others, mobile technology will probably move on. Too broad are the advantages of wireless communication beyond voice-to-voice applications, too affordable the devices not to assume major changes in business and social paradigms based on the "new mobility".

2 The Digital Emancipation from Time and Space: 21st-Century Mass-Media Content

2.1 Mass-Media Socialization in a Flexible Environment

Mass-media content traditionally demands users to make time and space decisions. In order to obtain a newspaper or a book consumers have to go to a newsstand or to a store. A newly released movie is only available by going to a movie theater. TV shows are usually shown only once or at best a few times. Until recently, audio-media like radio and cassette or CD were the most mobile electronic content providers. With transistor technology, the radio became mobile in the 1960s, the walkman became a household name in the 1970s, the watchman did not make it in the 1980s. Again, it was an audio-medium, the disc-man, which won in the 1990s. Now, it is the MP3 player.

The reason for the success of these devices, apart from the device size, is their behavioural function: Music and sound are potentially low-attention media; they can be used as parallel-media while being involved with other activities. Or they answer mood-management needs when they reinforce an already existing emotion in a given situation, for example, a romantic date. Thus, they are a complement or an accompaniment to another focus. Portable games, from the early Nintendo-offers to the sophisticated game devices of the early 21st-century, however, are high-attention media. These observations already hint at the important role of the situation of media use. Despite the higher convenience of nearly any mobile device, rituals, practicabilities, and behaviour patterns still determine what kind of local or flexible media content is preferred.

However, times are changing. *Media socialization* along with availability, convenience, and price affects the direction of future individual behaviour. The generation that was brought up with the laptop and the wireless phone expects a broader spectrum of mobile content. They are increasingly used to services which meet the "5-i"-criteria: immediacy, internationality, integration (of media), independence (of time and space), and interactivity. To give an example: SMS allows an even more spontaneous distribution of informa-

tion than audio-telecommunication; it crosses the borders without technological or regulatory constraints; it may be the basis for multimedia messaging; it can be sent and received with any preferred delay; and of course it is interactive. SMS may pave the way for other forms of dynamic communication. The digital environment has become potentially independent of time and space: text devices are mobile. Laptops, PDAs, new-generation mobile phones not only offer opportunities for individual communication, they also process downloaded mass-media text content. The 40 printed volumes of the "Encyclopaedia Britannica" are now a CD-ROM or an Internet-download away. The reason why e-books have not quite made it may be due to the fact that they are not really needed: they could not compete with an already existing mobile medium, the pocket-book. The specific haptic qualities of bound paper also still provide a major ritual advantage.

Nevertheless, modern media socialization means that the early 21st-century witnesses a quiet revolution of time-and-space independent media (Noam, Groebel & Gerbarg, 2003). The digital cinema of the future is fed by satellite-distributed movies. If it were not for the theater as a location of high-quality sensual and social attraction or for the financial need to keep certain value exploitation chains, it could be skipped altogether in favor of a direct link to the home. This would certainly be facilitated by the success of the home theater with LCD or large plasma screens and Dolby, THX, or new forms of surround sound. For movies, the time step until they reach homes or people on the move has melted down. Discounting piracy, the time-span between first release, and following video-on-demand, DVD, pay-TV, and free-TV distribution has remarkably shortened. Potentially, the DVD makes a movie mobile within a few months of opening night. Yet, small devices are inferior means for movie watching. Who could imagine watching "Gone with the Wind" or "Gangs of New York" on a small mobile display? Again, there is a relation between content format, its function, and a viewer's mobility need.

Further indicators of the increasing electronic flexibility revolution are the hard-disc recorders (PVRs) for TV that challenge the fixed-schedule watching of programs, as well as the navigation based car TV-screen, and particularly MP3 players and other data-compression technologies for music. They have moved from limited-storage media like vinyl, cassette, or CD to downloaded "unlimited" hard-disc sound pools with thousands of songs on a small device. The music industry still does not have a convincing business model to respond to this move from physical to virtual space that may replace the physical CD with some form of subscription service.

2.2 From Multimedia to Polymedia

Despite the prepared grounds for a new age of electronic mobility, one major challenge to the breakthrough of all kinds of mobile content remains: the lack of systems-interoperability. The laptop and some PDAs may integrate many functions of information and communication. Yet, the small device dream-machine which is the epitomy of digital convergence does not see the light of the day because of a lack of technical commonality, collaboration, common platforms, copyrights, and competition. UMTS could be a potential basis for the small intelligent device linked with different peripheries across time and space: the hardware would carry the mobile digital center to link any service subscription to movies, music or other mass-media with the periphery devices that will be used for media consumption such as plasma-screen, HiFi, or an Internet-booth. This goes beyond the 1990s idea of one single monitor that unites all contents, known as *multimedia.* Now, we have an emerging intelligent mobile center which hooks up with the adequate local device via UMTS, W-LAN, or Bluetooth, which could be called *polymedia.*

3 Perspectives for the Mobile World: Consumer and Society

3.1 The Consumer

Media socialization is not only driven by convenience and a good financial cost-benefit-relation. They are necessary but not sufficient conditions for the adaptation of a new or recent technology. Although prospective consumer research usually can "prove" the advantages of a new product, reality often shows a random success in the market. Human behaviour is too complex for easy forecasts even with the most convincing technology.

If it were about convenience only, mobile content would make it big: it is available 24 hours, at all places, it can be customized, and it offers the 1990s' digital dream on convergence between communication, information, transaction, entertainment, and coordination. The communication part has indeed become a great success. And SMS became an unexpected hit. Yet, other parts of mobile technology remain hidden. Whether it is song-recognition software (you hum a tune into your phone and receive song title and artist immediately) or hotel booking services, these service providers are not close to a mass-audience.

Although forecasts are nearly impossible, some necessary conditions for mobile content success can be defined. These parameters are related to the fact that human behavior, despite much variation, shows some continuity across time and space. People need orientation, they seek distraction, they like to communicate with others, they appreciate doing and controlling things, they want to be thrilled. In other words, the psychological dimensions of cognition, emotion, interaction, action, and surprise are a basis for determining mobile content success.

Cognition. News and other useful information has always been regarded as a major driver for any (mobile) content considerations. Yet, surprisingly, the mobile phone has not become the center of news-gathering for users despite some interesting service-offers. Even during the September 11 shock the devices were mostly used for audio-communication rather than for mass-media texts. People rushed instead to the nearest TV-screen or radio-set, and even the Internet was dominated by personal e-mail exchange. Only when users want to access information while they are involved with other activities, for example, during an official meeting or while travelling, does the small size of the mobile unit become an advantage.

Nevertheless, mobile news and information content signifies a paradigm change: even when ritualized with the morning and evening TV-news, people used to "go to" the information. Now, customized information is coming to people regardless of the situation they are in. The stock exchange is a good example. The pre-programmed service has a perfect fit for reaching everyone at anytime and facilitates quick decision-making. For mobile content, the cost-benefit relation including the personal value of the received information is a crucial factor. For information which creates a personal advantage, the omnipresence of mobile services is of utmost importance.

Table 1: Some behavioral principles of local and mobile device based communication

Behavioral Modus	Local Device	Mobile Device
Cognition	Person-to-information	Information-to-person
Emotion	Scheduled mood management	Mood creation anytime
Interaction	Appointment centered	Spontaneity centered
Action	Specific environment based	Situation based
Surprise	Prepared	Unprepared

Therefore, any information content for mobile devices is determined by two cognitive decision-making tendencies: the personal *importance* of the received data, and/or the ability to replace existing information- and news-seeking *rituals*. It has also been argued that the small-screen display of the mobile unit would not support moving news images. However, unlike a big Hollywood production, the fast and short-term character of newscasts would suggest a mobile application even in thumbnail-format. Customized services which address more specific interests of the individual user will probably become more important, whether it in personal leisure time preferences or professional needs. As the development of new software for small target groups does not necessarily meet a balanced cost-benefit relation, the "import" of already existing services, for example, in collaboration with mass-media content providers through strategic alliances is an adequate option. With the increasing interactivity, particularly between TV programs and the consumer (call-ins, polls, tele-shopping), the door is open to not only use the mobile as a sender *to* broadcasters but also as a receiver from them.

People believe that their information seeking is solely based on rational decision-making and cool cost-benefit considerations. Yet, it is not. Only for major challenges complex cognitive processes are applied. Mostly, daily routines determine information seeking and processing. However, as mobile content is further decreasing the need to become active and to "go to" information it is an a-priori fit medium to serve the high- and low-involvement consumer.

Emotion. Even for rational applications or in business environments attractiveness and emotion play a major role in decision-making for new forms of content. Whether users opt for new technology, whether they are interested in new kinds of programs or services is not primarily determined by rational calculation. It is the expected thrill and emotional extra-value that are major factors to consumers. This starts with the design of the hardware, focuses on the fun that users may have in applying new software and in exploring its different possibilities, and extends to the emotional value of the service and the closeness to users' own interests and identity.

Apart from the relatively stable motives which drive any leisure time, e.g. hobbies, a so-called "mood management" plays a particular role. This concept assumes that media content is used primarily in order to steer or to support one's situational emotional states. If people are in a sad mood they prefer sad music if that particular mood is "liked". Even love-sickness easily falls into this category. If people want to change the mood they go for light content. A funny movie may be the answer. Research shows that this even works unconsciously. People usually do not make long-term plans for consuming music, movies or television programs, they act more or less sponta-

neously without applying complex decision-making processes as they would in a business environment. Usually, the mood-management media are local. With the exception of portable CD players or hard disc recorders, most leisure time and thus mood-management-media are to be found at home. However, as mood is a not a planned psychological factor it is plausible to extend the possibilities of active mood-management to any given situation. Here, mobile content is the perfect answer. Music, indeed, has been a model for this application. It can of course be extended to any other kind of distraction or mood-related service.

In this context, cognition and emotion are parallel processes: One can passionately dive into a symphony or a rock-song, say Brahms' "First" or Aimee Mann's "Lost in Planet", and at the same time consciously enjoy their musical structures. One can also be involved with work or shopping and be pleased about a background-sound. In fact, this is a separate genre: "muzak". Cows were found to produce more milk when they are treated with music that is easy to listen to. Even students can get better grades when they do their homework backed by music. Whether this is true for all genres is yet to be demonstrated. However, the logic is there: information is processed better if a mild state of emotional arousal increases attention and a positive mood. Again, it is plausible to exploit this principle in a mobile content context. Until now, the accompanying mood-management applications, for instance, for music in a shopping environment, have to assume an average mainstream taste. Linking one's own media taste with an external environment is technologically within reach: the portable earphone-device partly "encapsulates" the user within, for example, a shopping situation. Recent laser technology seems to be able to address several individuals specifically with their own sound in an identical situation without earphones. One could imagine a shop where the customers either choose their own pre-defined local sound environment or where their portable units are, via W-LAN, linked with the periphery of the local laser sound system.

The relationship between emotion and cognition can systematically be described in terms of involvement. Depending on an individual work, an individual leisure, or a communication context, three levels are to be distinguished: low, middle, and high involvement. Table 2 shows a possible classification with examples.

Low-involvement means that any content forms pure background media like an audio- (visual) wallpaper. It never actively grabs any conscious attention. Yet, it creates a certain mood. Imagine the shop or the café with their respective sounds. For leisure and work, the customized muzak example was already explained. For communication, even if it may be perceived as a "horror" scenario for many, one can imagine a customized "soundtrack" for the

Table 2: Examples of mobile mood management content depending on the situation

	Leisure	Work	Communication
Low-Involvment	Customized muzak	Customized muzak	Telephone soundtrack
Mid-Involvment	Parallel TV	Parallel Digi Games	Live report sports
High Involvment	Mobile movies	Relaxation-break TV	Export my own music

mobile phone, for instance, in a romantic conversation. Music works in the face-to-face context, it could also work on the mobile.

Mid-involvement means that attention is not permanently, maybe not even primarily, focused on the audio-visual content, yet, it can be created anytime depending on interest or the arousal value of what is offered. Television is a good example. Maybe particularly in its potential (mobile) "thumbnail" form it may partly replace the radio as a "parallel" medium with the exception of the car. When users are actively doing something else, their attention may turn to the medium, however, for the news or for a good. In the work context, psychologists even suggest that PC, laptop, or the mobile should regularly or at random offer brief mood-management distractions in order to increase the efficiency of activities through relaxation breaks. And a group get-together during an important sports event would profit from the possibility of briefly following the more suspenseful moments.

High-involvement is one of the most interesting mood-management applications. With the already described mobile society, people regularly find themselves away from home, at a hotel, an airport, or in a train. Music and the press have already made it into these environments, for example, with a printing-on-demand version of "The New York Times" in hotel lobbies. Yet, apart from the unsuccessful "watchman" of the 1980s or the portable DVD-player audiovisual content is not yet accessible in any given situation as a whole mood-management spectrum. Even with portable hard-disc devices, the choice would always have to be limited due to a lack or expense of capacity. Here, UMTS or future generation technology comes in. Linking the intelligent mobile unit with a local periphery, for instance, the plasma-screen in the hotel room would create exactly the same mood environment as in the home. For the work context, longer breaks would afford the possibility of alerting the user with his customized news or special interest TV, and every music fan knows the need to enthuse one's peers about the actual

favorite sound choice. Only the small mobile unit, linked with a HiFi-periphery (via W-LAN or bluetooth) offers all the fun. These are examples of how the mobile world can answer the situation based mood-management needs of the users depending on their respective involvement levels.

Interaction. Driving forces of any medium are the desire to belong to a certain group, to communicate with others, and to interact with people. Recent findings of the "World Internet Project" (Cole et al., 2003; Groebel & Gehrke, 2003; UCLA News, 2004) show that on an international scale the Internet is primarily used for communication, that is, e-mails. Mobile content, thus, which answers the particular communication needs of people is perfectly fit to be a success in the market. SMS is a good example. A particular group, namely teenagers, turned this mobile application into a success. It is practical, it is the only medium to enable communication in nearly any given situation including the classroom and of course it is a demonstration of fashionable and hip appearance.

Gender relations are, in this particular context, an important area. The first experiments to create a mutual profile recognition software for portable devices did not succeed. People would feed their personal profile and preferences into their device which then would, if a fitting partner would pass by, create a connection. However, a more advanced application could find its market. The Internet services "friendster.com" or "match.com" with their huge success show a vivid demand for connections. As meeting people is a mobile activity, it is more than plausible to apply this kind of service to the mobile content world. For business, an additional application could extend data-mining procedures which were one driving force behind the 1990's e-commerce models from a personal profile logic to a situation-typology logic.

Action. Apart from security considerations that still apply and that may prevent consumers from using electronic devices more often for business interaction (Groebel et al., 2001), any mobile service that allows a form of transaction is, in principle, plausible. Whether it is work, entertainment, finance, or managing the household from a distance, all these areas include activities which fit perfectly with any mobile service. The fact that action is potentially a 24 hour need makes the portable communication unit fit for a situation-based "management center". Tele-working was a dream idea of the 1990s. Despite some already established platforms it has not been realized to the anticipated extent. Still, many business areas would find a much more convenient working environment if the concept of mobility and situation-based action had a more consequently developed infrastructure. Thus, it makes sense to revisit the tele-working ideas and to see how they could be applied not only to the home environment but to a mobile context. If telecommunication has become a quintessential and necessary part of the business world,

the idea of mobile-supported work is not far from reality. It can be improved regarding the information processing which is also a necessary part of any job, but it can also be applied to decision-making based on electronic logic. And of course the same holds true for payment and buying transactions. Two arguments may be used to explain why the idea of product displays in the streets or on TV screens and subsequent ordering via the (mobile) phone has not been as successful as forecast. It may have to do with (1) the fact that it had not yet become a mass application and (2) that the exact analysis of the psychological necessities to support such a concept had not been answered in a satisfying way. To summarize: many people would like to use mobile devices as an action and transaction steering device. Those applications will gain ground in the future.

Surprise. In the perfect consumer world, market research is supposed to lead to the successful introduction of a new product. Reality is different. Particularly with electronic devices, spontaneous and unexpected bottom-up applications often become successful. The telephone is a good example. When it was introduced in the late 19th-century, forecasts centered on the transmission of music and on limited business applications. The rest is history. More or less the same happened with SMS. Only a few would have expected it to become a major communication tool. Thus, platforms which leave enough space for spontaneous applications and which provide do-it-yourself (DIY)-tools potentially pose successful opportunities for the mobile world.

Taken all the different human behavioral factors together, the answer of mobile content success does not primarily lie in an either-or-application. It is rather the specific combination of those factors for the development of any mobile service that is essential. Business is not only about information processing, it is also about emotions. Emotion, vice versa, is also partly based on conscious decision making, partly on unconscious mood-management tendencies. All of that relates to potential action and definitely to interaction with other people. And surprise is an essential driver in all areas of life including business.

It is not possible to create a formula for mobile content success. However, at least the discussed factors should be considered. Thus, a mobile success formula would read:

$$M = C \times F \times S$$

Mobility success is a function of content, the functionality for human behavior and the respective situation a person is in.

3.2 Society

With an integrated inter-operable and saturated high-capacity mobile infrastructure, major changes could occur in the further development of society. Whether it is information-seeking, business, or leisure-time, the dominant scheme for behavior in the traditional world is still that users, citizens, or consumers have "to go to" whatever they want. Thus, part of physical mobility still means moving towards the targeted objectives. Communication has shown some of the potential changes. With the telephone and with e-mails, communication frequencies have further gone up, but this does not necessarily reduces the face-to-face contact between people. However, mobile communication itself has shown how a situation-based behavior tendency occurs in the face of a given opportunity. In the mobile world people just like to communicate to others what mood they are in, which place they are at or what they are going to do next. Thus, communication partly has become an end in itself. The step towards other kinds of behaviors outside pure communication is only a small one.

For society, these developments would basically mean a paradigm shift from the P2S (Person-to-situation) infrastructure to a *S2P* (Situation-to-person) pattern. Services and products already accompany people to a certain extent. That logic would develop further: Whatever users want in a given situation, whatever preferences they have, it could be fulfilled on-site immediately. This creates an *option-society* where the 24-hour-universal world becomes reality. The way is paved on a small scale with the "not so silent" revolution in music services (MP3, etc.) or with people slowly getting used to always being able to make their media choice whatever the content may be (hard disc player, satellites, etc.). With only a little fantasy involved, this option society sees a social and cultural convergence moving away from a phase-oriented sequential world toward a situation-oriented parallel one. Individual behavior is often influenced by locations that are connected with certain periods of life or phases, for instance, college, university, job. Often, only the need to address people together at the same place defines those phases. However, in many areas a deliberation from fixed locations via mobile information and communication technologies would, at the same time, mean a shift from this phase-determination to a situation-oriented paradigm that is based on the needs of a particular situation. For example, linking people in the mobile world with any kind of information or training in any situation could result in a meaningful convergence of job and education. Life-long learning makes sense in a world where knowledge needs to be permanently renewed in order to keep track of work demands. After basic education, more flexible forms of

knowledge acquisition and management can be realized based on the mobile *S2P*-paradigm.

More specifically, it is not demographics like age or social background and thus certain work or leisure time locations that need to determine preferences and facilities of people. It is purely the (sometimes spontaneous) motive to immediately receive or apply what is wanted. However, we still think in terms of phases when it comes to education. For example, up to 70% of people, particularly those employed in SMEs, are never systematically confronted with refreshed knowledge content after having finished their basic education. This, among other factors, leads to the fact that the elderly are not systematically linked with the most actual information on a permanent basis. This supposedly makes them unsuitable for work at a later age stage. At the same time, parts of the world see a systematically increasing gap between the time percentage which people spend on the job and the whole life cycle. This creates major social and economic problems: leaving work at 60 to 65 and still being physically and cognitively fit, yet, having another 20 or more years to live without work does not fill everyone with pleasure. On top, many economies suffer from a system where the whole community has to finance the non-working population. With the increasing gap between working and non-working time, the refinancing problem increases dramatically.

Of course, it is not for the mobile world to solve these problems. Yet, the underlying situation-based information and transactions paradigm could definitely make a difference. It would assume a permanent training- and information-based infrastructure and thus challenge the traditional age-frontiers. People would be linked with educational information at any given time and space. This associates media in a positive human-development context, unlike the frequent skeptical perspective (Groebel, 2002). Thus, the mobile paradigm opens the door for a more situation-based social approach. It supports the argument that we see an evolving society that may be called *option-society:* time and space do not determine anymore what kind of behavior is preferred, in business transactions, media consumption, work, and private behavior patterns.

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