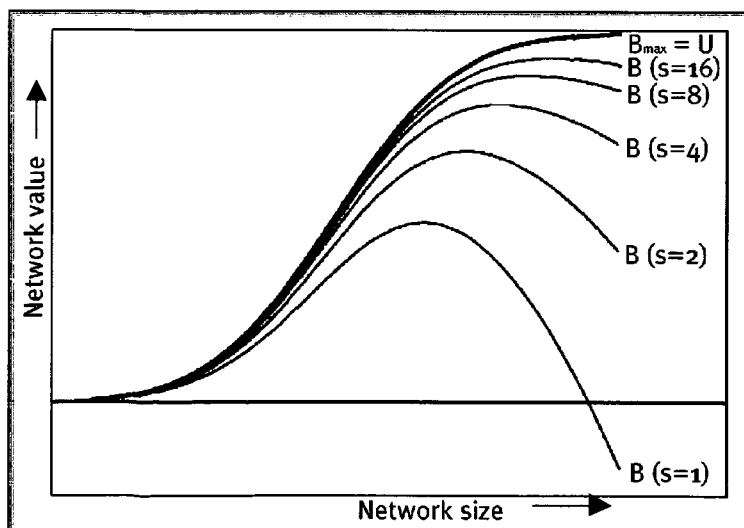


Figure 4-5 The network value (Benefit B) of a communications network vs. the network size (users) and the effect of its scalability (s)

When combining this with the required critical mass, Windrum and Swan indicate that this law should be presented with the classic S-shaped diffusion curve as in Figure 4-5 (Windrum & Swan, 1999, p. 10). After a critical size, the network value might even decrease when the system is not scalable. The users might find difficulties in finding each other and the network quality might fall.

It is clear that the instant messaging industry has emerged rapidly. After the start of the service by the end of 1996, the service has reached about 95 million actual users world-wide<sup>80</sup> in 2000. The leading players are achieving critical mass and this growth can be expected to continue until instant messaging has become a commodity. E-mail, for example, has reached that point with about one billion world-wide e-mail users nowadays.

This rapid industry growth ensures that companies can improve results just by keeping up with industry (Porter, 1980, p. 18). This decreases the intensity of rivalry.

- *Low fixed costs* - As instant messaging uses the existing Internet infrastructure, the fixed costs are mainly limited to the messaging servers. These low fixed costs decrease the intensity of rivalry. However, the term 'low' is very subjective, since the most companies make no direct revenue from their instant messaging service. The impact of this factor on the intensity of rivalry is therefore also related with the value added. When the instant messaging providers are able to earn enough with their service, the low fixed costs will lower the intensity of rivalry due to the low cost pressure.
- *Lack of differentiation or switching costs* - As the instant messaging service is getting perceived as commodity, choice by the buyer is largely based on price and service. This service is still free and therefore the service differentiation is the most important factor. Currently, AOL's ICQ has by far the most differentiation. It enables voice calls, conferencing, sending SMS, network games etc. The other instant messengers also started to implement voice calls. Since the differentiation and switching costs are limited, the intensity of rivalry is increased.
- *Capacity augmented in large increments* - In the instant messaging market, the capacity is not incremented in large amounts. For increasing the user capacity, only new servers are required. These investments are relatively low and therefore have a minor negative impact on the intensity rivalry.
- *Diverse competitors* - Company strategies regarding the regular residential user are not so diverse. The leading players do not obtain direct incomes from the users on the PC platform. The mobile platform gives an other trend. AOL and Yahoo both unveiled two-way paging devices designed for access to their instant messaging networks and email services. After purchasing the device, the user has to pay a monthly subscription fee (see §5.2.3).  
For the business user the diversification in strategies is larger. There are for example companies that focus on a specific market (e.g. collaboration in offices, Customer Relationship Management, conferencing). The pricing policy varies from direct input streams (e.g. subscription or product buy) to indirect streams (e.g. advertisements or e-commerce via IM). The company background plays a major role as well. An Internet service provider (like AOL) uses IM to promote its ISP-services, while a small specialised IM-company uses it as core activity. The free service approach makes instant messaging dependent of horizontal and/or vertical integration to add value to products. Other strategies than differentiating by product integration are difficult to maintain in a profitable way. Only highly specialised markets are able to maintain direct revenues. More about the company strategies within the market is described in §4.2.2.
- *High strategic stakes* - The previous factor already mentioned the power of the AOL strategy on the market. AOL has a high strategic stake which destabilises the market. They seem to find great importance in achieving success in this industry, however it does not provide them yet with direct income. Sign of this is also their buy-out of Mirabilis ICQ (Case & Pittman, 2000). The high strategic stake of AOL in the market increase the intensity of rivalry.
- *Low exit barriers* - Instant messaging does not require specialised assets. The used IM-servers can also be used for other targets. The fixed costs of exit would have impact on the labour agreements. However, that would be technicians for a major part which are easily able to function on other computing departments. The strategic interrelationships depend on the focus of instant messaging in the company. When this service is integrated with other services of the company, it might have a direct negative effect on the other business units. There will also be emotional barriers, but these are hard to estimate. The government and social restrictions are rather low, since the number of people solely working in the IM-industry is not so large. Since instant messaging is an international market, regional im-

<sup>80</sup> Media Metrix takes its measurements in a selection of countries that covers 85% of the world-wide Internet users



pacts will be low. In general can be concluded that the exit barriers are low, which decreases the intensity of rivalry.

**Pressure from substitute products**

Substitute products that are subjects to trends improving their price-performance trade-off with the industry's product:

- *E-mail* - E-mail forms a substitute in the way that it enables the sending of text messages to a recipient. It does not have a presence feature and has a less instant character. E-mail forms a better platform for sending bigger messages. For sending attachments, e-mail forms a substitute in the sense of that emails with attachment always arrive. The current instant messengers are able to send files to a recipient only when that recipient is available. This is caused by its peer-to-peer (P2P) character. The advantage of this P2P connections is that also very large files can be sent, which is often not allowed by email servers. This P2P connection enables a lot of communications services which are not possible with email, such as chat/conferencing, direct customer support, gaming, etc. For these reasons is email only a substitute for a part (sending big or offline messages) of the possibilities of instant messaging.

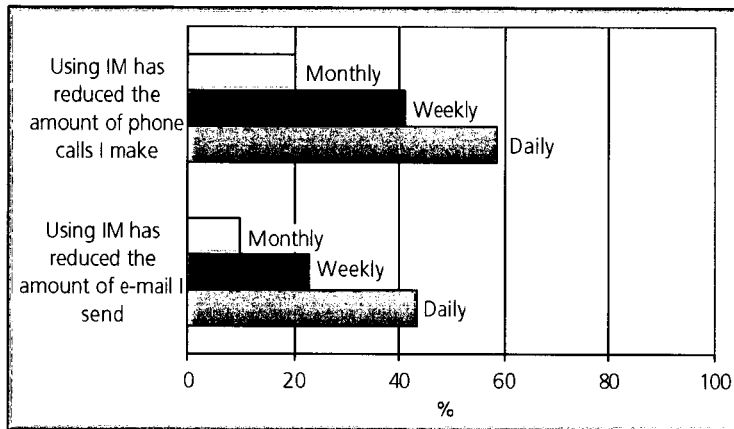


Figure 4-6 Results from instant messaging survey from Forrester Research

According to a Forrester Research survey is 43% of IM-users sending less daily e-mail (see Figure 4-6).<sup>81</sup> This is caused by the overlap (small text messages) of the technologies. Forrester also foresees that the business usage of email will remain 100%, while instant messaging and web conferencing will be the strongest growing collaboration tools (Radjou et al., 1999), see Figure 4-7. The major focus of the technologies is different and therefore are email and instant messaging able to coexist very good.

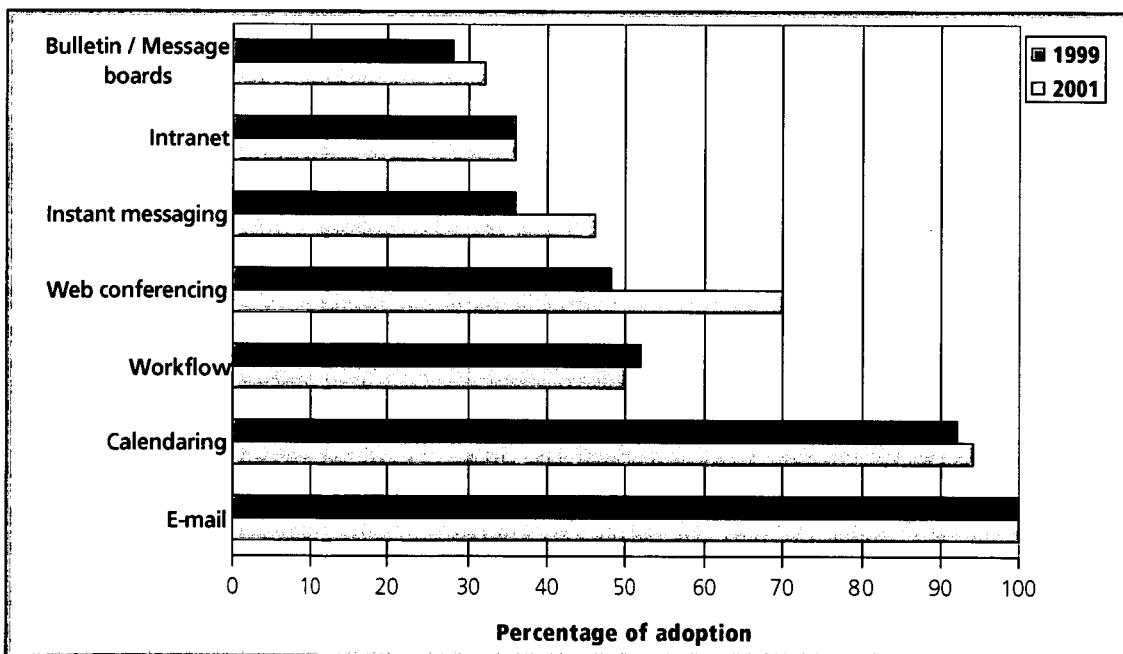


Figure 4-7 Percentage of collaboration tools adoption. Interview results of 50 fortune 1000 companies by Forrester (The exact data that is used for creating figures can be found in appendix A)

<sup>81</sup> IM impacting wireless PDQ (pretty darn quick) - January 10, 2001 - 3G Mobile (Forrester survey quotation)

- *Telephone* - Telephony is substitute in the way that it is instant. A telephone conversation is easier, especially when it is a large discussion. Instant messaging is instant as well, but is not disturbing the recipient as aggressive as a telephone does. It gives users a little more time to think or to do other things meanwhile. Besides, instant messaging has a lot functionality for collaborating. When people are discussing a document, instant messaging allows sending or simultaneous changing of a document. Forrester Research found that 59% of the daily IM-users make fewer daily phone calls since using IM (see Figure 4-6).<sup>81</sup>

Substitute products that are produced by industries earning high profits:

- *SMS*; When regarding the mobile phone industry, SMS is a substitute that has an identical character. The most important difference is that it does not have a presence feature. SMS, surprisingly, has become a big success in Europe and is rendering about 10% of the total revenue of telecommunications providers. During December 2000, fifteen billion SMS-messages were sent globally. The mobile phone user in Europe usually owns a GSM and is therefore able to use SMS. The rise in short messaging services provides positive evidence that the ambitious visions of mobile data growth will be realised.<sup>82</sup> IDC, GartnerGroup and Herschel Shostek expect a continuation of the strong subscriber growth (see Figure 4-8).<sup>83</sup> This expectation is shared with the GSM Association, which expects 200 billion messages to be sent during 2001.<sup>82</sup>

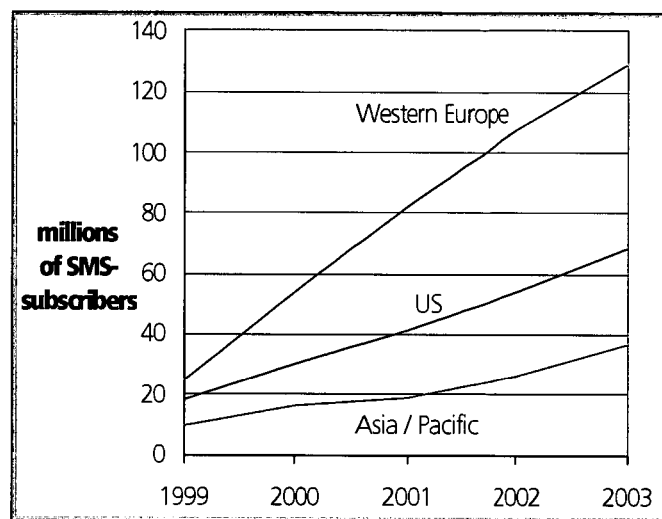


Figure 4-8 Number of SMS subscribers in millions

However active IM-users use less email and telephony communications, almost two-thirds of these users contact more people more frequently since adopting IM.<sup>81</sup> Email and telephony are only substitutes for a small part of the instant messaging capabilities. SMS forms a better substitute, since it is also specialised for sending small messages. It however does not have so many capabilities as instant messaging has.

### Bargaining power of buyers

The bargaining power of buyers (consumers as well as companies) in the instant messaging industry is influenced by these factors:

- *The buyer group is not concentrated and purchases small volumes relative to seller sales* - Because instant messaging focuses on the end-user market, buyer groups are more differentiated and only buy small volumes. At the moment, the group of business users is relatively small. These factors lower the bargaining power of the buyers. When companies form a bigger part of the customers in the future, the buyers will become more powerful.
- *The products they purchase from the instant messaging industry represent a small fraction of their costs or purchases* - Instant messaging applications are relatively cheap (or free) and also the more specific applications like collaboration tools form just a small part of the buyer's costs. This lowers the power of the buyer.
- *The products it purchases from the industry are differentiated, but not standard* - As stated in §3.3, there is not yet an open accepted standard. Open standards like Jabber do not have enough users. The

<sup>82</sup> More than 200 billion GSM text messages... - February 12, 2001 - [http://www.gsmworld.com/news/press\\_2001/press\\_releases\\_4.html](http://www.gsmworld.com/news/press_2001/press_releases_4.html)

<sup>83</sup> Trends in short messaging and instant messaging - November 30, 2000 - T.J. Lorello (TCS) at the Pulver Presence and IM Conference

mostly used standard is America Online. Buyers can easily switch to other IM service providers which use the standard of AOL, like Yahoo and Lycos. These providers pay license fees to AOL. Since the user has no other alternatives which are compatible, the user power lowered. All major instant messaging have mentioned to use the IMPP-standard when it becomes available. When this really becomes the case (including AOL!), the user becomes much more power. Most instant messaging providers provide differentiated services, but the impact of a standard is much higher. When instant messaging is standardised, the differentiation of the services will become much more important.

- *It faces few switching costs* - Switching costs are not common in the instant messaging market. These only appear, when users are buying specific instant messaging devices, such as the AOL Mobile Communicator. For normal PC- or WAP-based applications switching of provider is free at the moment. These low switching costs increase the power of the buyers.
- *It earns low profits* - There is yet not much known about the profits the buyers make with instant messaging. This group of companies is still rather small and often are the profits hard to measure (e.g. more efficient collaboration using instant messaging). Since the costs are low as well, the low profits are a smaller issue for the user.
- *Buyers pose a credible threat of backward integration* - Since the technology of instant messaging is not complicated, the probability exists that the potential buyers will make their own instant messaging application. Lots of users already create their own application using the free Jabber developers platform (see §3.3.2). Since there does not yet exist a common standard, it is not interesting for companies to do this. When the IMPP-standard is openly available, the threat certainly exists that bigger companies develop their own application. Right now the influence on the buyer power will be low, but it can increase the buyer power, when the standardisation is finished.
- *The industry's product is unimportant to the quality of the buyers' products or services* - The quality of the buyers' product is not expected to change directly by instant messaging. When instant messaging will be used for mission critical applications this might change. As long as instant messaging is not an essential application for the buying companies, the buyer power will remain higher.
- *The buyer has full information* - The buyers are good informed where to find the free instant messaging services. Because the users are used to the free character of the applications, it might be hard to start asking money for it. This information gives the buyers more buyer power.

### **Bargaining power of suppliers**

The bargaining power of suppliers (e.g. instant messaging servers, software) in the instant messaging industry is influenced by these factors:

- *It is not dominated by a few companies and is not more concentrated than the industry it sells to* - There are lot's of servers available that are able to perform as an instant messaging server. Since the IM-applications are often programmed by the company itself, they can often choose which operating system will be used. For these reasons, the power of suppliers is low. Only when the instant messaging application has to be bought (e.g. from AOL), there exists a supplier domination.
- *It is not obliged to contend with other substitute products for sale to the industry* - The suppliers (hardware and software) do not have to contend with substitutes in this industry. This makes the suppliers more powerful.
- *The industry is not an important customer of the supplier group* - Since the computer server market is huge, the instant messaging servers (and software as well) is just a small part of suppliers market share. This makes the suppliers more powerful.
- *The suppliers' product is an important input to the buyer's business* - The used computers and software are important for the buyers. Their capacity determine the usability of the instant messaging service. This gives the supplier more power.
- *The supplier group's products are not differentiated, but it has built up switching costs* - The computer market is not differentiated. There are lots of suppliers which can provide the same systems. There exist switching cost, since a change requires a new investment. Especially the fact that there is not much specific differentiation in the suppliers market, lowers the power of the suppliers.

- *The supplier group poses a credible threat of forward integration* - There exists a threat that instant messaging will be integrated in the operating systems. This happened also with the Internet Explorer of Microsoft and it will be easy for them to integrate their instant messaging application in their operating system. When the new standard is adopted, this could be a threat that a player like Microsoft will be able to take the current position of America Online.

### Summary

The external forces on industries are subject to change. Especially the developments in the instant messaging industry, like standardisation, will probably have a big impact on the forces within the industry. Figure 4-9 shows the power of the forces in the current IM-industry and also makes a prediction of the forces in the instant messaging industry of 2002. The year 2002 is chosen for the forecast, since the IMPP standard will have reached the market by then. In this case it is assumed that there is a major adoption of the new IMPP-standard (which also assumes adoption by America Online). All the leading players have announced to implement the IMPP-standard.

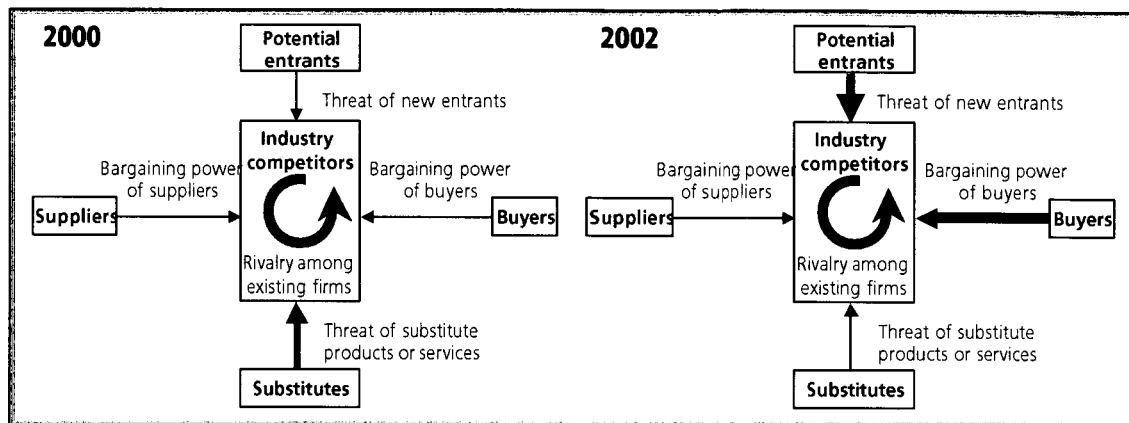


Figure 4-9 The power of the five forces in the instant messaging market for 2000 and a forecast for 2002

The main causes of the intensity of the forces are:

#### **Threat of entry**

The biggest barriers of entry are the access to the defacto proprietary standard of AOL (product differentiation) and the access to distribution channels, e.g. portals. This barrier will decrease when the IMPP-standard will be published and AOL will support it. The threat of new entrants is the inverse of the barriers. This means that the threat of new entrants in the market will increase by the adoption of the new standard.

#### **Intensity of rivalry among existing competitors**

The factor with the most influence is the 'unbalanced competition', since it also has a big influence on the other factors. It causes a very strong (almost unfair) competition and thus the rivalry is high. This unbalanced competition is a determinant that is able to change due to probable interventions of trade commissions. When the competition becomes more balanced in the future, the rivalry will remain high when the revenues of the instant messaging market remain low.

#### **Pressure from substitute products**

Email and telephony are only substitutes for a small part of the instant messaging capabilities. SMS forms a better substitute, since it is also specialised for sending small messages. It however does not have so many capabilities as instant messaging has. Instant messaging is expected to fill in a new niche, which has good opportunities to become a commodity.

#### **Bargaining power of buyers**

The bargaining power of the buyers is still low. This is mainly caused by the missing of a standard and the minor importance of instant messaging to the buyers' business. When the IMPP-standard will be overall accepted, the bargaining power of the users will increase a lot.

#### **Bargaining power of suppliers**

Suppliers have a minor effect on the rivalry. There are not so many supplies required and there is also a lot of choice between the suppliers.

The industry competition is already high and will remain high in the future. The buyers and new entrants will achieve more power when the new standard will have a major adoption. These forces indicate that it will be a battle to achieve the customers and that the pressure on the revenues will increase. Differentiation will be a key-issue to survive in that battle.

#### 4.2.2 Strategic group analysis

The business model analyses of the next chapter require strategic groups of comparable companies to be defined. These groups are defined after having studied the companies that play a role in this industry. These strategic groups are analysed regarding their strategic dimensions to provide more insight.

##### Instant messaging industry survey

The industry analysis is based upon a survey. Companies that provide instant messaging services were analysed regarding their products (see Appendix B).

The information is gathered by field research. The companies that provide instant messaging services were found via instant messaging reviews, software directories and news publications. Those products were further analysed by observing the software (whenever possible) and the corporate website.

For the survey, these indicators were found to be important and were traced for every company:

- Number of subscribers, distinguishing registered subscribers and actual subscribers;
- Compatibility with other messengers and VoIP services;
- Availability of server software, enabling a corporate IM-server;
- User focus of the service;
- Differentiation by features, distinguishing the features:
  - Text, voice and video instant messaging;
  - SMS messaging;
  - IM-access via WAP or SMS;
  - E-mail client and e-mail notification;
  - Text-to-voice;
  - Conference or chat sessions;
  - Sending pictures, sounds and greeting cards;
  - Changing skin and sounds of the messenger;
  - Notification of information (e.g. news, stock quotes and weather);
  - Retrieving users via directory service;
  - Browsing together (co-browsing);
  - Application, scheduler and file sharing;
  - Encryption and authentication;
  - Integration in the system (e.g. Explorer and Outlook).
- Price per client.

The differentiation by features is given a weight scale. The weight values are subjectivity to the type of use. In this survey, every weight factor is set to '1', because they are only used to give an idea of the extensivity of the services. This is indicated with a differentiation factor that is created by multiplying the features with their factors and summarising these outcomes. For other investigations, the weight factors can be changed in value according to their importance in application.

##### Definition of the strategic groups

After analysis of the found instant messaging services, several strategic groups are defined. This definition and selection is based on their technology and the manner that it gets in contact with the users.

These four strategic groups are defined:

- **Internet portals** - Companies in this group provide instant messaging services to the visitors via their web portal. These portals are meant to obtain a lot of visitors to increase advertising revenue. These portals are used frequently for their search functionality or their up to date content, like news (see §4.2.3);
- **Internet service providers** - Companies in this group provide instant messaging services to their ISP-subscribers. Besides Internet access, these companies provide other Internet based services (see §4.2.4);
- **Mobile Internet service providers** - Companies in this group provide Internet services to their subscribers using mobile networks. Instant messaging is one of these Internet services (see §4.2.5);

- **Non-portal service providers** - Companies that provide instant messaging services, but do not have a strong customer access through a portal are selected in this group (see §4.2.6). This is a rest group that can be sub-divided further in:
  - **Software providers** - Companies that have software as main product, but extended the software with an instant messaging service;
  - **VoIP service providers** - Companies that provide instant messaging as extension of their Voice over IP services;
  - **Other IM-services providers** - This is a final rest group that contains companies that have instant messaging as sole product. Examples are: niche players, start-ups and programming hobbyists.

**Strategic dimensions of the strategic groups**

For the analysis of the strategic groups, strategic dimensions are chosen that provide a distribution in which distinguishes the several groups. The dimensions were chosen after having observed common used dimension (e.g. those defined by Porter and Mintzberg).

Four dimensions proved to distinguish between the groups:

- **Product orientation** - The product orientation defines the type of customer market. Is the company approaching all kind of customers or is it specialising on a specific market?
- **Geographical coverage** - The geographical coverage defines the location range of the product. Is the product nationally or globally available?
- **Pricing policy** - The price policy defines the manner that the user pays for the service. Is revenue created via indirect pricing (free service via advertising) or via direct pricing (buy product, subscription, usage pay, etc.)?
- **Differentiation** - The differentiation of the service indicates the extensity of the features. It corresponds to is the service only providing text messaging or is a full range of features available?

A rough placement along these dimensions is indicated in Figure 4-10. The first figure indicates the customer markets of the groups by setting off the product orientation against the geographical coverage. The second figure gives an impression of the services by setting off the pricing policy of the strategic groups against the differentiation.

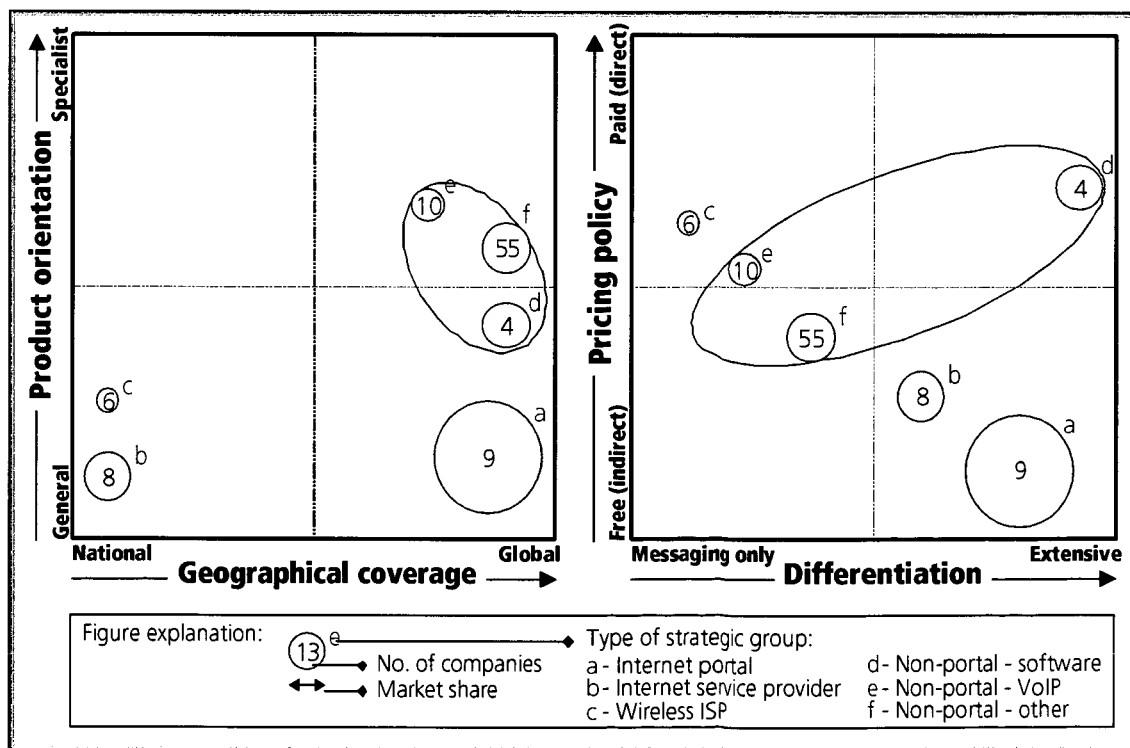


Figure 4-10 Strategic groups within the instant messaging industry

The figure is based on strategic maps (Porter, 1980, p. 131). The dimensions are placed among the axes. Strategic groups are indicated with circles. The size of the circles indicate the market share of the strategic group. The number within the circle mentions the number of companies of the survey that are

placed in that group. The strategic group 'non-portal' is indicated with dotted lines. The size of that circle is not meant to indicate its market share, but to join its sub-groups.

Based on the survey, the strategic groups and their companies are explained more extensive in the following paragraphs.

### 4.2.3 Internet portals

Internet portals provide several kind of services to their visitors. However, Internet portals that provide instant messaging seem to have a search engine as main functionality. The most visited portals are MSN, Yahoo and AOL/Netscape.

The Internet portals under review were all focused on the global market and on a broad range of customer types, however mainly residential users (community usage). Their instant messengers are very extensive, containing most of the current available features. All portals provide the instant messengers for free to bind the visitors to their portal/messenger and to obtain advertising revenue. More about their business models can be found in §5.2.1.

The leading players MSN, Yahoo and AOL all have messengers based on proprietary incompatible protocols. They made their messengers for multiple platforms (see also §3.3.3).

### 4.2.4 Internet service providers

Internet service providers (ISP's) provide access to the Internet for computer users. This access can be obtained via a PSTN-, ISDN- or cable modem. The group of Internet service providers is led with distance by AOL. An emerging ISP is Microsoft, who integrated its ISP services in its Internet Explorer. However, Microsoft is not automatically providing an instant messenger like AOL is doing. The customers of the ISP's (except AOL) have to obtain their instant messenger via the Internet portal of the ISP.

However AOL and Microsoft are global players in this industry, a user always calls locally to its ISP. Therefore the ISP industry is very national-based. The product orientation of the ISP is very broad, providing access to residential as well as business customers. The differentiation of the messengers is in general lower than the Internet portals. The instant messaging service is provided for free, but the online time forms a direct income via the telecommunications operator. More about their business models can be found in §5.2.2.

### 4.2.5 Mobile Internet service providers

Mobile telephony reached maturity, but mobile Internet is still an emerging market (see Figure 4-11). The coming years, the mobile Internet will be driven by faster communication technologies like GPRS and UMTS. These technologies allow a packet switched connections that enable an 'always online' service.

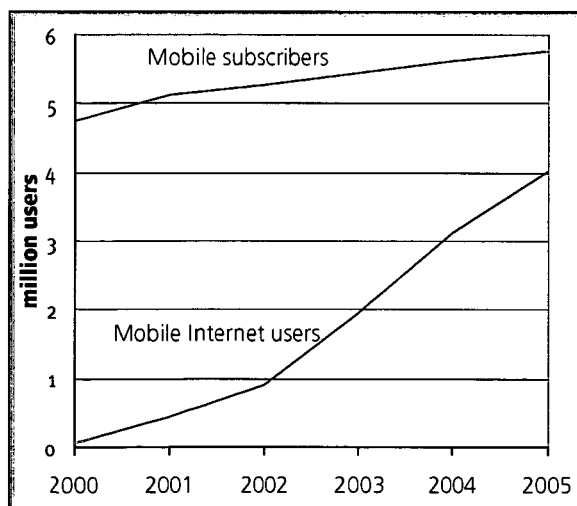


Figure 4-11 Forecast mobile Internet usage in Switzerland (Nordan et al., 2000)

Since mobile Internet is new, instant messaging is new for mobile ISP's as well. For usage estimates of instant messaging, the big success of SMS (Figure 4-8) and the mobile Internet (Figure 4-11) are often combined.

There are two developments regarding instant messaging. Firstly, the leading instant messaging service providers from the Internet have introduced instant messaging services for American mobile networks (see also §5.2.3). Secondly, mobile operators introduce mobile instant messaging services themselves, like Swisscom Mobile is doing with 'Z the friendZone' (see §3.2.4).

Although the instant messaging providers from the Internet world already reached critical mass, they keep a disadvantage not to have access to location information. This information is only accessible for mobile operators. These mobile operators are able to combine location information with presence information regarding instant messaging. This is a point where the IM-provider and the mobile ISP might meet, taking advantage of the user-base of a big IM-provider (e.g. AOL) and the location information of a mobile ISP (e.g. Swisscom Mobile).<sup>84</sup>

The availability of presence is already built on the preferences of the user itself. Privacy issues should not be a problem, since the user controls this information and the current messengers on the Internet show no problem as well. The continuous availability of location information, however is much more privacy sensitive. The impact of this is an issue for further research.

Mobile ISP's are companies that are focused on their national market. They have a broad customer focus. Due to the limitations of the mobile devices, there are not yet much features available apart from text messaging. The pricing is often based on SMS-messaging, but other payment possibilities might be applied as the technologies evolve. More about their business models can be found in §5.2.3.

#### 4.2.6 Non-portal service providers

Due to the bigger deviation within this group the sub groups 'Software providers', 'VoIP service providers' and 'Other IM-services providers' are treated separated. More about their business models can be found in §5.2.4.

##### Software providers

Companies that extend their existing software with instant messaging services are starting to appear. The growth of instant messaging in business usage is already indicated in Figure 4-7 on page 47.

This development is clear in collaborative software. Lotus Sametime, for example, combines conferencing, application sharing and instant messaging. Microsoft integrated instant messaging in their Exchange mail server and in the Windows ME operating system. Future integration will take place with Office XP (see §0). Typical for business usage is that the companies prefer an internal instant messaging server to keep the network secure and to disallow private chats. Inter-office communications via instant messaging is already used in 23.5% of interviewed companies, according to a TechRepublic<sup>85</sup> survey (see Figure 4-12). Workflow management takes another 5.4%. The server software allows functioning without an Internet connection as well.

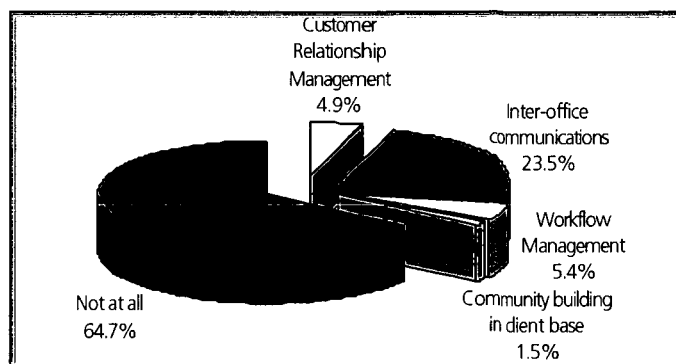


Figure 4-12 IM-usage in organisations<sup>85</sup>

<sup>84</sup> You've got...m-commerce - December 11, 2000 - The Wall Street Journal

<sup>85</sup> How is your organisation using instant messaging technology? - April 2, 2000 - TechRepublic.com



Another type of IM-serving software providers are those that provide Customer Relationship Management (CRM) solutions. This specific usage accounts for 4.9% in the TechRepublic survey.

These companies use instant messaging to get in contact with the customer (e.g. helpdesk or sales). To pass by compatibility and authorisation issues, these companies often use web-based (Java) IM-clients. Common features are text chat with website users and simultaneous browsing (co-browsing) on the Internet to demonstrate features seem.

The mentioned available world-wide via retail or the Internet. The usage market is rather specific, like collaboration and CRM usage. For that reason, the features are also more differentiated, like file sharing, conferencing, file transfer, security, white boarding, etc. The messengers tend to be free, but the server software has to be bought.

### **VoIP service providers**

Voice over IP providers are merging with instant messaging. Their initial voice capability has been extended with a contact list that indicates presence information. Some provider have added text and/or video messaging as well. The text messaging is generally not compatible with leading messengers and would for that reason not have much usage. The free call features on the other side have led to strong usage of these programs. The VoIP leader, Dialpad, claims to have 13 million users.

The access to PC-to-PC connections is available world-wide. PC-to-phone or phone to-phone connections however require a gateway that make the service geographic dependent. The VoIP providers have a specific range of supported countries. For those countries it is often possible to call cheaper, but with less quality. They serve a specific user market with these cheaper phone connections. Revenue is obtained indirectly via advertisement and/or directly via subscription or via margins on the PC-to-phone / phone-to-phone connections.

### **Other IM-services providers**

The companies in this group have a very strong focus on instant messaging and less on other products or services. For that reason they often find difficulties in acquiring new users. To achieve growth they try to be very innovative (e.g. Odigo and ICQ) or to be compatible with several messaging platforms (e.g. Odigo and Jabber). These messengers mainly grew through a social network effect. Most of the other companies (and hobbyists) in this group are not able to achieve such a network effect. They especially have a tough position since messengers with a big user base and lots of features are available for free.

The companies have an international focus by providing their software on the Internet. They often seek exclusivity by adding specific features that the market leaders do not provide. However, they provide much less features. Revenue is mainly obtained via advertisement.

## **4.3 Conclusions**

This chapter answers two research questions:

### **Which are the existing key players of the instant messaging industry?**

The key players are separated into four strategic groups:

1. **Internet portals** - Companies that provide an instant messaging service besides their search and/or directory functionality.  
Characteristics: General product orientation, global coverage, free pricing policy and extensive messengers.  
Key players<sup>86</sup>: AOL IM (31.0%), MSN Messenger (31.4%) and Yahoo! Messenger (15.7%)
2. **Internet service providers** - Companies that provide an instant messaging service to their Internet access subscribers.  
Characteristics: General product orientation, national coverage, free pricing policy and Rather extensive messengers.  
Key players: AOL IM(world-wide), Sunrise Messenger and BLuewin BlueMessenger (Switzerland)

<sup>86</sup> Situation as of February 2001, based on Media Metrix measurement data that is perceived as accurate by this research (see Figure 4-4, page 45)

3. **Mobile Internet service providers** - Companies that provide an instant messaging service to their mobile subscribers.  
Characteristics: Rather general product orientation, national coverage, paid pricing policy and not extensive messengers.  
Key players: NTT-DoCoMo/AOL alliance (world-wide), none in Switzerland yet
4. **Non-portal service providers** - Companies that provide an instant messaging service, but do not have a portal function.  
Characteristics: General to specialistic varying product orientation, global coverage, pricing policy varies from free messengers, VoIP income to server sale and the extensivity of the products varies from rather simple VoIP messengers to extensive collaboration software.  
Key players:
  - *software providers*: Microsoft Exchange Instant Messenger, Lotus Sametime
  - *VoIP service providers*: Dialpad, PalTalk
  - *Other IM-service providers*: ICQ, Jabber, Odigo and Groove

### **What are the trends and future key players on the field of instant messaging for the next five years?**

The trends and the expected future key players according to their strategic group are:

1. **Internet portals** - Leading portals like Microsoft, AOL and Yahoo set the trend to charge services. Microsoft started with the execution of its .NET strategy, which provides software-as-a-service. Together with the integration of MSN Messenger in its Exchange, Internet Explorer, Windows, Hail-Storm and future Office products and the compatibility with IETF CPIM by the end of 2001, MSN Messenger is expected to continue to be the fastest growing Messenger. This will have a negative impact on AOL.
2. **Internet service providers** - AOL/CompuServe continues its strong position on the ISP market. Microsoft is expected to grow very fast with the integration of Microsoft ISP in its leading Internet Explorer software. Due to the expected software penetration of Microsoft Messenger, the need for other ISP's to provide Messengers declines. Bluewin and Sunrise will find difficulties with the diffusion of their messengers.
3. **Mobile Internet service providers** - This market is still very small, but it is promising to achieve a strong growth. Mobile instant messaging on mobile phones and RIM-devices is growing strong in the US. These players (AOL and Yahoo) are expected to enter the European market soon (via WAP). Microsoft does not yet provide a Mobile Messenger, but it does have alliances with a big range of telecom operators for other mobile services. The step for Microsoft to the Mobile Messenger market is therefor small and expectable. Swisscom Mobile is one of the first European mobile operators that will provide mobile instant messaging. Their growth, however, is not foreseeable due to its proprietary incompatible technology. Instant messaging might become a substitute(WAP) as well as an extension of SMS.
4. **Non-portal service providers** - Instant messaging will probably become a commodity in collaboration software. The role of instant messaging in customer relationship management is unforeseeable on ground of this research. The VoIP messengers are not expected to grow with their proprietary messaging technology. However, when they implement the future CPIM compatibility, instant messaging is expected to give a push to their VoIP-usage. Odigo and Jabber might play an important role if they can link themselves with more portals.

In general:

- The market leader AOL Time Warner has to open up its instant messenger by the Federal Communication Commission of the United States when they start providing advanced video services via their messenger;
- The instant messaging standard CPIM will probably be finished its standardisation track by the second half of 2001. It will be implemented by most of the leading IM service providers, except AOL on first instance;
- The instant messaging industry will become more competitive due to the CPIM standard. However, the CPIM compatible MSN Messenger will achieve a strong penetration due to its wide integration;
- The power of the customer will increase, which makes service differentiation very important.



## 5 BUSINESS MODEL ANALYSIS

This chapter gives an analysis of the currently used business models in the instant messaging industry. This analysis forms a lead to chapter six, where instant messaging business models are set-up for Swisscom. This chapter aims to answer this sub-research question:

6. Which technical feasible business models can be applied for the integration of instant messaging with other services?

At the end of this chapter, the reader should have an understanding of the value flows that exist around instant messaging.

### 5.1 Research framework

The industry analysis chapter highlighted the instant messaging trend towards a communications portal. Such a communications portal has several characteristics of Internet portals. One important characteristic is the co-operation with other service providers, like content-, VoIP- or e-commerce service providers. This gives every company the opportunity to focus on their specialisation in the value chain and enables quick implementation of new services.

To analyse this more complex industry with its 'virtual' products and alliances, a flexible research framework is required.

#### 5.1.1 Framework choice

Werbach announced the importance of business co-operation in his "Syndication: The emerging model for business in the Internet era". His new rules on competition and strategy are built around three actors (Werbach, 2000):

- **Originators** make the original specific service, which can be anything (e.g. original content, a search engine service like Inktomi or a gaming service);
- **Syndicators** free distributors from having to find and negotiate with hundreds of different originators. This is done by bringing together content from a variety of sources and making it available through standard formats and contracts;
- **Distributors** are customer-facing businesses that use syndication to lower their cost for acquiring content and to expand the value they provide to consumers.

An instant messaging contact list can be seen as a typical distributor. The delivery (push) of content via a syndicator is emerging for instant messaging services. Instant messaging provider Odigo, for example, engaged a strategic partnership with syndicator iSyndicate.<sup>87</sup> This structure of syndicating services is possible with much more services, e.g. by retrieving a network game service or a VoIP service from a syndicator. It should be noted that this model is developed in particular for information, since information is never really consumed. Non-informational products are not suitable for this approach.

When looking at the industry at a more general level, the value chain of Porter is often used to analyse a company's business (Porter, 1985). The value chain was originally designed for the traditional industry (see Figure 5-1).

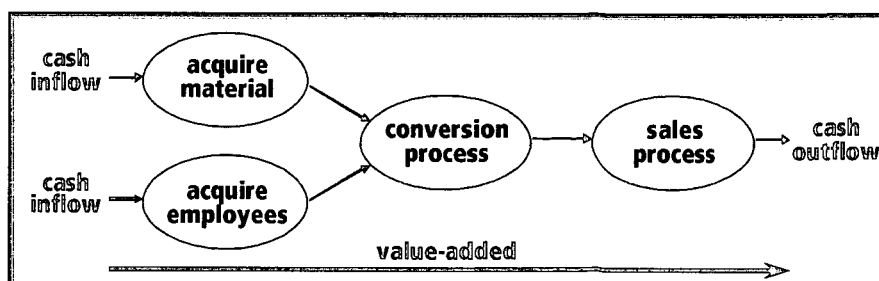


Figure 5-1 Example of value added process in Porters' value chain

<sup>87</sup> Odigo and iSyndicate announce strategic partnership - February 1, 2001 - <http://www.odigo.com/news/02-01-01.html>

Due to this, the model has become less applicable for the dynamic Internet, where the business models are formed in dynamic co-operation networks with other companies. Examples are the partnership structures as described by Werbach. Moreover this research is not focussed on all business processes (e.g. marketing, human resources) but is intended to give an indication of the used business strategy. Norman and Ramirez indicate that this fast changing industry needs creation of value instead of adding value only, like the value chain tries to do (Norman & Ramirez, 1993). For these reasons, the value chain does not seem to be the best choice.

Geerts and McCarthy have developed a modelling framework for value added processes (Geerts & McCarthy, 1997). This hierarchical framework exists of basic units that indicate value flows based on resources, events and agents (REA). These value flows are based on dualism that indicates the value exchanges.

This dyadic relationship between the supplier and the buyer is also encouraged by Williams (Williams, 1997). The ultimate gain is the strengthening of a relationship wherein both parties mutually benefit, and to prevent disruption in the direct exchange relationship.

The REA model is initially designed for modelling information systems on an object oriented manner. For this reason, such a value design can be implemented easily for information systems. Especially syndication systems like the ones from Werbach can have advantages of this (e.g. by coupling standardised XML-based information to an automated accounting system).

These opportunities and the clear design of the REA-model from the leads of the use of the REA model in this chapter.

### 5.1.2 Resource-Event-Agent value-added process hierarchy methodology

The origin for the REA accounting model lies in object oriented information systems (McCarthy, 1982). This model is developed using computer data modelling techniques. Its underlying structure is found to consist of sets representing economic resources, economic events and economic agents plus relationships among those sets. This model is based on a hierarchical structure, where the top-level consists out of the value system between companies processes. Every company can be split up in several processes as well. When these processes are placed in a supply/demand sequence, a value system is built (Geerts & McCarthy, 1997). Between the processes there is an exchange, the economic event. This exchange usually involves cash versus components, which both are economic resources. This exchange is a dual process, where the supplying and demanding agents make an availability arrangement for the component, e.g. a lease for one month. In the opposite direction, the agents make a payment arrangement (see Figure 5-3).

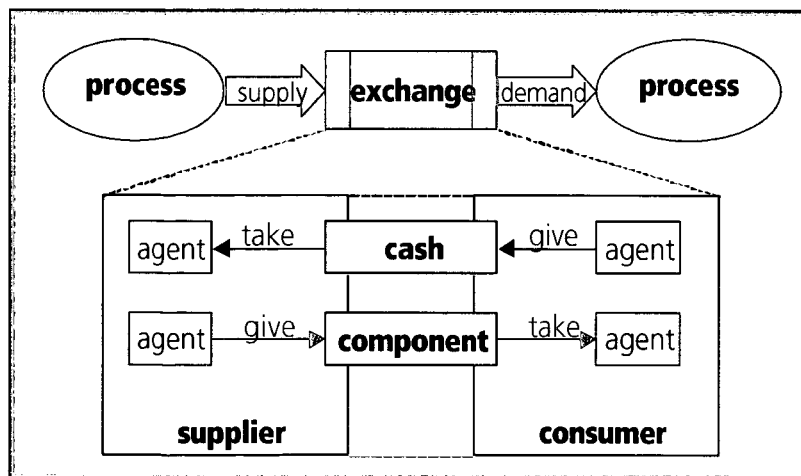


Figure 5-2 The exchange process within the REA model

There are cases where exchanges between components and cash are not preferable. In those cases, exchanges can also be performed between the components (e.g. a goods or service exchange) or between the cash (e.g. a money exchange). It is however preferred that there an exchange exists. Summarising, the exchange is the most important characteristic of this model.

When thinking in terms of value, the customer value should be observed. The bottom line is its enabling of creating a value chain with high customer value, where customers are thus willing to pay for.

A bottom process is called a leaf (from the tree) and gives an overview of the increment and decrement processes that appear within a company process. The analysis in this research, however, does not reach the leaf-detail level.

## 5.2 Instant messaging business model analysis

The described REA-framework will be applied on the instant messaging industry. The sector analysis provided these four main types of companies in the instant messaging industry:

- Internet portals;
- Internet service providers;
- Mobile Internet service providers;
- Non-portal service providers:

For these type of companies, the used business models are drawn up in this paragraph.

Although the REA accounting model enables analysis on the most detailed level, this paragraph only treats the top level. The value flows are indicated for this top-level. This will provide an understanding of the currently used business models. This business model analysis is mainly based on the information of the sector analysis study (see Appendix B).

### 5.2.1 Internet portals

Internet portals are defined as web sites that users use regularly to start their Internet session. These portals typically contain an Internet search feature and/or a categorised Internet index. The main purpose is to help the Internet visitor to find the site they are looking for. Besides, these portals usually provide extra services to bind the customer, such as a news and/or an instant messaging service.

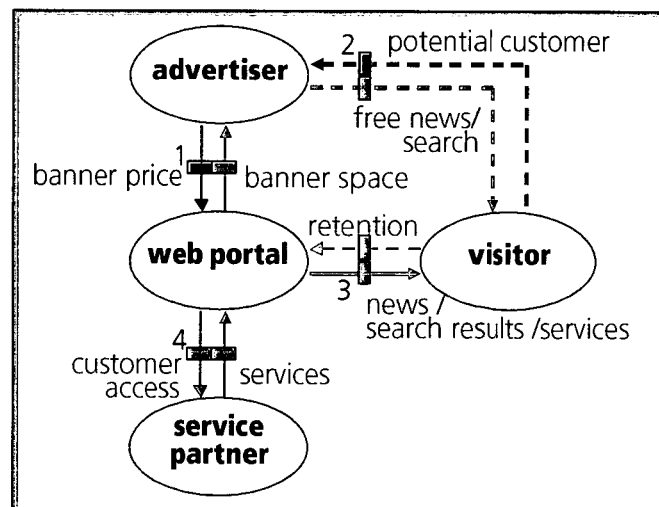


Figure 5-3 Value system of web portal

The most common value stream for Internet portals (see Figure 5-3):

1. Internet portals are for the largest part financed by advertisements. The advertisers pay for a part of the page that they can use for their banner;
2. These advertisements create an indirect value flow. Via the portal, the advertiser enables free news and search services for the visitor. In return the advertiser gets potential customers and/or builds its image;
3. The actual customer of the web portal is the advertiser, not the visitor. Though the visitor is the most important factor, since the number and type of visitors determine the value of the web portal. A portal can be beautiful with lots of services, but when it does not have enough visitors it is useless for the advertisers. For that reason the web portal tries to distinguish itself with extra services or quality of search results to reach customer retention. The web portal can also be seen as an intermediary function between the advertiser and the customer;
4. Web portals often have alliances with service partners that provide additional value to the portal in the form of services. In exchange the service partner gets access to the portals' user base.

Whether there are money streams between the portal and the service partner and the direction of these streams depend on the difference in value streams. When the service partner adds a big value to the portal, the portal might want to pay for the service. Otherwise the service partner probably has to pay for the customer access.

Examples of service partners are an e-shop or an instant messaging service provider. The advertising model, which is common for the current Internet, is changing. The declining incomes of advertisements last year urges the web portal to ask the visitor for a fee for certain services.

The leading search engines started charging fees for an URL-submission<sup>88</sup>. Further, MSN announced to change certain free services, like searching the web, into charged premium services. Yahoo also announced to initiate the standard/premium service model. It is however doubtful whether the visitors are willing to pay for this. It will probably only work when all the big competitors take the same strategy in standard/premium services. The paid URL-submission is at the moment the only service where these portals have the same premium-strategy.

Regarding instant messaging, the world's biggest Internet portals have the unique position to have their own instant messaging service<sup>89</sup>:

- |                    |  |                       |
|--------------------|--|-----------------------|
| 1. Microsoft sites | (90.6 million unique visitors a month) | MSN Messenger         |
| 2. Yahoo!          | (87.5 million unique visitors a month) | Yahoo! Messenger      |
| 3. AOL Network     | (85.2 million unique visitors a month) | AOL Instant Messenger |

For this reason, these players do not need a service partner for instant messaging. Other portals often start an alliance like Lycos did with AOL AIM.

Summarising, Internet portals depend mainly on advertising at this moment. There is a trend towards premium services, but the success of that trend depends on the global development regarding premium services.

## 5.2.2 Internet service providers

The Internet Service Provider (ISP) is the gateway to the Internet for the customer. This access to the Internet is often delivered with additional services (e.g. email-address, website-hosting).

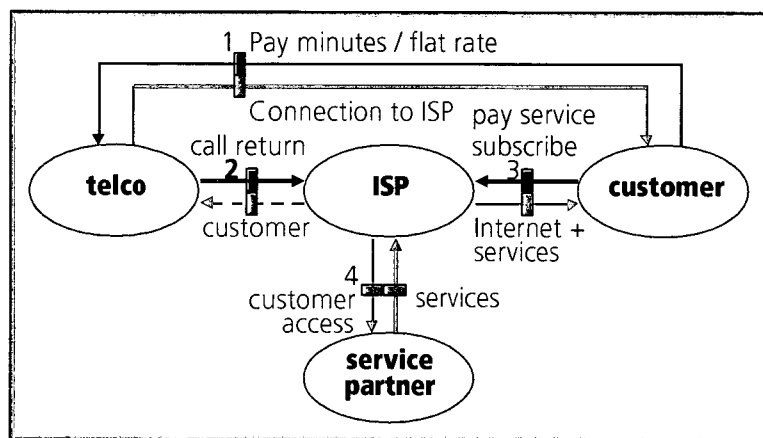


Figure 5-4 Value system of ISP

The major value streams for the ISP are (see Figure 5-4):

1. The customer usually connects to the ISP via a telecommunications operator. For this connection, the customer usually pays an amount per minute or a flat-rate price. Broadband connections are often provided in the form of flat-rate connections;
2. It is common for telco's to pay the ISP a fee for the customer that they have brought online. This call-return forms a major part (about 70%) of the ISP income<sup>90</sup>;
3. Most customers are able to subscribe for free at an ISP, since they have paid via the telco. For premium services, however, users often have to pay. For example, a normal Internet connection is usu-

<sup>88</sup> Go.com's premium service - <http://www.searchengineposition.com/Articles/paygo.htm>

<sup>89</sup> These are the unique number of visitors a month, measured by MediaMetrix in Australia, Brazil, Canada, Denmark, France, Germany, Japan, UK & US. The numbers of Microsoft, Yahoo and AOL all represent an aggregation of commonly owned and/or branded domain names.

<sup>90</sup> Retrieved from interviewing an ISP at February 13, 2001

ally free, but a broadband connection has to be paid for. Other premium services are the provision of e-mail addresses and website-hosting disk space. The premium services form about 20% of the ISP income<sup>90</sup>;

In the same manner as Internet portals, ISP's also make use of service partners. Examples are e-shops or website hosting. Whether there exists a money stream between the ISP and the service partner again depends on the type of value flow. The service partners take profit of the customer base of the ISP and they form about 10% of the ISP income in the form of advertisement, free-SMS-contracts and e-commerce.<sup>90</sup>

The customers usually connect to the ISP via one of these payment schedules:

- Free subscription and pay telephone costs. This is a very common method at the moment. The ISP's offering a free subscription make it hard for other ISPs to charge the customer for it. It is common for telco's to provide the ISP with a compensating fee for users that make a connection to the ISP;
- Subscription to ISP and pay telephone costs. This construction is only attractive for the customer when the ISP provides an added value, like providing extra services and/or providing extra quality;
- Flat rate connection. The customer pays a monthly fee. It is usually provided as a wholesale between the ISP and the telco. Broadband connections (ADSL/cable) are often provided with this construction.

Europe's biggest ISP, the German T-Online, stopped its flat-rate service at March 1, 2001. T-Online pays the telco, Deutsche Telekom, for the minutes that the user is online. There were too many users that used the service full-time. A customer survey indicated several types of users. For these user types, several subscription types have been made up. The maximum subscription type is now 120 hours a month as a ISP/telco wholesale, with a pay per minute schedule for extra minutes.<sup>91</sup>

These possibilities are sometimes also combined with a standard/premium service suite, where the extra (premium) services have to be paid for.

The ISP AOL already provided instant messaging (AOL IM) free to its American customers in 1996. AOL has used the strategy to integrate a range of additional services in Internet access software. This makes the services also available without accessing the ISP's web-portal. AOL Compuserve uses the same strategy and now also provides AOL IM. AOL built a very strong IM-user base that has reached a critical mass, especially in the United States. This unique position allowed AOL IM to remain a proprietary protocol.

Although it is not attractive for smaller providers to follow this strategy, Swisscom Bluewin provides a proprietary messenger to its customers without a service partner. This solution might be cheaper than having an alliance with a market leader, but the probability of reaching critical mass approaches zero as long as there is no accepted standard. BlueMessenger is provided as a free service, but sending messages to SMS costs CHF 0.10 per message (20 free SMS-messages per month).

Other ISP's have initiated alliances with IM service partners, like:

- AT&T Worldnet with PowWow<sup>92</sup> (AIM<sup>93</sup>, MSN & PowWow)
- BT LineOne with Odigo (AIM<sup>93</sup>, ICQ & Yahoo)
- Sprint US / EarthLink with Bantu (ICQ, MSN & Yahoo)
- Sprint PCS with AIM (AIM)
- Sunrise Freesurf with Odigo (AIM<sup>93</sup>, ICQ & Yahoo)

Instant messaging is seen as an important service due to its sticky character, which makes the online session longer and/or forms a reason to get back online. The bigger online time of IM-users generates more revenue via the telco. The contact list also has the opportunity to create new revenue streams, e.g. by initiating a voice or video connection based on a text-messaging event.

### 5.2.3 Mobile Internet service providers

The Mobile ISP (MISP) is the ISP that enables the mobile phone user to connect to the Internet. This function is usually performed by the mobile carrier itself, since this access is integrated in the mobile network itself. 'Internet access' is still a big expression, regarding the few possibilities at the moment with WAP and i-mode. It is at the moment mainly used for email-checking and simple information serv-

<sup>91</sup> **Fragen zu T-Online flat** - <http://www.t-online.de/service/index/ntasvxqa.htm> and the newsgroup: de.comm.provider.t-online

<sup>92</sup> CGMI, the owner of PowWow, has stepped out of the IM-industry. At March 1, 2001 the service to AT&T also stops. AT&T searches for a new alliance.

<sup>93</sup> These players try to be compatible with AOL IM using backwards engineering, but AOL often blocks the access by making protocol changes.



ices via special Internet-sites. In Japan, the mobile Internet is used more for entertainment, such as horoscopes, games and pictures.

The launch of the GPRS network (spring 2001 for Swisscom) extends the packet switched functionality to the mobile phones. It increases the speed and enables an always-online connection. The appearance of UMTS in 2002 enables a complete new range of services.

The major value streams for the MISP are (see Figure 5-5):

1. In Europe, a user calls a WAP-gateway to get WAP-access. The user pays per minute and has access to all the WAP-servers on the Internet. GPRS and UMTS enable new payment structures, like pay per packet. The type of preferred payment method is very user dependent. The SMS-success in Europe indicates that European users are willing to pay per service/message. The mobile Internet in the United States has not yet penetrated the market, but these users have a stronger preference for flat-rate connections. These flat-rate services also started in the US for mobile services, like AOL and Yahoo provide it. In Japan, NTT DoCoMo users pay a subscription fee every month and a fee per packet. In return they receive access to a large amount of free services. For premium services they pay via the MISP;
2. In Europe, the Mobile ISPs often collaborate with service partners. These partners are used to differentiate from the competition by providing more/better services. In such cases, the MISP pays for the service. A profiting service like an e-shop might have to pay for the access to the user base. The WAP users, however, have access to any server on the Internet and are therefore able to find lots of services for free. In Japan, i-mode has a much more protective system. Users have only access to sites that are linked to the i-mode portal. These content sites can link to NTT DoCoMo for free and they provide the Mobile ISP with differentiation. Due to the limited display size and the slow connection, the mobile phones are not (yet) attractive for advertisement;
3. The i-mode system provides an extra source of revenue. NTT DoCoMo performs the billing for all the service partners. When a customer uses or subscribes to a paid service of a service partner, he will find these costs on his phone bill. This makes the barrier for the customer lower to make small transactions. For every transactions, NTT DoCoMo charges a commission fee of 9%. This fee enables the participation in the content value chain as well.

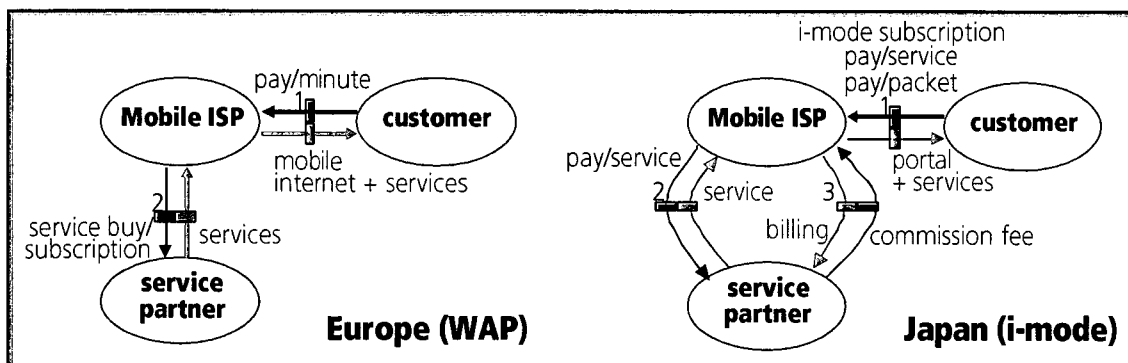


Figure 5-5 Value system of Mobile ISPs in Europe and Japan

Moreover, i-mode users call 15% more than non i-mode users and thus i-mode is indirectly generating extra voice revenue (Ericsson consulting, 2000). The i-mode business model is described as well, since NTT DoCoMo is introducing i-mode in Europe in alliance with Hutchison Whampoa and KPN Mobile (and in the US in alliance with AT&T). The launch of the packet switched GPRS network makes the i-mode system attractive. In particular since the European mobile Internet users are disappointed about WAP, due to over-expectations (Haskins et al., 2000).

Instant messaging on mobile phones is starting to evolve. AOL and Yahoo offer instant messaging services for mobile phones, by which the mobile users get access to their PC-buddies:

AOL Mobile Communicator \$329.95 (set-up) + \$19.95 a month

Yahoo eLink Fortified \$335 (set-up) + \$34.95 a month (\$14.95 a month for 100kb limit)

Swisscom Mobile launched "Z the friendZone" in May 2001. This is an instant messenger using WAP or SMS. On request, the phone shows which of somebody's contacts are online and where they are. This location information is an asset that is specific for mobile carriers and distinguishes them from current available WAP-messengers.

A drawback is that this instant messaging technology is proprietary, which means that it does not give access to the big IM-systems and to the BlueMessenger of ISP Bluewin. The initial payment system will probably be per message and per presence/location update.

The instant messaging service can also be retrieved from an instant messaging service partner.

Ericsson, Lucent and MessageVine all have developed instant messaging systems with location-based services for mobile phones. The system from MessageVine thereby also grants access to the Microsoft and ICQ messenger users.

Examples of current service partner alliances are:

- Bell Mobility with Yahoo! (Yahoo)
- Cingular Wireless with MSN (MSN)
- Verizon Wireless with Yahoo! (Yahoo)

The IM-compatibility with other local mobile telephony providers is very important. This compatibility between European wide mobile carriers was one of the major success factors of SMS (Longueuil, 2000). Moreover SMS remains an important substitute in the beginning (see §4.2.1). An extra push of mobile instant messaging would be the compatibility with the leading IM-providers and the IMPP standards when they appear.

#### 5.2.4 Non-portal service providers

The Internet portal, ISP and MISP have in common that they form a portal to the users and are therefore able to reach potential IM-users. There also exist many IM-providers that do not have the luxury of a portal to access the customers. Regarding their background and objective, these providers can be divided in these groups:

- Software providers, which have software as main product and use instant messaging to differentiate it;
- VoIP service providers, which find their origin in voice over IP provision and extend their service with a contact list (presence);
- Other IM-service providers, which are specialised in providing IM-services. This group contains niche-players, start-ups and programming hobbyists.

These three groups are described in this paragraph.

#### Software providers

Instant messaging was initiated primarily as an ISP-differentiator and as a free communication tool on the Internet. Software providers now just started implementing instant messaging as well in their software. These vendors have other programs as product that they are extending with instant messaging.

The clearest examples are Microsoft Exchange Instant Messenger and Lotus Sametime. Lotus and Microsoft mainly differentiated their email applications with this addition. The users (clients) get the instant messaging application for free, but the server version of the software needs to be paid for. The server allows Internet-independent messaging for secure environments. However, the Microsoft version can connect to MSN Messenger Internet servers as well. These two market leaders of business collaboration software have made a serious step to use instant messaging as a business collaboration tool instead of a private community. Instant messaging is very interesting in a corporate environment to initiate other communication sessions as well, like voice and video conferencing. It also extends the functionality of computer networks (e.g. file transfer, application sharing and co-browsing).

The major value streams for the software provider are (see Figure 5-6)

1. The software vendors integrates the instant messaging service in their product, which they sell to the customer. The instant messaging service can be included as an Internet service, where the software provider enables an online instant messaging service.

For corporate usage instant messaging can be included as a Local Area Network(LAN) service, where the customer buys an instant messaging server version of the software. In that case an external IM-service provider is not needed. This construction is interesting for companies, since it enables

the companies to protect themselves better against hackers and espionage. Moreover, it disallows private usage;

2. A software provider can use a service partner to provide instant messaging. The Internet browser Opera, for example, included an instant messenger using the ICQ-service. Microsoft and Lotus both have their own messaging systems and thus have no reason to use a service partner. When the software provider only uses instant messaging for LAN collaborative usage, service partners are less relevant as well.

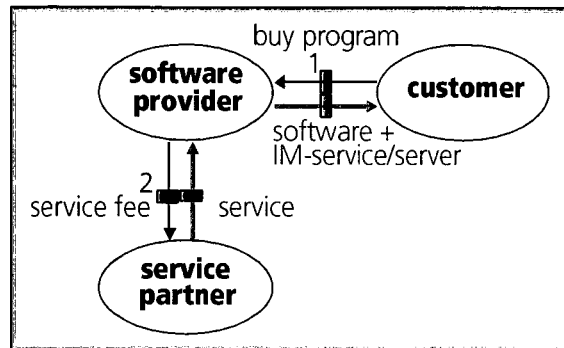


Figure 5-6 Value system of software provider

Instant messaging is now also integrated Windows ME (Millennium Edition). When this and future Windows operating systems have penetrated the market, other software vendors may find more difficulty in reaching the instant messaging users. The Windows platform then also works as a kind of portal. It is a similar construction as Microsoft used with promoting their Internet Explorer and it enables an enormous strong position of Microsoft on the future instant messaging market. It is likely that users will soon or later work on a Windows version that contains MSN Messenger.

### VoIP service providers

Another source of messaging is voice over IP (VoIP). The VoIP service providers initially made systems that only enable direct VoIP connections. These systems however have evolved and are now integrated with much more functionality. The contact list with presence feature is one of them. The inclusion of the presence feature makes these systems part of the definition of instant messaging. These VoIP-providers are thus new in the instant messaging industry, but can become serious players when observing that a company like Dialpad has 12 million registered users. There are two main types of business models, for VoIP providers, depending on the use of a gateway to the phone net..

The major value streams for the PC-to-PC VoIP provider (see Figure 5-7a):

1. The PC-to-PC model does not have use a gateway to the Internet. This makes the service much cheaper but also less comfortable for telephone conversations. The business model of this provider depends heavily on the advertiser, who pays for a banner on the VoIP-program and/or website;
2. The advertiser enables free Internet telephony to the customer. and hopes to reach potential customers;
3. The VoIP provider provides the call service to the user. This mainly contains out of a VoIP-program and access to a presence server. The voice connection itself is peer-to-peer, which means that the VoIP provider does not have to perform centralised communications interfaces. The provider becomes customer retention by providing the service for free. This retention, the user-base, determines the market value for the advertisers. In some cases the user also has the option to buy-off the advertisement and thus become an undisturbed user-interface;
4. It is possible for the VoIP-provider to use a service partner. Examples are the provision of a presence service that is compatible with other providers/standards or to enhance the service with quality of service (QoS).

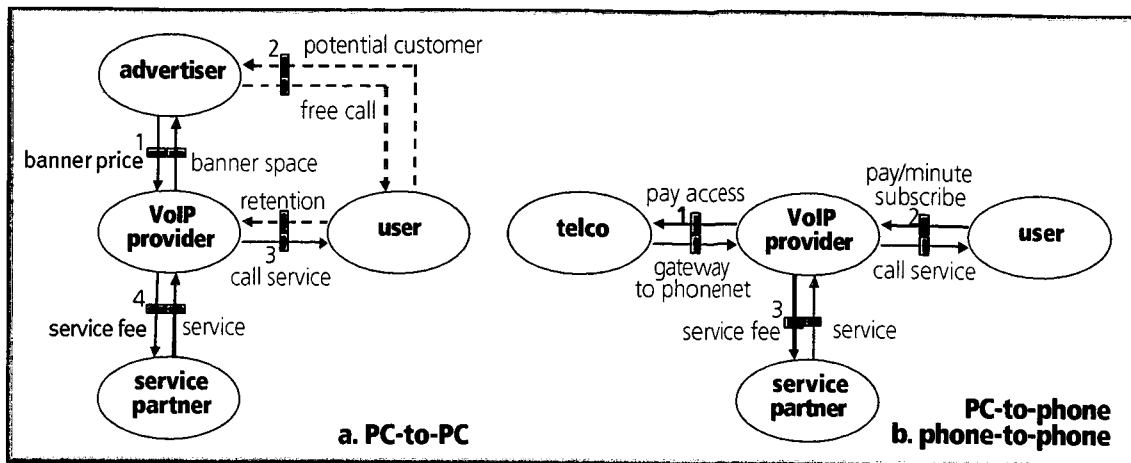


Figure 5-7 Value system of VoIP providers: a. Internet-only b. gateway to phone

The major value streams for providers using gateways (see Figure 5-7b):

1. When the VoIP-provider provides PC-to-phone or phone-to-phone services, it requires access to the phone network at the destination and/or source side. This connection between the Internet and the phone network is done via a gateway. Such a gateway has several phone connections and thus has to pay for that.
2. The user pays a tariff per minute and/or subscription fee for a connection to a phone. The destination countries are often service dependent, which means that the provider generally only has access to gateways in certain countries. The tariffs are often much cheaper than calling by phone, especially when calling to another country. However, this difference is declining due to the decreasing international phone tariffs.
3. VoIP providers often work together with other VoIP service partners that give access to other gateways. This is done since it is unattractive to build a world-wide network of gateways on its own. Besides also other services can be externalised, like the presence service.

It should be noted that the VoIP-providers with gateways to the phone network often also provide PC-to-PC services, like Dialpad and Mediaring do. These services are than usually provided for free and the advertising business model of Figure 5-7a is than combined with the gateway model of Figure 5-7b. The advertising can also be about the phone-gateway service from its own company of course.

A major drawback of voice over IP services at the moment is that quality can't be guaranteed yet.

### Other IM-service providers

When having grouped all the instant messaging service providers according to their business models, there still is a group left that does not fit in the previous mentioned categories.

These providers have instant messaging as main service and do not used it to differentiate other services/software. Moreover, these instant messengers are not linked to any portal and are for that reason often smal.

This resting group mainly exists of:

- Niche players like the fast growing Groove peer-to-peer collaboration service, Imici and Instant Mercury, which try to access specific businesses. Examples are customer relationship management, collaboration and specific communities (e.g. gaming). These services distinguish on specific points like security and collaboration possibilities. The business services rely more on paid services or software buy and the community services more on advertising;
- Innovating instant messaging providers like Odigo, Jabber and ICQ. These have all reached a critical mass by networking effect in the user-community (mostly formed by first movers and techies) and/or their interoperability. Odigo and ICQ (since spring 2001<sup>94</sup>) are using an advertising business model by providing banners on the contact list. Jabber makes business by selling the server application. All parties also provide their services as service partner. When regarding the user-base, these innovators form the second place (after AIM, MSN and Yahoo). Therefor these providers form serious players. Odigo and Jabber in particular are emerging;

<sup>94</sup> Ad banners seek home on ICQ - <http://news.cnet.com/news/0-1005-200-4950972.html>

- Programming hobbyists, where most are forthcoming out of the Jabber open source platform. Examples are CloudChat and KIM. These programs/services usually do not have a serious business case. Their business models (when they have it) rely on advertising and shareware constructions. However these players are very small, they provide access to all the leading instant messaging services platform, since Jabber provides this interoperability. Therefore they do not have problems with a critical mass of users.

Since the big variety in business models of this group, these models are not presented in an figure.

### 5.3 Conclusions

This chapter gave an overview of currently used business models to answer the research question:

#### **Which technical feasible business models can be applied for the integration of instant messaging with other services?**

The business models that can be used for instant messaging are indicated for every strategic group:

#### **Internet portals**

Internet portals, like search engines, rely heavily on advertising. Since advertising is declining, these portals started charging money for premium services. Another emerging source of income is e-commerce, although it still forms a minor part of the total income. Instant messaging is mainly used to extend the services. This differentiation and the sticky character of instant messaging bind customers to the portal. Instant messaging therefor indirectly creates revenue via the advertiser since it increases value for advertising.

#### **Internet service providers**

Internet service providers rely heavily on the compensating fee that the telecommunications carriers provide. The largest business case at the moment is thus the time that users are online. Instant messaging is a sticky application, which proved users to spend more time online.

The integrated contact list generates a lower barrier to voice and video communication, which generates even more online time and bandwidth and hence carrier revenue. This binding to the Internet of instant messaging can be a push always-online service services like ADSL. Moreover, the initiation possibilities of broadband services like video conferencing can create a need for broadband services like ADSL. In general, there is a shift from pay-per-minute (PSTN and ISDN) to pay-flat-tariff (ADSL: always-online plus limited throughput). In the United States, full flat-rate connections are common (AOL), although this complete unlimited usage seemed not to be affordable by T-Online and Bluewin).

#### **Mobile Internet service providers**

The stickiness of instant messaging can form a trigger for mobile users. When a user sees his friend online, the barrier to send an instant message is much lower than it is with SMS. Instant messaging generates revenue directly for paying per message or indirectly via online time. The combination with location information can be an extra impulse, like contacting a friend when he is in your neighbourhood (as used in Z. the friendZone). Swisscom differentiates its mobile telephony from the competitors when implementing instant messaging and is therefor able to attract new subscribers.

Especially the presence feature of instant messaging enables new value-added services to be developed. The mobile instant messaging contact list allows a lot of new services to be initiated with the contacts, like gaming and picture messaging. This development can be important when pay per packet business models (GPRS and UMTS) are implemented. Text messages are very small and thus not generating much packet revenue. However, i-mode proved that mobile Internet can increase the conventional mobile voice calls as well.

#### **Non-portal service providers**

The software vendors mainly use instant messaging to differentiate from the competition. VoIP providers use instant messaging for its presence feature, which drives communications and differentiates them from the competition. They mainly retrieve their revenue from gateway fees.

The remaining instant messaging service providers are very differentiated. Their largest part, like the innovators and the programming hobbyists, rely on advertising. Since these players have a much smaller user-base than the market leaders, the advertising revenues will be much smaller as well. The niche

players of this group earn their money basically by selling their service/software to their specific customers.

Instant messaging provides the best direct business case for (mobile) Internet service providers, because they (still) generate revenue per called minute. Other providers use it mainly for generating more advertising revenue or just as differentiator.



## 6 CASE: SWISSCOM AND INSTANT MESSAGING

The previous chapters described the instant messaging standards, technologies, industry and business models. This information forms the lead to indicate the strengths, weaknesses, opportunities and threats of Swisscom regarding instant messaging. These factors again lead to Swisscom-specific strategy recommendations, answering the research question:

7. Which place in the value chain can instant messaging take to have a positive impact on the total revenue?

At the end of this chapter, the reader is informed of the strategy recommendations regarding instant messaging and should understand the reasons for them.

### 6.1 Research framework

It is insightful to analyse the different instant messaging aspects from the previous chapters together. This enables correlation between the standardisation, technological, industry and business model aspects. It gives a more complete vision regarding instant messaging to retrieve possible impacts for Swisscom.

The results of the previous analyses form the starting point of the created framework (see Figure 6-1). These results are firstly analysed in an intermediate phase that distinguishes between the internal and the external assessment. The assessment in this report are all basically external analyses. The external assessment is therefore more extensive than the internal analysis. The internal aspects have been mentioned in these analysis by positioning Swisscom in respect to the external standards, technologies, companies and business models. The internal and external assessment join in the next phase that aligns the internal and external world regarding instant messaging. Based on this alignment, Swisscom-specific strategy recommendations are made.

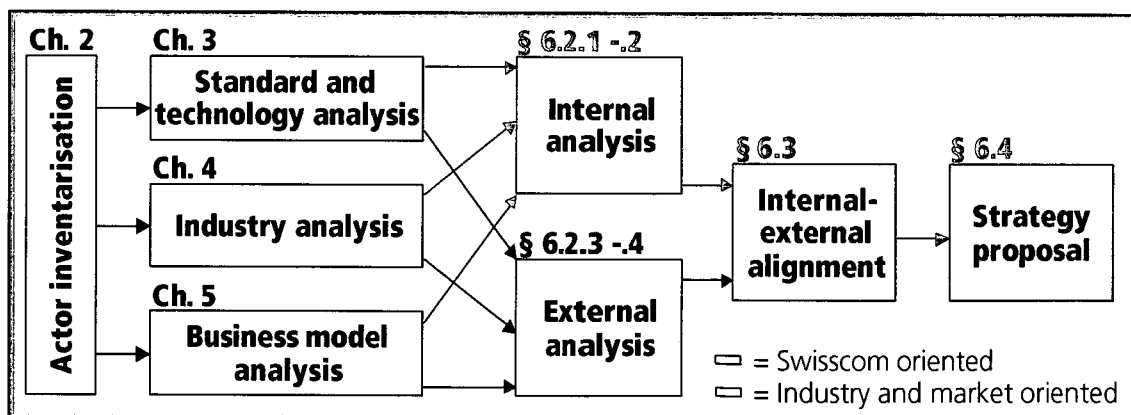


Figure 6-1 Framework to align the analyses of previous chapters

A useful framework to make an internal and external analysis is found in the SWOT analysis framework (see § 6.1.1). For the alignment of internal and external factors, the TOWS matrix is a good fit (see § 6.1.2). The SWOT- and TOWS analysis frameworks form complementary tools that have proven to be very valuable when they are applied with care. The strategy proposals are derived by interpreting the alignment results.

#### 6.1.1 SWOT analysis

The concept of the SWOT analysis is introduced by Andrews in 1965 by seeking to match what the firm can do (internal strengths and weaknesses) with what the firm might do (external opportunities and threats) (O'Shannassy, 1999, p. 3).

A SWOT analysis is an assessment tool for identifying an organisation's internal Strengths and Weaknesses and external Opportunities and Threats. The information provided by a SWOT analysis can help



the assessment of business operations within the industry and community. The information obtained from the SWOT analysis forms a good lead to the development of suitable strategies and tactics.

Besides the advantages, two studies identified strong concerns regarding the SWOT-usage (Hill & Westbrook, 1997, p. 51; Pickton & Wright, 1998).

These concerns are mainly based on:

- Inadequate definition of factors, which cause vague proposals;
- Lack of prioritisation of factors, which can lead to a failure in importance interpretation;
- Over-subjectivity in the generation of factors, due to a compiler bias.

However, both studies argue that SWOT could still be very valuable when it is undertaken with more rigour, challenging of assumptions and subsequent validation and investigation.

### 6.1.2 TOWS matrix

The threats, opportunities, weaknesses and strengths can be turned into strategy using the TOWS matrix (Weihrich, 1982). It aligns the internal and external issues by defining four combinations (see Table 6-1):

- The most favourable strategy occurs when a company uses its strengths to take advantage of opportunities in the industry.
- In a global competitive market, the company faces threats that might be overcome by its strengths;
- Weaknesses must be overcome in order to take advantage of external opportunities. This can be reached by a developmental plan that attempts to convert company's weaknesses into strengths;
- The least favourable situation in the TOWS matrix occurs when a company faces external threats in the light of its weaknesses. It makes it difficult for the company to operate in the global market. This requires a strategy that aims at minimising both the internal weaknesses and the external threats.

	Internal Strengths	Internal Weaknesses
External Opportunities	strategy that uses internal strengths to take advantage of external opportunities	strategy that uses external opportunities to overcome internal weaknesses
External Threats	strategy that uses internal strengths to avoid or cope with external threats	strategy to minimise internal weaknesses and to avoid external threats

Table 6-1 Developing strategies using the TOWS matrix

### 6.2 Swisscom IM-SWOT analysis

This paragraph describes the application of the SWOT analysis to the Swisscom business units Swisscom Mobile and Bluewin. The business units are analysed together to allow synergy. The strengths, weaknesses, opportunities and threats are analysed regarding instant messaging. This paragraph will not introduce new information, but rely on information retrieved in earlier chapters.

To distinguish the importance of different issues, every issue is prioritised. The used indicators and their weighting are described below. Note that this prioritisation is 'only' provided to give the reader a feeling of the importance of the issues in this research. Since the analysis is based on qualitative research results and the comparisons are subjective to instant messaging, these values have no scientific and statistical value!

#### Indicators for strengths and weaknesses

These indicators need to be considered relative to the firm's competitors.

**performance** A number from 0 to 1 that identifies the performance of the asset.  
 0.0= no performance;  
 0.5= performing only on half of possible power;  
 1.0= outstanding performance of the asset.

**importance** A number from 0 to 1 that identifies the importance of the asset.  
 0.0= absolutely unimportant;  
 0.5= performing only on half of possible power;  
 1.0= essential.

**priority** A number from 0 to 1 that identifies the priority of the asset ( $x$ ) in respect to all the assets together ( $n$ ). The priority is a calculated value that is derived from the performance  $perf$  and the importance  $imp$  as indicated in this formula:

$$priority_x = \frac{perf_x \cdot imp_x}{\sum_{i=1}^n (perf_i \cdot imp_i)}$$

It is preferable not to have identical priority numbers

### Indicators for opportunities and threats

A factor that scores highly on both probability of occurrence and on likely impact on the business would have to be one worthy of close attention and play a significant part in the development of the business's strategic plan.

**probability** A number from 0 to 1 that identifies the probability of the hypothesis.  
0.0= impossible;  
0.5= the probability is 50%;  
1.0= 100% certain.

**impact** A number from 0 to 1 that identifies the impact of the hypothesis when it would be true:  
0.0= no change;  
0.2= minor impact on Swisscom, no action required;  
0.5= impact on Swisscom is clear, requirement of action is arguable;  
0.7= major impact on Swisscom, action required;  
1.0= reformation of Swisscom.

**priority** A number from 0 to 1 that identifies the priority of the hypothesis ( $x$ ) in respect to all the hypotheses together ( $n$ ). The priority is a calculated value that is derived from the probability  $prob$  and the impact  $imp$  as indicated in this formula:

$$priority_x = \frac{prob_x \cdot imp_x}{\sum_{i=1}^n (prob_i \cdot imp_i)}$$

It is preferable not to have identical priority numbers

The numbers that are mentioned in the following analysis are based on the theory, trends, interviews and analysis of the previous chapters. The numbers are verified by internal specialists on the specific field.

The threats and opportunities are often dependent of the time. Therefore indications of the relevant time-scale are mentioned if applicable.

### 6.2.1 Strengths

Swisscom has the following strengths that are also summarised in Table 6-2:

1. Swisscom Mobile started a pilot regarding mobile instant messaging at the begin of 2001. This pilot indicated that Swisscom is technically able to launch a mobile instant messaging service using WAP and/or SMS. Swisscom together with service partner Valis have a good knowledge of instant messaging and its possible additional services (see §3.2.4 and §5.2.3);
2. The mobile instant messaging service of Swisscom Mobile is integrated with location based services. This enables Swisscom to take advantage of their unique position of owning this information. It means that Swisscom is technically able to extend the instant messaging service with any kind of location based services. However, it is recommended to improve the actuality and the accuracy of location information. The lack of frequent updating location information to decrease network load, has probably had a negative impact on the mobile instant messaging pilot (see §3.2.4, §3.4.2 and §5.2.3);

3. Swisscom Mobile is the mobile telephony market leader of Switzerland. This, in respect to the maturity of the mobile telephony market, causes Swisscom to focus more on customer retention than on achieving new customers. On the other side, Swisscom searches for a killer application that let current customers step over to new technologies like GPRS and UMTS (see §1.1.5 and §3.2.3);
4. BlueMessenger contains the most important functionality of an instant messaging client. Besides, it should be rather easy to combine the contact list of BlueMessenger with new services. BlueMessenger is technically a good product (see §4.2 and §5.2.2);
5. Bluewin already provides an always-online service using ADSL. This is very useful when using instant messaging. The higher bandwidth can already be used for IM-initiated Voice over IP connections (see §3.2.2 and §5.2.2).

strength	performance	importance	priority
1 Swisscom Mobile has IM application and IM-knowledge	0.6	0.7	<b>0.23</b>
2 Swisscom Mobile LBS integration knowledge	0.6	0.8	<b>0.27</b>
3 Swisscom Mobile is the leading mobile operator of Switzerland	0.7	0.5	<b>0.19</b>
4 Bluewin has IM application and IM-knowledge	0.5	0.5	<b>0.14</b>
5 Bluewin already sells always-online ADSL	0.5	0.6	<b>0.17</b>

Table 6-2 Strengths of Swisscom regarding instant messaging

### 6.2.2 Weaknesses

Swisscom has the following weaknesses that are also summarised in Table 6-3:

1. The instant messenger 'Z' of Swisscom Mobile is a good combination of instant messaging and location based services, but the pilot doesn't show a continuous growth of its users. The application does not have the character of a killer application. When combining this with the fact that this instant messenger is completely proprietary, it can be expected that a critical mass is very hard to reach (see §3.2.4, §4.2 and §5.2.3);
2. BlueMessenger is a completely proprietary messenger, which is not compatible with any other messenger. The user group is still very small and the competition with global instant messaging providers is extreme high. BlueMessenger will not be able to reach a critical mass of users when it stays incompatible (see §4.2 and §5.2.2);
3. The positioning of BlueMessenger in the value chain is not clear. It does not create any direct revenue. It does not create indirect revenue as well (like more minutes online), since it is unable to attract users (see §5.2.2);
4. Value added services like SMS and voice mail create a big part of the revenue of Swisscom. Internet services are competing with several of these services. On the long term, this might cause Swisscom to generate revenue only from minutes online, capacity used of flat-rate subscriptions. The threat is that Swisscom turns into a communications capacity provider instead of a communications service provider revenue streams (see §5.2).

weakness	performance	importance	priority
1 Z is not compatible and misses a critical mass of users	0.4	0.8	<b>0.33</b>
2 BlueMessenger is not compatible and misses a critical mass of users	0.2	0.6	<b>0.12</b>
3 BlueMessenger does not have a clear business model	0.2	0.7	<b>0.14</b>
4 Swisscom's revenue depends strongly on internal network based services	0.5	0.8	<b>0.41</b>

Table 6-3 Weaknesses of Swisscom regarding instant messaging

### 6.2.3 Opportunities

The following external opportunities were found that are also summarised in Table 6-4:

1. Via the IMUnified consortium or the Jabber open source platform, interoperability with messengers such as MSN and Yahoo is already possible. It is not a professional solution, since users have to register at every messaging platform for interoperability. But it is a manner to immediately give access to a big user base (see §2.2.2 and §3.3.2);
2. By May 2001, the CPIM message format of the IETF IMPP working group is finished. The APEX, PRIM and SIMPLE working groups present their CPIM based draft as well in May. By the end of 2001, these standards should have finished the standard tracks. Except AOL, all major players in the IM industry will support the CPIM message format. However it will take time before the users have replaced their old messengers with CPIM compatible versions (see §2.2.2 and §3.3.1);
3. Location Based Services are still new on the consumer market. The mobile operator has the unique position to own this location information. There lies a big opportunity in using this information for valuable customer services. An instant messaging contact list is a good manner to give access to such location information (see §3.4.2, §4.2.2, and §5.2.3);
4. Instant messaging is proved to be a sticky application that keeps users much longer on the Internet. This same behaviour can be expected on the mobile telephones when mobile instant messaging breaks through. This behaviour on leads to a need for always-on services like GPRS and UMTS. Therefore the use of mobile instant messaging can lead to GPRS/UMTS adoption (see §3.2.3 and §4.2.2);
5. When instant messaging has become a common communications tool, the link to other communications sessions is close. Under UMTS, such sessions could for example contain gaming or picture messaging that require more bandwidth. When a packet-based payment structure will be enabled, such high bandwidth applications can be very valuable (see §3.2.3 and §5.2.3).;
6. The leading web portals, MSN, Yahoo and AOL, have started a trend to charge for premium services. It is unclear what the impact will be on other free Internet services. When this development continues in the form of a global trend, it will enable Bluewin to charge for premium services as well. On the other side could the user escape from charged services bring Bluewin new users when Bluewin leaves key services uncharged (see §5.2.1 and §5.2.2);
7. Instant messaging is proved to be a sticky application that keeps users much longer on the Internet. This behaviour leads to a need for flat-rate services like ADSL. Therefore the use of instant messaging can lead to ADSL adoption (see §3.2.2 and §4.2.2);
8. As instant messaging becomes a commodity communications tool, the link to other types of communications sessions is close. Under ADSL, such sessions could for example contain video chat/conferencing, gaming and application collaboration sessions. These bandwidth requiring applications drive packet-based payment, since pay per minute and flat-rate connections can be unattractive for operators when the infrastructure is used heavily (see §3.2.2 and §5.2.2);
9. The separation of Swisscom in independent business units provides a clearer organisation and profitability structure for the shareholders, but it might harm synergy opportunities. Instant messaging provides user base sharing opportunities between Swisscom Mobile and Bluewin. This creates a win-win situation for both parties (see §1.1.5 and 5.2).

opportunity	actual from	probability	impact	priority
1 IMUnified and Jabber already enable IM-interoperability	Q1 2001	1.0	0.2	<b>0.06</b>
2 IMPP offers industry-wide IM-compatibility	Q4 2001	0.8	0.7	<b>0.18</b>
3 LBS integration make IM-services of telco exclusive	Q1 2001	0.6	0.7	<b>0.13</b>
4 IM-stickiness leads to GPRS/UMTS adoption	Q1 2001	0.6	0.6	<b>0.12</b>
5 IM-communications portal stimulates broadband UMTS services	2002	0.5	0.7	<b>0.11</b>
6 Trend to charged premium Internet services enables Internet profits	Q1 2002	0.4	0.7	<b>0.09</b>
7 IM-stickiness leads to ADSL flat-rate adoption	Q3 2000	0.6	0.6	<b>0.12</b>
8 IM-communications portal stimulates broadband ADSL services	Q1 2001	0.5	0.7	<b>0.11</b>
9 Sharing mobile and Bluewin user base gives win-win situation	Q1 2001	0.4	0.6	<b>0.08</b>

Table 6-4 Opportunities for Swisscom regarding instant messaging

## 6.2.4 Threats

The following external threats were found that are also summarised in Table 6-5:

1. MSN Messenger has a strong potential to become a commodity in Europe for these reasons:
  - MSN Messenger is or becomes an integrated part of Windows ME/CE/XP, Office XP, Exchange 2000 and Xbox game console (see §3.2.1).
  - The future software-as-a-service strategy of Microsoft (MSN.NET and HailStorm) is very strong. The set of software building blocks, code-named HailStorm promotes developers to create XML-based web services for many types of devices. Instant messaging will be positioned as a development application that enables users to do web-based e-mail, real-time stock quotes and calendar functions. Bill Gates announced to charge for new Hailstorm-based services, but the basic instant messaging functionality will remain accessible for free (see §5.2.1 and §5.2.4).
  - MSN Messenger is Europe's fastest growing instant messaging protocol and it will continue to be so regarding its wide availability to users (see §4.2.2).

The probable future commodity of MSN Messenger can make BlueMessenger unnecessary, even though it can be compatible with an IMPP standard. The premium services will be based on the .NET technology, which make them inaccessible for BlueMessenger (see §5.2.2);

2. AOL Time Warner has a strong strategic position in the instant messaging industry. They can keep this position in Europe only by the community-effect or to achieve new ISP's. Further, AOL is not cooperating in the IETF IMPP standardisation and it is not certain whether they will implement it. This way they protect their user base, but makes it hard for them to achieve new communities. ICQ still remains a major competitor of BlueMessenger. The threat of AOL in the future seems smaller than expected due to the opening up of instant messaging (by Microsoft and Yahoo in particular). However, it should be kept in mind that AOL Time Warner is a powerful and rich organisation and could be a danger when they initiate a partnership with an other Swiss ISP and/or Mobile ISP (see §4.2.2);
3. Although the need for bandwidth and flat-rate connections will grow, Swisscom will have to provide a communications service, like ADSL, that is more attractive than competing services like flat-rate cable. Otherwise the sticky instant messaging service might cause current Internet subscribers to switch to the competition (see §3.2.2 and §5.2.2);
4. The leading instant messaging providers AOL, Yahoo and MSN have developed messengers for US mobile networks. Most of these services are still based on HDML, but migration to WAP can be foreseen in the near future. This would mean that it can be directly enabled on the European WAP phones. These messengers increase the online time of the users and might lead to more broadband services within a few years. The drawback is that Swisscom loses its control over service itself and thus is not able to charge the customer for the service. Yet the push function is possible within WAP 1.2 and GPRS allows always online, it is possible for a mobile messenger to behave exactly the same like a PC-version of such a messenger (see §3.2.3, §3.2.4, §0 and §5.2.3);
5. GPS is a mature precise satellite based location information standard. It can be build in new mobile phones and provide location information for free without having to contact the mobile operator.

When such GPS information becomes directly available to WAP programs, the exclusivity of Swisscom's location based services might be harmed (see §3.4.2);

6. For so far there are no plans for an i-mode launch in Switzerland. However, NTT DoCoMo, KPN Mobile and Telecom Italia Mobile are approaching the European market aggressively with i-mode. The first launches are planned for Germany, Belgium, The Netherlands and Italy. When these launches are successful, it is possible that Swiss competitors join the alliance. This can be a big threat when it happens a much earlier than the UMTS launch. i-mode together with GPRS enables certain new services that are not yet able with the current WAP versions, like colour picture messaging (see §3.2.4 and §5.2.3);
7. WMAN can form a threat to UMTS services when it will be implemented on large scale in Switzerland. Such developments are yet unknown for Switzerland, but when implemented WMAN might give mobile users access to the Internet for free or for a low fee. This would be a serious threat for UMTS services and its margins (see §3.2.3);
8. Peer-to-peer services like instant messaging can form a threat for telecom operators when they do not adjust their business models. These usually Internet based services take away the control over services. When the mobile access to the Internet is improved, the users get access to free services via the Internet. The threat lies in the transformation from the full-service telecom operator into a data transmission-only operator that does not generate revenue with other services. This will take away several opportunities to differentiate from the competition and will decrease the margins (see §3.4).

threat	actual from	probability	impact	priority
1 MSN Messenger has potential to become commodity in Europe	Q1 2002	0.7	0.7	<b>0.18</b>
2 AOL keeps AIM proprietary and IMPP-incompatible	Q1 2000	0.7	0.5	<b>0.13</b>
3 Flat-rate cable services lessen ADSL exclusivity	Q3 2000	0.6	0.7	<b>0.15</b>
4 WAP enables mobile instant messaging	Q1 2000	1.0	0.5	<b>0.18</b>
5 Mobile-GPS integration decreases LBS exclusivity of telco	Q2 2001	0.5	0.6	<b>0.11</b>
6 Swiss i-mode adoption decreases WAP usage	Q3 2001	0.2	0.8	<b>0.06</b>
7 WMAN decreases margins of UMTS-services	2002	0.1	0.9	<b>0.03</b>
8 P2P technologies decrease exclusivity of Swisscom services	Q1 2001	0.6	0.7	<b>0.15</b>

Table 6-5 Threats for Swisscom regarding instant messaging

### 6.3 Aligning internal and external strategic issues

The strengths, weaknesses, opportunities and threats that were found in the previous paragraph will be put together in the TOWS Matrix.

To align Swisscom with the industry regarding instant messaging, these questions were answered:

- How can the Strengths of Swisscom be used to exploit external Opportunities?
- How can Weaknesses of Swisscom be overcome by exploiting external Opportunities?
- How can Strengths of Swisscom be used to avoid external Threats?
- How can Weaknesses of Swisscom be minimised and external Threats be avoided?

The answers to these questions are identified in Table 6-6 and described more extensive below the table. Before the answers, the used issue numbers of the SWOT analysis are mentioned. The answers are focused on Swisscom Mobile (MC), Swisscom Bluewin (BW) or Swisscom in general.

strengths		weaknesses	
<i>(s - o) use strengths to exploit opportunities</i>		<i>(w - o) overcome weaknesses by exploiting opportunities</i>	
opportunities	1 - MC: Use IM-knowledge to extend stickiness and enable mobile broadband-services so that 'Z' becomes an important platform for the adoption of GPRS and UMTS	1 - MC: Solve IM-incompatibility with IMPP (with IMUnified/Jabber on the short term)	
	4,5	1,2	
	2 - MC: Use and improve LBS to introduce enhanced IM-services	1,2 - SC: Compatibility between MC and BW will have a positive effect on both	9
	3	2 - BW: Solve IM-incompatibility with IMPP (with IMUnified/Jabber on the short term)	1,2
4 - BW: Use IM-knowledge and existing content resources to develop local-market IM-services	3 - 6 BW: Continually align premium service charges with global trend		
7,8			
<i>(s - t) use strengths to avoid threats</i>		<i>(w - t) minimise weaknesses and avoid threats</i>	
threats	2 - MC: Use LBS to distinguish from future WAP IM-services	2 - BW: Avoid competing MSN, AOL and Yahoo	1,2
	4	4 - 8 SC: Influence of external P2P-communications services increases, threatening value added services. Keep this in mind when making business strategies	
	2 - MC: Give cell-location based services a unique character to distinguish them from the emerging GPS-location based services		
	5		
	3 - MC: Keep leadership by regarding threats of Swiss i-mode and WMAN developments		
	6,7		
4 - BW: Use IM-knowledge to develop Swisscom supporting services for MSN .Net			
1			
5 - BW: Keep ADSL distinguishing from cable communications			
3			

Table 6-6 The TOWS matrix with recommendations for Swisscom Mobile (MC), Swisscom Bluewin (BW) and Swisscom general (SC)

#### Using strengths to take advantage of opportunities

Combining S1, O4 & O5 for Swisscom Mobile. Together with Valis an innovative mobile instant messaging pilot is launched. This project has the opportunity to let users sent more messages and to initiate other communication sessions. These other communication, e.g. picture messaging and games, can form a need for broadband mobile technologies. This way the diffusion of GPRS and UMTS can be stimulated;

Combining S2 & O3 for Swisscom Mobile. The Location Based Services form an important asset that enable new and/or enhanced services. Swisscom has the assets to start these services. For the most applications, however, it is important that location information is recent and accurate. It should be calculated that frequent location updates can heavily increase network load. The location information becomes much more valuable if it doesn't only specify a neighbourhood, but is accurate enough to determine an exact location on a city map;

Combining S4, O7 & O8 for Bluewin in general. Competing with the global IM-industry is very hard. Swisscom should use its IM-knowledge to provide exclusive services that the leading competitors do not provide. The most clear aspect in which Swisscom can distinguish itself are local Swiss based services. Examples are local movie info and ticket booking, weather forecast, local news, community services like dating. These services can be built around the IM-contact list. Most of these resources are already avail-

able at the Bluewin portal. The preference/push character of instant messaging distinguishes it from the website provided services.

### **Overcoming weaknesses by taking advantage of opportunities**

Combining W1, O1 & O2 for Swisscom Mobile. Swisscom Mobile's new mobile messenger 'Z' is a product with potential, but it will have to face its incompatibility with other mobile operators and with the Internet world. The IMPP protocols enable compatibility with Internet based messengers. Compatibility with IMPP not only provides a critical mass, it also differentiates from the competitors and might lead to new Swisscom Mobile subscriptions. On the short term interoperability can already be reached with IMUnified/Jabber;

Combining W1, W2 & O9 for Swisscom in general. The BlueMessenger from Bluewin and 'Z' from Swisscom Mobile are incompatible with each other. This is an issue that can be solved internally and provides both sides with a bigger user base. Swisscom can differentiate from the competition when it is the first Swiss operator that enables such fixed-mobile messaging. However, this is an issue that has to be solved with synergy within Swisscom;

Combining W2, O1 & O2 for Bluewin. BlueMessenger has a small user base that currently misses the potential to grow. One important reason of this is the unavailability of a critical mass of users. The IMPP standards will enable global compatibility (except AOL) and give access to big user bases like MSN and Yahoo. To play a serious role with instant messaging it is recommended that Bluewin will at least implement an IMPP standard. For direct interoperability, the IMUnified or Jabber platforms can be used. An other option for the short term is an alliance with AOL;

Combining W3 & O6 for Bluewin. Internet will always provide free services, but the choice of the leading Internet players (MSN, AOL and Yahoo) to charge for premium services might introduce a paradigm shift. This trend might support the premium services of Bluewin. Bluewin has to continually align its premium services with the global trend and the willingness of the subscribers to pay for them.

### **Using strengths to avoid threats**

Combining S2 & T4 for Swisscom Mobile. The enabling of WAP instant messaging by the leading IM-providers is a threat for SMS. Besides, instant messaging might become an external service and loose the ability to charge for messaging or additional services except the used network capacity. A manner to keep the ownership when WAP instant messaging becomes common is to integrate it with location based services.

Combining S2 & T5 for Swisscom Mobile. Mobile phones with integrated GPS already exist and can form a threat for cell-based location information. GPS makes cell-based location information less exclusive and might lead to external location based services that decrease the revenue margins. For this reason, Swisscom Mobile should make their location based services superior to GPS-based services. This can be reached by improving the quality (accuracy and update frequency) and by integrating it with communications services like instant messaging;

Combining S3, T6 & T7 for Swisscom Mobile. i-mode and WMAN are not dangerous for Switzerland at the moment. However, the aggressive i-mode approach might reach Switzerland as well and threaten the exclusivity of Swisscom's mobile Internet services. A thorough introduction of a national WMAN network is even less likely, but would very strongly decrease the margins of Swisscom's mobile Internet services. For these reasons, i-mode and WMAN developments should be regarded carefully to be able to respond in an early stadium;

Combining S4 & T1 for Bluewin. However the strongly rising MSN network is a direct threat for BlueMessenger at the moment, the open developers platform enable new services with a huge user base. Bluewin can apply its IM-knowledge to develop IM based services that are built around HailStorm. It might for example be interesting to provide a Switzerland and communication oriented application to stimulate Swiss Internet traffic. When the application is exclusive enough it might be provided as a premium service and/or attract new subscribers;



Combining S5 & T3 for Bluewin. Sticky applications like instant messaging promote always-online connections like ADSL. It should be noted that this also involves the emerging cable flat-rate Internet access network. For this reason the ADSL-service should keep itself distinguishing from cable communications. Besides quality and price this can be done with offering broadband (IM-initiated) services.

**Minimising weaknesses and avoiding threats**

Combining W2, T1 & T2 for Bluewin. BlueMessenger contains the most important functionality that an instant messenger should have. However it does not distinguish itself from the leading messengers of MSN, AOL and Yahoo. These messengers provide more functionality and a big accessible user base for free. It is of no use to compete directly with these big global competitors. Every Bluewin customer can easily get access to these leading messengers for free. Making BlueMessenger compatible with IMPP protocols is probably not sufficient. It might be better to use one of the leading messengers or to add attractive services to BlueMessenger that the leading Messengers do not provide;

Combining W4 and T8 for Swisscom in general. Peer-to-peer technologies like Napster, Voice over IP and instant messaging are emerging at a rapid speed. These services increase the time that (mobile) Internet users are online and increase the bandwidth they use. On the other side they decrease the use of internal value added services like voicemail and SMS. This development should be kept in mind when developing new business strategies. Flat-rate connections for example might give higher subscription fees, but on the other side it might lead to a decrease in value added service revenues.

## 6.4 Conclusions

The analysis of this chapter resulted in answers for the research question:

### **Which place in the value chain can instant messaging take to have a positive impact on the total revenue?**

This paragraph will provide these answers by providing proposed actions for Swisscom.

#### **6.4.1 Actions for Swisscom Bluewin**

It can be summarised that BlueMessenger has a hard position at the moment due to:

- BlueMessenger does not have a critical mass of users;
- Incompatibility with other instant messengers;
- Incompatibility with other mobile instant messengers;
- Competing instant messengers are available for free;
- Competing instant messengers have a much larger user base;
- Competing instant messengers have more functionality;
- MSN Messenger is automatically installed on new Windows systems.

Since instant messaging is becoming a commodity it can be interesting for Bluewin to be involved in that trend. To play a role in this trend, these two strategies can be followed:

1. Extend BlueMessenger's compatibility and functionality;
  - Avoid direct competition with leading messengers by exclusivity;
  - Create exclusivity by introducing local instant messaging based services, like local weather, news and cinema notification or local community services like dating;
  - Provide free IM-services to attract users and premium IM-based services to generate extra revenue;
  - Retrieve local information from the Bluewin web portal resources;
  - Implement compatibility with CPIM-based protocols when they come available;
  - Implement interoperability with IMUnified or Jabber to extend the user base on the short term (not for the long term);
  - Initiate an alliance with AOL for a large user base extension on the short term (not recommended on the long term due to a user shift towards CPIM and MSN developments).
2. Create applications and/or services on top of emerging instant messaging platforms:
  - Create an IM application using MSN Hailstorm;
  - Make this application Switzerland oriented to attract Swiss customers that generate network traffic;
  - Use instant messaging as a communications portal, to make a step towards a Communications Application Service Provider (CASP);
  - Let the messenger stimulate broadband communications, like webcam/VoIP communication;
  - Attract premium service customers to generate direct revenue.

#### **6.4.2 Actions for Swisscom Mobile**

Issues that Swisscom Mobile has to solve are:

- Applications and services that let users step over to 2.5 and 3G networks have to be found;
- Incompatibility with all Internet instant messengers;
- Unavailability and incompatibility with competing mobile operators;
- Threat of WAP-based external instant messengers;
- GPS integration might take away location information exclusivity;

Solutions to solve these issues are:

- Extend stickiness to promote 2.5G and 3G always online networks;
- Integrate broadband services, like picture messaging or games to promote 3G networks;
- Increase accuracy of location information;
- Increase actuality of location information and keep regarding its network load;
- Create compatibility with BlueMessenger and more important, with the leading messengers;
- Create compatibility with the future CPIM-based protocols and the future IMPS-protocol;

- Negotiate about selling 'Z. The friendZone' to competing mobile operators and create compatibility with them to let both parties increase the user base;
- Negotiate about selling 'Z. The friendZone' to foreign mobile operators to gain extra revenue;
- Differentiate the instant messenger from competition by providing extra presence- and location based services (based on contact list);
- Keep regarding i-mode and WMAN developments.

#### **6.4.3 Actions for Swisscom in general**

In general Swisscom is confronted with these issues:

- Opportunities of combining fixed and mobile Internet services are not used;
- Peer-to-peer technologies threaten internal network services.

These issues can be solved by:

- Make BlueMessenger en 'Z' compatible with each other;
- Create business models that are able to exploit Internet-based services;
- Keep advanced value-added services more exclusive than is possible with Internet based services (Quality of Service, unifying fixed and mobile technologies).

## 7 CONCLUSIONS AND RECOMMENDATIONS

*The previous chapters have answered the sub-research questions. This conclusion will discuss to what extent the research goal is reached. Besides recommendations for further investigations are made.*

### 7.1 Answers to the sub-research question

Conclusions for every research question are already made at the end of every chapter. This paragraph summarises these conclusions again together as answers towards the main research question:

#### 1. Which standardisation actors play a role on the diffusion of instant messaging technology?

The most important standardisation actors are:

- IETF consortium, because it has several working groups that are developing an Internet instant messaging standard;
- IMUnified consortium, because it developed an instant messaging interoperability specification that already enables interoperability between the existing proprietary messengers;
- PAM forum, because it develops an interoperability specification for the management of presence information (e.g. for unified messaging);
- W3C consortium, because it defined the MIME- and XML-protocols that are used within several instant messaging protocols;
- AOL Time Warner and Microsoft Networks, because they have large user shares in the instant messaging market and they have the power to push their technologies.

This list shows that compatibility consortia are emerging. There are no official standardisation bodies directly involved with instant messaging. However, on the field of PSTN/Internet interoperation and the related Voice over IP services, ETSI Tiphon and ITU-T play an important role.

#### 2. What are the key technologies to enable instant messaging?

Instant messaging platforms:

- Windows on a PC is by far the leading platform for enabling instant messaging. Key enablers are 'always-online' access platforms like ADSL and Cable;
- Mobile phones already enable instant messaging using WAP. This still slow and expensive circuit switched connection protocol will become more attractive when always-online packet-switched access is provided, like GPRS and UMTS;
- New PDA's and PocketPC's enable wireless connections and make mobile instant messaging more user-friendly. For intensive messaging, they are preferable above mobile phones. IM-products are available for Windows CE, Palm and RIM. Especially RIM is good for messaging due to its fixed keyboard;

Instant messaging protocols:

Compatibility protocols:

- IETF CPIM, the Common Profile for Instant Messaging that enables compatibility (target: Q2 2001);
- IETF APEX protocol, a small XML structured CPIM compliant protocol based on BEEP (target: Q2 2001);
- IETF PRIM protocol, a small CPIM compliant protocol based on long-lived TCP (target: Q3 2001);
- IETF SIMPLE protocol, a SIP based CPIM compliant protocol enabling all kinds of communications sessions. SIMPLE has a strong position due to its broad support by Microsoft (target: Q2 2001);
- IMPS, the mobile instant messaging protocol from Wireless Village (target: Q4 2001). IMPS has a strong position due to its support of Ericsson, Nokia and Motorola.

Interoperability protocols:

- IMUnified, a specification that makes current proprietary instant messengers interoperable. The specification is not published, but available for new participating companies. IMUnified is only a short term solution and already supported by Yahoo and MSN;
- Jabber, an open source specification that enables interoperability with ICQ, Yahoo and MSN.

- Proprietary protocols:
- MSN, AIM, ICQ and Yahoo!

### 3. With which services can instant messaging be integrated to enable additional services?

The main services with combining opportunities are:

#### ◆ Location services

Location services enhance the presence and availability information with location information. Leading location technologies are based on cell-ID and GPS. The Location Interoperability Forum has been set up to reach interoperability between the several location technologies;

#### ◆ Voice services

Usage of Voice over IP has emerged, although the quality of service is still low. VoIP can be enabled by an instant messaging contact list (e.g. integrated in the new MSN platform). Therefore instant messaging can drive the diffusion of voice services.

The main voice over IP supporting protocols are:

- H.323, the multimedia conferencing protocol of the ITU;
- SIP, the session initiation protocol of the IETF;
- MGCP/SGCP, a gateway protocol, which can be used between H.323 and SIP;
- Megaco/H.248, a gateway protocol, which can be used between H.323 and SIP.

#### ◆ Directory services

Directory services can be integrated with the presence information of instant messaging. The directory service can be enhanced from a information service to a communication enabling service. The directory can also form the converging factor between different devices when it knows the communications profile of users (e.g. device depending availability). Current important directory technologies are LDAP and DEN.

### 4. Which are the existing key players of the instant messaging industry?

The key players are separated into four strategic groups:

#### ◆ Internet portals

Companies that provide an instant messaging service besides their search and/or directory functionality.

Characteristics: General product orientation, global coverage, free pricing policy and extensive messengers.

Key players on Feb. 2001: AOL IM (31.0%), MSN Messenger (31.4%) and Yahoo! Messenger (15.7%)

#### ◆ Internet service providers

Companies that provide an instant messaging service to their Internet access subscribers.

Characteristics: General product orientation, national coverage, free pricing policy and Rather extensive messengers.

Key players: AOL IM(world-wide), Sunrise Messenger and BLuewin BlueMessenger (Switzerland)

#### ◆ Mobile Internet service providers

Companies that provide an instant messaging service to their mobile subscribers.

Characteristics: Rather general product orientation, national coverage, paid pricing policy and not extensive messengers.

Key players: NTT-DoCoMo/AOL alliance (world-wide), Swisscom Mobile launch in Switzerland

#### ◆ Non-portal service providers

Companies that provide an instant messaging service, but do not have a portal function.

Characteristics: General to specialistic varying product orientation, global coverage, pricing policy varies from free messengers, VoIP income to server sale and the extensivity of the products varies from rather simple VoIP messengers to extensive collaboration software.

Key players: - *software providers*: Microsoft Exchange Instant Messenger, Lotus Sametime  
 - *VoIP service providers*: Dialpad, PalTalk  
 - *Other IM-service providers*: ICQ, Jabber, Odigo and Groove

## 5. What are the trends and future key players on the field of instant messaging for the next five years?

The trends and the expected future key players according to their strategic group are:

### ◆ Internet portals

Leading portals like Microsoft, AOL and Yahoo set the trend to charge services. Microsoft started with the execution of its .NET strategy, which provides software-as-a-service. Together with the integration of MSN Messenger in its Exchange, Internet Explorer, Windows, HailStorm and future Office products and the compatibility with IETF CPIM by the end of 2001, MSN Messenger is expected to continue to be the fastest growing Messenger. This will have a negative impact on AOL.

### ◆ Internet service providers

AOL/CompuServe continues its strong position on the ISP market. Microsoft is expected to grow very fast with the integration of Microsoft ISP in its leading Internet Explorer software. Due to the expected software penetration of Microsoft Messenger, the need for other ISP's to provide Messengers declines. Bluewin and Sunrise will find difficulties with the diffusion of their messengers.

### ◆ Mobile Internet service providers

This market is still very small, but it is promising to achieve a strong growth. Mobile instant messaging on mobile phones and RIM-devices is growing strong in the US. These players (AOL and Yahoo) are expected to enter the European market soon (via WAP). Microsoft does not yet provide a Mobile Messenger, but it does have alliances with a big range of telecom operators for other mobile services. The step for Microsoft to the Mobile Messenger market is therefore small and expectable. Swisscom Mobile is one of the first European mobile operators that will provide mobile instant messaging. Their growth, however, is not foreseeable due to its proprietary incompatible technology. Instant messaging might become a substitute (WAP) as well as an extension of SMS.

### ◆ Non-portal service providers

Instant messaging will probably become a commodity in collaboration software. The role of instant messaging in customer relationship management is unforeseeable on ground of this research. The VoIP messengers are not expected to grow with their proprietary messaging technology. However, when they implement the future CPIM compatibility, instant messaging is expected to give a push to their VoIP-usage. Odigo and Jabber might play an important role if they can link themselves with more portals.

In general:

- ◆ The market leader AOL Time Warner has to open up its instant messenger by the Federal Communication Commission of the United States when they start providing advanced video services via their messenger.
- ◆ The instant messaging standard CPIM will probably be finished its standardisation track by the second half of 2001. It will be implemented by most of the leading IM service providers, except AOL on first instance.
- ◆ The instant messaging industry will become more competitive due to the CPIM standard. However, the CPIM compatible MSN Messenger will achieve a strong penetration due to its wide integration.
- ◆ The power of the customer will increase, which makes service differentiation very important.

## 6. Which technical feasible business models can be applied for the integration of instant messaging with other services?

The business models that can be used for instant messaging are indicated for every strategic group:

### ◆ Internet portals

Internet portals, like search engines, rely heavily on advertising. Since advertising is declining, these portals started charging money for premium services. Another emerging source of income is e-commerce, although it still forms a minor part of the total income. Instant messaging is mainly used to extend the services. This differentiation and the sticky character of instant messaging bind customers to the portal. Instant messaging therefore indirectly creates revenue via the advertiser since it increases value for advertising.

◆ **Internet service providers**

Internet service providers rely heavily on the compensating fee that the telecommunications carriers provide. The largest business case at the moment is thus the time that users are online. Instant messaging is a sticky application, which proved users to spend more time online.

The integrated contact list generates a lower barrier to voice and video communication, which generates even more online time and bandwidth and hence carrier revenue. This binding to the Internet of instant messaging can be a push always-online service services like ADSL. Moreover, the initiation possibilities of broadband services like video conferencing can create a need for broadband services like ADSL. In general, there is a shift from pay-per-minute (PSTN and ISDN) to pay-flat-tariff (ADSL: always-online plus limited throughput). In the United States, full flat-rate connections are common (AOL), although this complete unlimited usage seemed not to be affordable by T-Online and Bluewin).

◆ **Mobile Internet service providers**

The stickiness of instant messaging can form a trigger for mobile users. When a user sees his friend online, the barrier to send an instant message is much lower than it is with SMS. Instant messaging generates revenue directly for paying per message or indirectly via online time. The combination with location information can be an extra impulse, like contacting a friend when he is in your neighbourhood (as used in Z. The friendZone). Swisscom differentiates its mobile telephony from the competitors when implementing instant messaging and is therefore able to attract new subscribers.

Especially the presence feature of instant messaging enables new value-added services to be developed. The mobile instant messaging contact list allows a lot of new services to be initiated with the contacts, like gaming and picture messaging. This development can be important when pay per packet business models (GPRS and UMTS) are implemented. Text messages are very small and thus not generating much packet revenue. However, i-mode proved that mobile Internet can increase the conventional mobile voice calls as well.

◆ **Non-portal service providers**

The software vendors mainly use instant messaging to differentiate from the competition. VoIP providers use instant messaging for its presence feature, which drives communications and differentiates them from the competition. They mainly retrieve their revenue from gateway fees.

The remaining instant messaging service providers are very differentiated. Their largest part, like the innovators and the programming hobbyists, rely on advertising. Since these players have a much smaller user-base than the market leaders, the advertising revenues will be much smaller as well. The niche players of this group earn their money basically by selling their service/software to their specific customers.

Instant messaging provides the best direct business case for (mobile) Internet service providers, because it (still) generates revenue per called minute. Other providers use it mainly for generating more advertising revenue or just as differentiator.

**7. Which place in the value chain can instant messaging take to have a positive impact on the total revenue?**

The answers are proposed by actions for Swisscom:

◆ **Actions for Swisscom Bluewin**

It can be summarised that BlueMessenger has a hard position at the moment due to:

- BlueMessenger does not have a critical mass of users;
- Incompatibility with other instant messengers;
- Incompatibility with other mobile instant messengers;
- Competing instant messengers are available for free;
- Competing instant messengers have a much larger user base;
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Since instant messaging is becoming a commodity it can be interesting for Bluewin to be involved in that trend. To play a role in this trend, these two strategies can be followed:

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  - Create exclusivity by introducing local instant messaging based services, like local weather, news and cinema notification or local community services like dating;
  - Provide free IM-services to attract users and premium IM-based services to generate extra revenue;
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2. Create applications and/or services on top of emerging instant messaging platforms:
- Create an IM application using MSN Hailstorm;
  - Make this application Switzerland oriented to attract Swiss customers that generate network traffic;
  - Use instant messaging as a communications portal, to make a step towards a Communications Application Service Provider (CASP);
  - Let the messenger stimulate broadband communications, like webcam/VoIP communication;
  - Attract premium service customers to generate direct revenue.

#### ◆ **Actions for Swisscom Mobile**

Issues that Swisscom Mobile has to solve are:

- Applications and services that let users step over to 2.5 and 3G networks have to be found;
- Incompatibility with all Internet instant messengers;
- Unavailability and incompatibility with competing mobile operators;
- Threat of WAP-based external instant messengers;
- GPS integration might take away location information exclusivity;

Solutions to solve these issues are:

- Extend stickiness to promote 2.5G and 3G always online networks;
- Integrate broadband services, like picture messaging or games to promote 3G networks;
- Increase accuracy of location information;
- Increase actuality of location information and keep regarding its network load;
- Create compatibility with the future CPIM-based protocols and the future IMPS-protocol;
- Create compatibility with BlueMessenger and more important, with the leading messengers;
- Negotiate about selling 'Z. The friendZone' to competing mobile operators and create compatibility with them to let both parties increase the user base;
- Negotiate about selling 'Z. The friendZone' to foreign mobile operators to gain extra revenue;
- Differentiate the instant messenger from competition by providing extra presence- and location based services (based on contact list);
- Keep regarding i-mode and WMAN developments.

#### ◆ **Actions for Swisscom in general**

In general Swisscom is confronted with these issues:

- Opportunities of combining fixed and mobile Internet services are not used;
- Peer-to-peer technologies threaten internal network services.

These issues can be solved by:

- Make BlueMessenger en 'Z' compatible with each other;
- Create business models that are able to exploit Internet-based services;
- Keep advanced value added services more exclusive than is possible with Internet based services (Quality of Service, unifying fixed and mobile technologies



## 7.2 Answers to the research question

The extensive answers of the sub-research questions together answer the research question:

### **Which technical and business aspects have influence on the differentiation possibilities generated by instant messaging for the next five years?**

The major technical aspects that have influence on the differentiation possibilities by instant messaging are:

#### ◆ **Always-online technologies**

Instant messaging, as a sticky application, is able to drive always-online technologies. This applies to the fixed technologies ADSL and Cable and for the mobile technologies GPRS and the future UMTS;

#### ◆ **Multimedia session enabler**

The presence/contact list combination of instant messaging enables a wide range of multimedia communications sessions. Especially voice over IP is able to profit from instant messaging as a session initiation platform.

#### ◆ **Presence information**

Presence forms the most important part of instant messaging. The presence/contact list combination of instant messaging enables a wide range of multimedia communications sessions. Especially voice over IP is able to profit from instant messaging as a session initiation platform;

#### ◆ **Location information**

Location information can be combined with the presence information to enable much more value-added services, like location depending conversations and person-tracking;

#### ◆ **Directory services**

Directory services are able to make use of the presence information of instant messaging. Combined with the location information as well, the directory services become more powerful. It is for example an enabler for unified messaging, when it knows all possible communications devices of a user and can choose one depending on preference, presence and location.

The major business aspects that have influence on the differentiation possibilities by instant messaging are:

#### ◆ **Compatibility and competition**

The Internet competition on basic text messaging will decrease due to the IETF instant messaging standards. The competition on non-text messaging might continue, since this is not defined in the CPIM standard. Differentiation possibilities lie in the convergence of Internet messaging and mobile messaging, including real-time presence information;

#### ◆ **Diffusion by MSN-platform**

The broad Microsoft support for SIMPLE makes it a strong platform. The further efforts of Microsoft in .NET and developers platform HailStorm, enable other companies to differentiate using Microsoft's platform.

Swisscom specific differentiation opportunities are analysed in chapter 6.

### 7.3 Expectations and research recommendations

Based on user numbers, the instant messaging industry is entering a mature stadium. Technically it is a dynamic industry which will change strong in the years to come. It is recommended to follow these changes to be able to take advantage of them.

The standardisation of the IETF is not finished yet. The proposed IMPP protocol will not appear, instead the CPIM compatibility specification is under development. The IETF standards APEX, PRIM and SIMPLE are expected to continue the standards track as proposed, finishing it by the third quarter of 2001. The leading mobile phone manufacturers Nokia, Motorola and Ericsson initiated the Wireless Village consortium for the development of a mobile instant messaging standard. When their products arrive in 2002, mobile instant messaging via IETF protocols will decline, when they are not compatible with the CPIM specification.

The most important instant messaging corporations to keep an eye on are AOL Time Warner and Microsoft Networks.

- ◆ AOL is expected to keep their messaging protocols proprietary for the years to come. AOL has started with a strong focus on the mobile market. Alliances with partners like AT&T and NTT DoCoMo are already made and these alliances can be expected in Europe as well. Although AOL will loose IM market share on the fixed network to MSN, they are expected to achieve a strong growth on the mobile network.
  
- ◆ By the beginning of 2001, MSN passed AOL in user numbers and they are expected to keep the strongest growth due to the integration in every possible Microsoft product. They don't see instant messaging any longer as a product to compete with, but as a commodity just like Windows. MSN complies with the IETF SIMPLE protocol, which enables any kind of SIP-initiated multimedia session. In combination with their broad constellation of gateways, this is a global thread for the fixed telephony operators. Operators should investigate how to turn this thread into an opportunity by creating communications applications on the MSN platform. These applications should be focused on their own residential market and enable communications sessions in their most profitable way.

Instant messaging is expected to be a complement of email in the collaboration industry. This role will probably be taken by the current leading collaboration software manufacturers that enhanced their email and office products (mainly Microsoft and Lotus).

Instant messaging is playing an increasing role in the Customer Relationship Management industry. This industry is not thoroughly studied in this research, but might be interesting the business unit Contact Center Solutions. Especially website-based support is easy to achieve with instant messaging (current leader is Bantu).

Presence-WWW integration enables more application opportunities that are not particularly message based (PresenceWorks provides such solutions).

Instant messaging is NOT a killer application, it is an emerging commodity that pushes the new era in multimedia communications.

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## GLOSSARY

**2G** - Second Generation (mobile phones) - The first generation of digital mobile phones (1G phones being their analogue predecessors). 2G phones use GSM for voice services and to permit relatively low-speed (eg 9.6 kbps) data services to be used for text messaging and WAP Internet access. 2G phones will be technologically succeeded over the next couple of years by 2.5G and then 3G phones.

**2.5G** - Second and a half Generation (mobile phones) - Soon to start to replace 2G mobiles, 2.5G phones will use GPRS technology to offer always-on data connections at speeds of up to 56 kbps (the same as most conventional landline desktop modems).

**3G** - Third Generation (mobile phones) - 3G mobile phones will offer high-speed Internet connectivity (at speeds of up to 384 kbps) using UMTS technology.

**ADSL** - Asymmetric Digital Subscriber Line - Modems attached to twisted pair copper wiring that transmit from 1.5 Mbps to 9 Mbps downstream (to the subscriber) and from 16 kbps to 800 kbps upstream, depending on line distance.

**GPRS** - General Packet Radio Service - GPRS is a packet-oriented overlay to GSM networks supporting connection- and connection-less-oriented services and diverse quality-of-service mechanisms. The theoretical maximum speed can be as high as 171.2 Kbps using all eight time slots and CS 4 channel speeds. Real-life user throughput is expected to be much lower — less than or equal to 56 Kbps. GPRS will become the bearer service of choice for most GSM-based WAP services because its “always on” nature brings immediacy to WAP services.

**ISDN** - Integrated Services Digital Network - Gives a user up to 56 kbps of data bandwidth on a phone line that is also used for voice, or up to 128 kbps if the line is only used for data.

**ISP** - Internet Service Provider - An entity that provides commercial access to the Internet. These can range in size from someone operating dial-up access with a 56 kilobit line and several dozens of customers to providers with multiple pops in multiple cities and substantial backbones and thousands or even tens of thousands of customers.

**PSTN** - Public Switched Telephone Network.

**QoS** - Quality of Service.

**SS7** - Signalling System 7 - The defacto standard control protocol of the world's public voice networks. Together with the intelligent networks it did allow, to a limited degree, the ability to develop services independently of the switch manufacturer.

**TELCO** - Telephone Company - Generic name for telephone companies throughout the world which encompasses Regional Bell Operating Companies, Local Exchange Carriers and PTTs.

**MISP** - Mobile Internet Service Provider - At a minimum, MISPs are mobile gateway services that connect the wired Internet to one or more mobile bearer services.

**XML** - Extensible Markup Language - A set of rules, guidelines, conventions for designing text formats for data. This is done in a way that files are easy to generate and read (by a computer), they are unambiguous, and they avoid common pitfalls, such as lack of extensibility, lack of support for internationalisation/localisation, and platform-dependency.

**UMTS** - Universal Mobile Telephone System - The technology standard to be used in third generation (3G) mobile phones (as expected to roll-out in Japan mid-2000, Europe in 2002 and the US in 2003), and which can enable a high speed (384 kbps) data connection to the Internet.

**VoIP** - Voice over Internet Protocol - The use of the Internet for making telephone calls. The main advantage for users of VoIP connections is that they generally only have to pay their usual (local) Internet connection charges regardless of where they are calling anywhere in the world.



**INDEX**

- A**
- ADSL ..... 21
  - AIM/Oscar ..... 30
  - AOL Time Warner ..... 13
  - APEX ..... 27
  - Application layer ..... 17
  - ARPANET ..... 1
- B**
- BEEP ..... 28
- C**
- Cable ..... 21
  - CPIM ..... 26
- D**
- Data link layer ..... 18
  - DEN ..... 35
- E**
- ECMA ..... 11
  - EDGE ..... 22
  - ETSI ..... 9
- F**
- Five forces model ..... 40
  - friendZone ..... 24
- G**
- Game console ..... 20
  - Glossary ..... 94
  - GPRS ..... 3, 22
  - GSM ..... 21
- H**
- H.248 ..... 35
  - H.323 ..... 34
  - HSCSD ..... 21
  - HTML ..... 1
- I**
- ICQ ..... 30
  - IETF ..... 11
- J**
- Jabber ..... 29
  - JAIN ..... 13
- L**
- LDAP ..... 35
- M**
- Megaco ..... 35
  - Metcalfe's Law ..... 45
  - MGCP ..... 35
  - Microsoft Networks ..... 13
  - MSN ..... See Microsoft Networks
- N**
- Network layer ..... 18
- O**
- OSI model ..... 16
- P**
- PAM Forum ..... 12
  - Parlay ..... 12
  - PC19
  - PDA ..... 19
  - Physical layer ..... 18
  - PocketPC ..... 19
  - Porter ..... 39
  - Power line ..... 21
  - Presentation layer ..... 17
  - PRIM ..... 28
  - PSTN ..... 21
- R**
- REA model ..... 59
- S**
- Session layer ..... 17
  - SGCP ..... 35
  - SIMPLE ..... 27
  - SIP 35
  - SMS ..... 3, 23
  - Softswitch ..... 12
  - SS7 ..... 4
  - Swisscom ..... 5
  - SWOT analysis ..... 70
  - Syndication ..... 58
- T**
- TCP/IP model ..... 17
  - TOWS matrix ..... 71
  - Transport layer ..... 18
  - TV set-top box ..... 20
- U**
- UMTS ..... 22
- V**
- Value chain ..... 58
  - VoIP ..... 34
- W**
- W3C ..... 12
  - WAP ..... 3, 24
  - Wireless Village ..... 13
  - WLAN ..... 22
  - WMAN ..... 22
  - WWW ..... 1
- Y**
- Yahoo ..... 31
- References** ..... 89
- Research goal ..... 6
  - Research methodology ..... 7
  - Research question ..... 6
  - RIM BlackBerry ..... 19
  - Rosenberg's Law ..... 5

**APPENDIX A - FIGURE DATA**

This appendix contains the data that is used in the report's figures. It is presented in table format.

**Figure 4-3, page 44**

The number of registered users of the major IM-providers as published by Wall Street Journal  
Data source: The Wall Street Journal, FCC wants AOL to open IM, September 13, 2000

Company	users (million)
AOL ICQ	73
AOL Instant Messenger	65.5
MSN Messenger	18
CMGi PowWow	8
Yahoo! Messenger	8
Odigo	1,3
CGMi iCast	0,5

**Figure 4-4, page 45**

Actual user growth development of the IM market leaders (based on Media Metrix data) (x 1000 users)  
Data source: Media Metrix as published in: Letter to Ms. Lathen (FCC)

	Mar-00	Apr-00	May-00	Jun-00	Jul-00	Aug-00	Sep-00	Oct-00	Nov-00	Mar-01
AIM	17,310	17,320	18,000	18,500	18,650	18,700	18,550	19,291	19,200	29,100
ICQ	8,858	8,900	9,300	8,950	8,780	8,650	8,400	8,385	8,900	20,600
MSN	4,748	5,170	6,009	6,503	7,611	8,798	9,573	9,986	13,400	29,500
Yahoo!	6,213	5,736	7,952	8,457	8,700	9,371	9,541	9,497	11,700	14,700
<b>Total</b>	<b>37,129</b>	<b>37,126</b>	<b>41,261</b>	<b>42,410</b>	<b>43,741</b>	<b>45,519</b>	<b>46,064</b>	<b>47,159</b>	<b>53,200</b>	<b>93,900</b>

**Figure 4-6, page 47**

Results from instant messaging survey from Forrester Research

Data source: IM impacting wireless PDQ (pretty darn quick) - Forrester survey quotation in 3G Mobile of January 10, 2001

Survey questions	Daily (%)	Weekly (%)	Monthly (%)
Using IM has reduced the amount of e-mail I send	43.1	22.7	9.7
Using IM has reduced the amount of phone calls I make	58.5	40.9	20.0
Using IM has increased the number of times I contact people during the week	62.5	37.2	14.0
Using IM has increased the number of people I stay in contact with regularly	64.2	35.2	16.0
Mean number of people on buddy list	16.4	10.4	7.8
I usually respond to instant messages from people I don't know	68.0	82.5	89.0

**Figure 4-7, page 47**

Percentage of collaboration tools adoption. Interview results of 50 fortune 1000 companies by Forrester (The exact data that is used for creating figures can be found in appendix A)

Data source: Radjou et al., 1999 (Forrester)

	1999	2001
E-mail	100	100
Calendaring	92	94
Workflow	52	50
Web conferencing	48	70
Instant messaging	36	46
Intranet	36	36
Bulletin / Message boards	28	32

**Figure 4-8, page 48**

Number of SMS subscribers in millions

Data source: IDC, Dataquest and Herschel Shosteck according to T.J. Lorello of TCS at the Pulver Presence and Instant Messaging Conference, November 30, 2000

	1999	2000	2001	2002	2003
Western Europe	25	54	82	107	129
United States	18	30	41	54	68
Asia/Pacific	10	16	19	26	37

**Figure 4-11, page 53**

Forecast mobile Internet usage in Switzerland (Nordan et al., 2000)

	2000	2001	2002	2003	2004	2005
Mobile subscribers	4,747	5,131	5,282	5,46	5,625	5,775
Mobile Internet users	0,053	0,423	0,902	1,955	3,12	4,024

**Figure 4-12, page 54**

IM-usage in organisations

Data source: TechRepublic, How is your organisation using instant messaging technology, April 2, 2000.

Usage	%
Customer Relations Management	4,9
Inter-office communications	23,5
Workflow Management	5,4
Community building in client base	1,5
Not at all	64,7

## **APPENDIX B - RESULTS OF INSTANT MESSAGING INDUSTRY SURVEY**

*This appendix contains the data that is gathered in the sector analysis study of the instant messaging market. It is presented in table format.*

