Understanding the Foundation of Mobile Content Quality
A Presentation of a New Research Field

Pär Landor

Institute for Advanced Management Systems Research

Åbo Akademi University

Lemminkäisenkatu 14 B

FIN-20520 TURKU

FINLAND

par.landor@abo.fi

Abstract

This paper studies some problems regarding mobile content quality (MCQ). Since the reason for communication is to be useful, we think that the only way of creating precise target group hitting mobile content is by thoroughly understanding MCQ and how it can be created. We present the results of a Finnish mobile user survey in which the users clearly point out MCQ areas that have to be improved in order to create secure, personalised, value adding mobile content usage and mobile commerce. Only media that add value to the user will be successful. Thus, we must understand that the underlying aspects of security, performance, usefulness, cost, and communication values are steering the general mobile value-adding features of personalisation, localisation, timeliness, ubiquity, and performance. These value-adding mobile features are again the ones that steer mobile content quality characteristics. We end up by presenting the path to mobile content quality − a new and important research field.

1. Introduction

Each information medium seems to mould its content, i.e. the product, in to a specific form, including specific information quality features, in order to make the product hit its target group efficiently. That is why, for example, newspaper content differs from television content, which differs from radio content etc. The way different media use and handle the same content in different ways also depends on the user context at hand. Newspapers, television and radio stations use different languages, forms, layouts etc. when for example reporting on sports and when dealing with political analyses.

We believe that the mobile medium differs totally from any other medium in its information handling, personalisation and flexibility features. The first pilot UMTS networks, which enable the use of 3G and 3,5G mobile devices, are up and running, but mobile communication is in general still merely about phone calling, sending SMS messages, and about navigating on the Internet anywhere, anytime. Mobile communication, i.e. mobility, with its value-adding features of personalisation, localisation, timeliness, ubiquity, and convenience [1] is, as we see it, the most flexible, interactive, and effective medium we have ever seen. Never before has the medium user had the ability to get what content the user wants, when ever the user wants it, wherever the user wants to consume it.

Information is a product even though it is not tangible. We believe that the mobile 3G and nG revolutions will create a keen atmosphere of competition on the mass communication market in general and on the mobile commerce market in particular. This will increase the "noise" on the market, which will − just like the segmentation of the mass communication markets − lead to a want to reach your target group as efficiently − rapidly and economically − as possible. In order to succeed in hitting the right spot on the communication dartboard with only one dart, we suggest that the mobile commerce producers need to understand the decisive role of *mobile content quality* (MCQ) as the sureness in aim.

The objective of this paper is to outline a way for understanding the foundation of MCQ. Our second objective is to line out a new field of research, namely the important research field of mobile content quality. We

start with a mobile consumer survey in mainland Finland and on the Åland Islands conducted by IAMSR [2] at Åbo Akademi University based on which we move on to establishing an outline of a basic foundation of mobile content quality. The survey demonstrates which barriers and benefits Finnish mobile users see in using mobile products and services. We end up discussing the mobile quality aspects we have pointed out as well as discussing which the next steps in mobile quality thinking and research can be. The purpose of this paper is to invite to a discussion on mobile content quality characteristics, their decisive role for mobile communication success, and how to improve mobile communication success by thinking in terms of mobile content quality.

Since the whole purpose of communication is to be useful [5], we suggest that when a mobile commerce producer (sender) wants to optimise the consumer's (receiver's) acceptance of her mobile products and services, the producer has to (1) know her customers' wants and needs, (2) know the customers' usage contexts, and (3) be able to maximize the MCQ for this particular customer segment. We suggest that MCQ is the sureness in aim for any mobile communication and commerce activity. In order to optimise the MCQ, the sender also has to understand that the general value-adding aspects of mobility, i.e. personalisation, localisation, timeliness, ubiquity, and convenience have to support and be supported by the general MCQ characteristics we will present in this paper.

English [9] states that "There is and must stand only one purpose for improving information quality: to improve customer and stakeholder satisfaction by increasing the effectiveness and efficiency of the business process". We agree with English.

2. The empirical study

In March and April 2002 IAMSR at Åbo Akademi University conducted a consumer survey in mainland Finland as well as on the Åland Islands [2]. The Åland Islands form an autonomous and demilitarised mainly Swedish-speaking province of Finland and is a good cross-section of the mainland Finnish society, but with a different, well-defined cultural framework. The objectives of the study were to investigate to what degree mobile users rank different barriers and benefits of using mobile products and services. 1000 questionnaires were sent out to a probability sample of respondents in the mainland. Of these 487 responses (48.7 %) were accepted for the study. Respectively 300 questionnaires were sent out on the Åland Islands, 185 (61.7 %) of these were approved

for the study. The study covered mobile users, both genders, both languages, i.e. Finnish and Swedish, and people from 16 to 64 years of age. The respondents were to give their opinions of barriers and benefits of mobile service usage on a scale from 1 to 5, where 5 indicated a strong agreement and 1 strong disagreement with given statements in the survey.

The benefits and the barriers of mobile service usage were investigated with the same respective questions on the mainland as well as on the Islands. Thus, the respondents judged the following statements of mobile service *benefits* (5 = strongly agree, 4 = partly agree, 3 = cannot say, 2 = partly disagree, and 1 = strongly disagree): (1) Reduced prices − special offers; (2) Uniqueness − services available only via a mobile device; (3) Effective time-management; (4) New dimensions of communication; (5) Enhancing communication; (6) Personal information; (7) Enhancing the social status; (8) To be trendy/up-to-date; (9) Entertaining features; (10) Real-time alerts and information services; (11) Convenience and handiness; (12) Flexibility − anywhere; anytime; (13) Unfamiliar with using a computer; and (14) Only access to the Internet.

The *barriers* of using mobile services were investigated with the statements: (1) Fear of loosing one's privacy; (2) Security risks; (3) Poor coverage of data networks; (4) Uselessness of service; (5) Lack of new mobile devices on the market, (6) Small screen size of mobile devices; (7) Services are complex to use; (8) Mobile devices are complex to use; (9) Slow data connection/flow; (10) Limited capacity of mobile devices; (11) High operating costs; (12) High initial costs.

The data was analysed by age group (16-22, 23-35, 36-50, 51-65 years) as well as totally, i.e. as an average of all answers per statement.

2.1. The outcome of the study

The results shown as totals in the figures 1-4 below clearly point out some important areas of both barriers and benefits of mobile service and product usage. On the Island as well as in the mainland all our statements of potential barriers were agreed on with values >2.8. Even the evaluation of the benefits seemed to follow a quite similar path in both geographical regions. However, here the respondents also strongly disagreed with our statements. On the Islands, getting personal information, enhancing the social status, to be trendy/up-to-date, entertaining features, being unfamiliar using a computer, and only having access to the Internet were disagreed upon as being benefits for using mobile services with values <2.4. The same picture appeared in the mainland

survey, where the respondents disagreed to our benefit statements by values <2.5. Agreements >3.0 were found for new dimensions of communication, enhancing communication, real-time alerts and information services, convenience and handiness, and flexibility. The ovals in the figures below show areas of interest later on in this article.
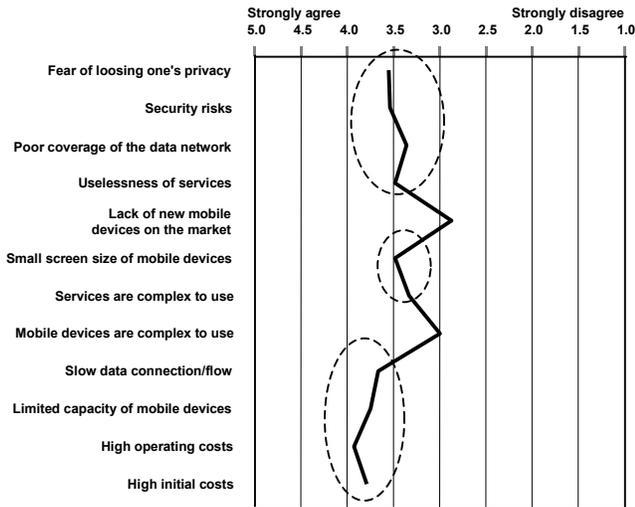

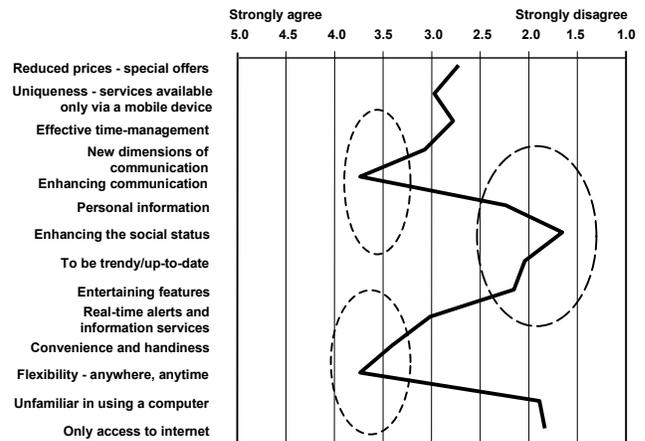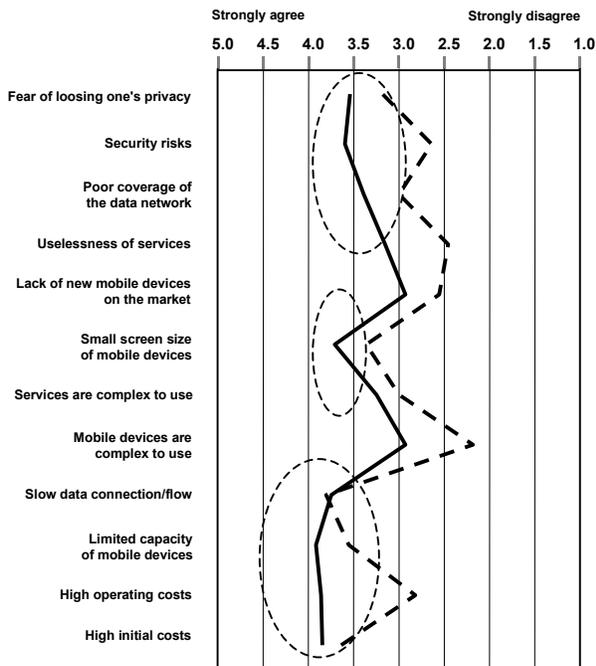**Figure 1. Barriers for using mobile products and services in mainland Finland.**

Figure 2. Mobile barriers on the Åland Islands. In the age group of 16-22 years the mobile users (the broken line) are over all more positive to using mobile products and services.

Figure 3. The benefits of using mobile products and services in mainland Finland.
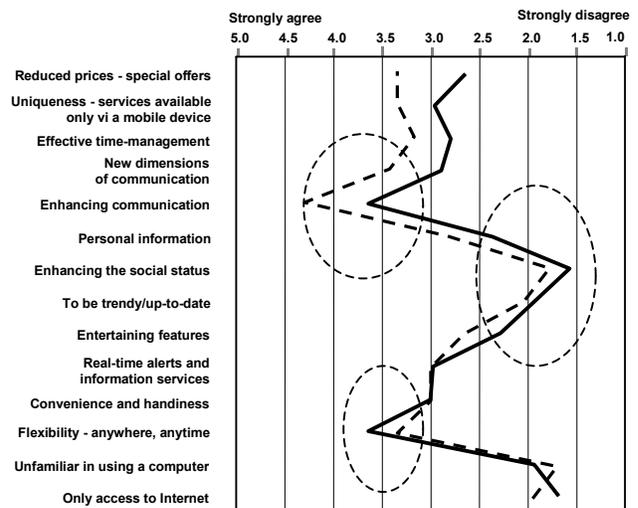

Figure 4. Benefits of mobile products and services on the Åland Islands. The broken line responds to the opinion of the group 16-22 years

The survey exposed some areas of benefits and barriers that seem to be essential to deal with in order to increase consumer acceptance of mobile products and services. The fear of loosing one's privacy, security issues, poor network coverage, and useless of services seem by the consumers to be strong barriers for using mobile products and services. The small screen of the device as well as slow data connections and flow, limited device performance and high costs also stick out as heavy barriers (the ovals in figures 1 and 2). The broken line in figure 2 indicates that the youth (age 16-22 years) does not see the barriers as severe as the older people do. The youth does not even regard operating costs as a problem. One explanation to this may be that the parents pay the mobile bills of their children. Nor do the youngsters consider the devices too complicated to use. The more positive attitude of the youngsters is, however, no surprise, since many of the respondents probably live in mobile tribes [3] [14].

The barriers seem to be grounded on intimacy fears and to some degrees on lack of faith in mobile products and services and maybe also resistance to change to some degree.

In section 5.1. we will discuss these main barriers in terms of mobile communication areas with lacking degrees of content quality.

The benefits gave us the same structure of strong agreements as well as strong disagreement in both geographical areas (ovals in figures 3 and 4). Mobile products and services are regarded as ways of enhancing communication as well as new ways of communication. Flexibility also seems to be a very strong benefit for using the mobile medium. Speaking in quality terms, these areas with strong benefit agreement indicate that effective communication and flexibility in communication are understood as good quality mobile characteristics. The broken line in figure 4 shows again the opinion of the youngsters. As expected they are very positive to the new dimensions of mobile communication.

Despite that the respondents are mobile users they seem to be sceptical towards personalised information. This is surprising, since the mobile medium is a highly personal one. This outcome can, however, be a result of intimacy fears. To be trendy, new entertainment possibilities, real-time alerts and information services, as well as operating a computer or having only mobile access to the Internet are not concerned as great benefits of using mobile products and services.

3. Quality

Of the handful of worldwide quality gurus W. Edward Deming is best known for starting the Japanese revolution in quality excellence after World War II. Deming's [6] [7] [8] basic philosophy is that quality and productivity improve as variation decreases. Deming defines "quality" as "Whatever the customer needs". Joseph M. Juran is credited with part of the quality success story in Japan. According to Juran [12], there are two kinds of "quality": "Fitness for use" and "Conformance to specifications". Philip B. Crosby is best known for his concept of zero defects in the early 1960s [4]. Crosby's theory of quality in a single word would be "prevention". Crosby's definitions of "quality" are: "Conformance to agreed requirements, and "Doing what we said we would do". Kaoru Ishikawa [11] is a somewhat forgotten guru in the world of quality. A simple set of tools that Ishikawa developed and put into wide use in Japan is the Quality Circle. Ishikawa defines "quality" as "Customer satisfaction". Armand V. Feigenbaum [10] is the originator of Total Quality Control. He emphasized the administrative viewpoint and considered human relations as a basic issue in quality control activities. Feigenbaum says that "quality" means, "Best for certain customer conditions." He stresses that quality does not mean "best", but best for the customer use and selling price.

3.1. Quality and value

If a product or service is fit for use, or it conforms to our requirements, we seem to be dealing with something that is value adding to us. The assumption of equality between value-addition and good quality is strongly supported by Joseph Juran [12] who states: "The fitness for use of an acquisition can only be assessed based on a thorough understanding of the relevant customers and their needs. Value is the relative cost of acquiring quality. If two different supply chains are able to produce a product with identical fitness for use, the chain, which can achieve the required fitness for use at the lower total cost of ownership, is the one with the greater value. Therefore, the ability to provide a given level of quality at a reduced total cost of ownership will always result in value generation." Juran does not, like Crosby does, believe that quality is free. He explains that there is an optimum point of quality, beyond which conformance is more costly than the value of the quality obtained. Crosby [4] agrees with Juran that there is an aspect of monetary value in the concept of value. Crosby claims that it is an

erroneous assumption that quality is an intangible and therefore not measurable. Crosby says that there is a way to measure quality − cold hard cash. More recently Lillrank [14] states that a high-quality item obviously carries value. However, in a strict sense, value is something that only can be realised in a transaction. Lillrank concludes that the final value of quality is defined by the transactions it enables. Transactions are parts of a market mechanism. English [9] states that, in an information quality setting, the value basis is the costs associated with the access and retrieval of information for use to add value. English says that Value = Benefit − Cost. For information products it means that the value basis is the costs of applying information − for example, the cost of applications that access or retrieve data − and to use it to perform work to solve a business problem. This means that even 100 percent complete and 100 percent accurate information has no tangible value; it only has potential value. Information value comes from its use, not from its existence.

Since the purpose on information is to be useful, it means that good quality, i.e. to the receiver value added information, triggers some kind of action. No matter if we believe that value-added information creates economic values for the receiver or triggers action that immediately cannot be measured in monetary terms, we find it quite clear that good quality mobile content equals to value-added content to the user of it.

3.2. Quality of information

A great deal of research has been done on quality of information. Juran [12] defines quality of information in the same way as he defines "quality" in general: High-quality data is data that is fit for use in its intended, operational, decision-making, planning, and strategic roles. Fitness implies both freedom from defects and possession of desired features. Juran's definition of information quality, showed in table 1, still covers most of the aspects recent research on quality of information has come up with. Juran's definition will function as a corner stone further on in this paper.

Table 1. Juran's definition of quality of information.

Free from defects		Possesses desired features
• Accessible • Accurate • Current • Complete • Consistent with other sources	Fitness for use	• Relevant • Comprehensive • Proper level of detail • Easy-to-read • Easy-to-interpret

Crosby [5] presents a rather similar view of information quality: "Communication is getting the message to the areas that need it in a way that will be accepted and implemented. That requires both credibility of presentation and integrity of content useful", and "When we can communicate with others in a way that helps them make the choice that is best for them, we are being useful. When we aim it at something that is best for us, and not for them, we are not being useful. The whole purpose of communication is to be useful." More recently (see also [17]) Wang and Strong [18] have presented an information quality framework consisting of four categories for classifying 15 data quality attributes. The four information quality categories are intrinsic, contextual, representational, and access, under which the data quality attributes sort. Lillrank [14] defines "quality of information" as its ability to generate action. English [9] presents a business-oriented definition that also has its roots in the quality gurus' theories: "There is and must stand only one purpose for improving information quality: to improve customer and stakeholder satisfaction by increasing the effectiveness and efficiency of the business process."

The quality aspects of mobile content have hardly been investigated at all. We assume in this paper that since mobile communication is a human information distributing activity, the quality roots of the mobile content is found in the basic information quality characteristics stated by Juran.

3.3. Mobile value-adding features

Carlsson and Walden [1] define the general value adding features of the mobile medium as (1) *person specific*, (2) *location specific*, (3) *time specific*, (4) *ubiquitous,* and (5) *convenience*. In their definition this means (1) *Personalisation*, which can be achieved by creating services that customise the end-user experience for the individual subscriber. It can be further enhanced in addition with intelligent personalisation platforms, which will optimise the interaction path for individual subscribers; (2) *Localisation* provides easy access to relevant data sources at the locations where they are needed. The key target group will be subscribers on the move, who have diversified needs for high-quality information; (3) *Timeliness,* which is the value of information that is inherent in its immediate delivery; (4) *Ubiquity*, which means that services are available at any time, anywhere; and (5) *Convenience*, which means "making life easier".

4. Data, information, knowledge, context

Mobile products and services are mobile communication, i.e. information or mobile content. This information can be transferred in three communication ways: mobile-to-mobile, mobile-to-Internet, and/or mobile-to-any-appropriate-digital-device. In order to understand the concept of mobile information quality, we have to specify what we mean by "mobile content", which is a concept that equals to mobile information in this paper.

Mobile content is information products or services, and it consists of text, sound, pictures, and/or video, and any combination of these. This broad definition gives us that the mobile medium carries a whole menu of different combinations of information. It is assumable that the detailed mobile content quality characteristics vary from content product to content product and from context to context, but this will be an issue for our further investigations. The 3G mobility will carry at least the following groups of content: (1) Voice; (2) SMS (short message service); (3) Voice + SMS; (4) MMS (multi media service), which includes combinations of voice, text, and pictures.

In a digital setting any piece of information is composed of digital *data*, i.e. megabytes carrying different pieces of data building blocks. With "data" we understand a standardized symbolic representation of states and events (see e.g. Lillrank 1997). Data can be stored, retrieved, compared, aggregated and analysed. Furthermore, data needs a *context* in order to be understandable. "Context" has over the years been given the general definition of parts, circumstances − information − that proceed and follow a word or passage and fixes its precise meaning. Pomerol and Brézillon [16] point more precisely out that the notion of context offers an alternative view to *knowing how* to capture that part of knowledge, which is related to decision-making and action. The notion of context does not explain *know ho*w, but it helps to understand how experienced people with a recognized *know how* adapt their behaviour according to the circumstances. In some sense, "context" is knowledge about the instantiation of *know ho*w, it is the framework which reveals *know ho*w. Lillrank [14] notes that the definition of information quality is context specific, i.e. output can be judged only in relation to intended use. Thus, "information" is data in a context with meaning, i.e. the usefulness of information is realized when it is communicated and received in a meaningful context.

Information tells how something *is*. Mobile content also consists of data, which becomes understandable − i.e.

information − in a meaningful context. In a mobile setting "context" has to include at least: (1) *A definition of the customer* (receiver, client, consumer, investor − in the roles of chooser, payer and user); (2) *The customer's needs* in terms of actions to be triggered or enabled; (3) *The life-cycle (time)* aspect; and (4) *An assumption of the customer's ability* to interpret and take action based on the information supplied.

When information tells us about how something is, then how is that information related to knowledge? Pomerol and Brézillon [16] point out that knowledge is information incorporated in an agent's (both human and software) reasoning and made ready either for active use within a decision process or for action. It is the output of a learning process. Thus, the roles of knowledge are to: (1) transform data into information, (2) derive new information from existing ones, and (3) acquire new knowledge pieces. Lillrank [14] states that information transforms into a component of knowledge when it is analysed critically and its underlying structure is understood in relation to other pieces of information and conceptions about how the world works.

We think, like for example Juran, that the quality of information has to be defined by the receiver − the customer/consumer. The bottom line of mobile content quality seems to be fitness for use and conformance to specifications for a specific receiver in a specific context. Thus, we can agree with Lillrank that the definition of information quality is context-based: Output can be evaluated only against its specification, and a specification can be judged only in relation to intended use. In a mobile setting this gives us that in order to be able to judge whether the mobile content is fit for use or not for the receiver, the receiver needs to be able to *instantly* transform the received information into knowledge of some degree. Note, that in a mobile setting this transformation process has to be rapid. Thus, from the user's point of view, mobile information must at least be easy and fast to overview; easy and fast to interpret; easy and fast to determine that it is reliable, accurate, valid; easy and fast to see who the sender is; why you were contacted; fast to open, use, trash, answer; and it has to present easy and fast access to further information.

5. Mobile content quality characteristics

In this paper we have built our mobile content quality (MCQ) reasoning on Carlsson and Walden's [1] general value adding features of the mobile medium: (1) Personalisation; (2) Localisation; (3) Timeliness; (4) Ubiquity; and (5) Convenience. These general features

express themselves in a mobile usage situation as global communication and interactivity, text, voice and picture messaging, as a medium for commerce, and as a medium that is always online if necessary. Thus, the value-adding features of mobility are imbued with the attributes of freedom and personalisation.

We have earlier [13] outlined a setting of general mobile content quality characteristics. These characters are derived from Juran's definition of information quality in table 1 above. By using Juran's definition of information quality in our mobile setting, we can say that the mobile content has to be fit for use, which implicates that it has to be free from defects and it has to possess desired features. Mobile information that is free from defects does not differ much from any other information. Thus, it must be *accessible*, *accurate*, *current*, *complete*, and *consistent with other sources*. In order to possess desired features the information in a mobile setting seems to demand mobile medium specific quality characteristics, which to a great extent seem to be dictated by the user context.

Since the mobile medium is used on the move, which implicates an uneasy usage situation, it seems to be clear that in addition to Carlsson and Walden's general value adding aspects of mobility, which support Juran's fit for use quality characteristics of information, Juran's list of desired features of good quality information also seems to fit well into the picture. But the mobile medium is completely different from any other previous communication media, and the way it is used also calls for a mobile meaning of Juran's desired information attribute in table 1. We agree with Juran that good quality mobile content also has to possess the desired features of being *relevant*, *comprehensive*, it must possess *a proper level of detail*, it must be *easy-to-read*, and *easy-to-interpret*. But, since the mobile medium is used on the move, the user is operating the mobile device in varying and probably also attention disturbing conditions; probably in a hurry; probably wanting the information instantly on the small or limited screen space of the mobile device; and maybe also manoeuvring the mobile device with only one hand etc. For example, opening any website as they are built today will probably confuse the mobile user, since the user is not interested in 117 googled and megabyte-heavy web sites, but wants to have the explicit piece of information the user is looking for in an interpretable form, in the right context in order to turn the information into knowledge. This means that the MCQ is heavily context-dependent and it is probable that successful mobile communication is more context dependent that any other medium we know.

Using a Juran-like term we suggest that a right mobile communication context conforms to fitting user interpretation. *Thus, in the right mobile context the communicated information needs to possess content that matches the user's personalisation, localization, timing, ubiquity, and convenience*. Furthermore, since the context also seems to be dictated by the limited performance of the mobile device it calls for *content carrying precise synthesis, immediateness, easiness of interpretation, and easiness of processing in the right situation*. We call the list of quality characteristics of mobile content above *General mobile content quality characteristics*.

5.1. Barriers and benefits as quality attributes

The results of the consumer study presented in section 2 added some areas – we call them underlying causes – that seem to be very important in a mobile content quality setting. The fear of loosing one's privacy and other security issues, were indicated as relatively strong barriers for mobile usage. We group this into a group we call *Security*. The small screen of the mobile device as well as slow data connections and flow, poor network coverage, and limited device performance also stuck out as heavy barriers. We call these indicators *Performance*. Useless of services also seemed to the consumers to be strong barriers for using mobile products and services. This attributes we group into a group called *Usefulness*. The customer's fears of high usage costs form the group *Cost*. In our survey, the respondents also disagreed to our statements of new dimensions of communication, enhancing communication, real-time alerts and information services, convenience and handiness, and flexibility being strong benefits for using mobile products and services. We call this group of attributes *Communication Values*.

This constellation seems to indicate that our general MCQ characteristics are steered by the underlying causes of security, performance, usefulness, cost, and communication values. These underlying causes have to be dealt with and moulded into value adding carriers of the general MCQ characteristics we have described. We end up with the following path towards mobile content quality:
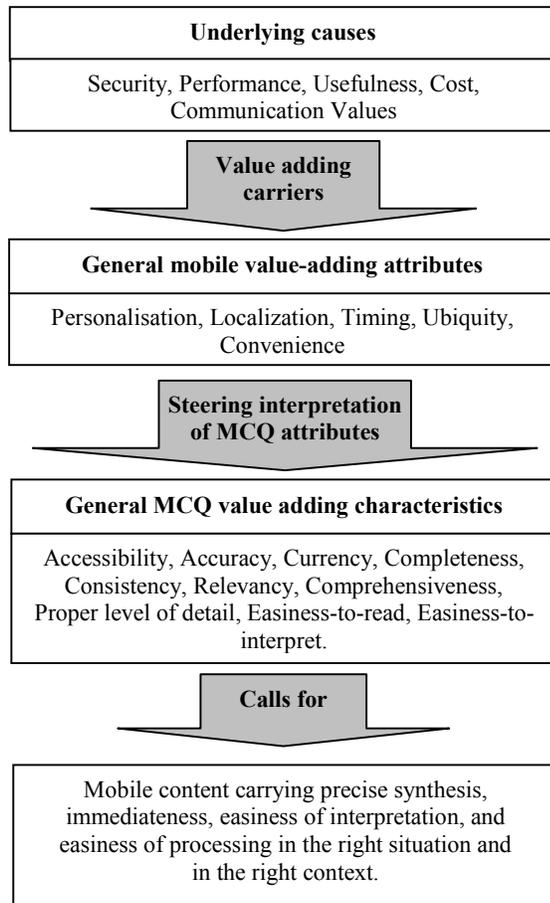
Figure 5. The path towards the understanding of mobile content quality. The figure presents a research field that seems to be very important for the evolution of mobile communication.

6. Discussion

Figure 5 above tells us how we should begin to think in terms of mobile content quality. We strongly believe that in order to hit the target groups for any mobile product and service, the sender needs to understand the foundation of MCQ we have outlined above. The purpose for mobile communication is to be useful, which means creating value-adding products and services for the receiver/customer. A value adding mobile product or service triggers positive action − positive both to the sender and the receiver. As we can see, the understanding of information quality in general and mobile information quality in particular deals with many layers of aspects from value-adding carriers to quality characteristics, the

understanding of the user's needs, and the differing contexts a mobile user is dealing with.

This setting is a very complex one, and maybe therefore the research of how to tailor-make high quality mobile content is still in its infant stage. However, since the 3G revolution probably will increase the competition between mobile players on the market, we will probably have an ear-splitting noise of, for example, mobile-commerce producers trying to hit the specific customer segments for their products and services. We do not think that broadcasting − i.e. throwing a handful of darts to the dartboard and hoping that at least one of them will hit the right spot, i.e. consumer − will be regarded as a significant way of marketing mobile commerce products, since operational costs of 3G information are regarded by Nokia to be two to three times as expensive compared to GPRS and GSM messaging. We think in terms of throwing only one dart to the board and hitting the right spot, i.e. the right consumer group, time after time.

This requires, however, that the mobile commerce producers know the needs and wants of their customers and potential customers in order to be efficient in their business. Customer profile building is by no means anything new in business. But since the mobile medium with its personalised, local-specific, time-specific, ubiquity, and convenience features, and with its myriads of different usage contexts and situations, differs totally from any other medium seen, we strongly believe that without a thorough understanding of how to tailor make mobile products and services for a specific receiver group, the mobile market as well as the mobile commerce markets will not be successful. We namely must take into consideration that at the same time the 3G revolution emerges the desktops get more powerful as do the networks. In this setting mobile communication in general and mobile commerce in particular will face heavy competition by fixed line Internet. A desktop always loses to a mobile device on being flexible to use on the move, but since our customer study pointed out that also costs are decisive factors in this setting, we need to be able to conform to the mobile user's calls for better security, performance, usefulness, reasonable costs, and inherent communication values in order to establish the mobile markets that have been outlined over the past years. This is an outline of a new research area.

Carlsson and Walden [2] have outlined an embryo of a conceptual framework for m-commerce products and services from three perspectives. This outline clearly points out the necessity of understanding the complexity of mobile communication, of which mobile commerce probably is going to be a huge area. Carlsson and Walden's perspectives deal with the customer's, the

producer's and the management's points of view. Carlsson and Walden suggest that seen from the perspective of the customer the necessary distinguishing elements are (i) *flexibilit*y, which means that m-commerce products and services should be available anywhere, at any time and anyhow, (ii) *value-addin*g, i.e. m-commerce products and services should improve productivity, they should be adaptive to localisation and they should be sensitive to customer personalisation, and (iii) *a mobile technology basi*s by which they understand that m-commerce products and services should use innovative and distinguishing features of mobile technology to enhance the quality of life (e.g. messaging, entertainment, education, information, privacy, etc.).

Seen from the perspective of the producer the necessary distinguishing elements are (i) *modularit*y, i.e. m-commerce products and services could be built from a core of generic product and service modules, which can be combined to form context adapted products and services; this should support the flexibility element, (ii) *layer*s, which indicate that m-commerce products and services could be built in layers to add attributes and characteristics, which are adapted to customer personalisation, localisation, brand profiles, privacy, etc., which should support the value-adding element, and (iii) *bundlin*g, i.e. m-commerce products and services could be built through a bundling of modular products and services, which would be a way to make use of the mobile technology basis. Bundling can be done through modules and layers, but can also be mobile technology based.

Seen from the perspective of the management the necessary distinguishing elements are (i) *value/cost ratio*s, i.e. m-commerce products and services should show good or very good value for cost in comparison with similar products and services; this should form the basis for pricing strategies, and cost and revenue models, (ii) *production, logistics, marketing and advertisin*g, meaning that m-commerce products and services should have innovative features in comparison with similar products and services; this may be a function of the possibilities offered by the mobile technology, and (iii) *business model*s, that equals to that m-commerce products and services should use innovative and distinguishing features of mobile technology to support new business models.

This conceptual framework seems to be inherent in different stages of our path leading to mobile content quality. However, exactly how and exactly where Carlsson and Walden's framework fits into the MCQ picture is a topic for our further research.

7. Conclusion

In this paper we have outlined a path to the understanding of mobile content quality. We propose that this path is a new and very important field of research.

The receiver judges the quality of mobile information. In order to be of good quality the mobile information must be fit for use and free from defects for a specific user in a specific context. Our empirical study on benefits and barriers for using mobile products and services exposed underlying areas – causes – that seem to steer the user's interpretation of good quality mobile content. These underlying areas are security, performance, usefulness, cost, and communication values. It seems that these aspects of mobile usage must reach a certain level of acceptance by the user before the user is willing to consume mobile products and services, i.e. mobile content and communication. Thus, the path towards good quality mobile content seems to start with creating qualitatively good features of mobile security, performance, usefulness, cost, and communication values before it is possible to establish more detailed mobile content quality characteristics.

Good quality of information is value adding to the user. The general value-adding features of the mobile medium are personalisation, localisation, timeliness, ubiquity and convenience. Our empirical study indicated that these features are by the user regarded as value adding when the underlying areas of security, performance, usefulness, cost, and communication values are seen as conforming to the user's requirements.

These two layers of underlying mobile quality causes seem to steer the user interpretation of the general value adding characteristics of accessibility, accuracy, currency, completeness, consistency, relevancy, comprehensiveness, proper level of detail, easiness-to-read, and easiness-to-interpret. Since the user contexts of the mobile medium differ dramatically from the user contexts of any other known media, good quality mobile information seems to call for precise synthesis, immediateness, easiness of interpretation, and easiness of processing the information in the right context.

The research on mobile content quality is in its infant stage. We strongly think that the 3G and nG revolutions will create keen competition on, for example, the mobile commerce markets. In this setting, the skill of tailor making good quality mobile content will be one of the most important factors of hitting the target groups time after time within reasonable costs.

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