

RZ 3237 (# 93283) 06/12/00
Computer Science/Mathematics 12 pages

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Quality Management through Electronic Markets Intermediaries

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Abstract

If goods or services in a market vary in quality and the consumer has due to information asymmetry no means to differentiate providers of high quality from providers of low quality, the market can become a 'lemon market'. This term was introduced by Akerlof to characterise markets where providers of bad quality drive out providers of good quality, creating cost of dishonesty and market failures. In electronic markets this problem can worsen. The reasons are mainly the separation of product and information flow, limited means of presentation and low entry barriers for providers.

Intermediaries have the potential to address this problem by institutionalising quality management functions. Quality management can avoid market failures, ensure efficient allocation and extend the scope of electronic markets to more complex business scenarios as observable in today's commodity markets.

On the basis of two case studies, eBay and AUCNET, this paper structures and discusses quality management functions that intermediaries and other agents can provide. The object of quality management can be the product itself or trading information about the product. Quality management comprises the setting of quality goals, monitoring quality and depending on the object of quality management and the performing agent, improving quality (TQM) or reducing quality uncertainty (with brand building, guarantees etc.).

In the future, advances in the area of electronic product presentation as well as support for electronic negotiating and contracting could further extend the possibilities to reduce quality uncertainty issues in electronic markets thus eliminating the risk of lemon markets and creating the trust necessary for complex electronic commerce scenarios.

1. Introduction

The role of intermediaries in electronic markets has been and still is being subject to a lot of research. Some researchers argue that electronic markets allow bypassing intermediaries, enabling direct relations between providers and consumers total disintermediation [1]. In contrary to this hypothesis, other research indicates four different outcomes depending on the impact of ubiquitous information infrastructures on the transaction cost: a reinforcement of direct provider-consumer relations, bypassing of intermediaries, a reinforcement of existing intermediaries or the emergence of new intermediaries [2].

One of the new functions in electronic markets that was suggested to be performed by emerging intermediaries is quality management [3].

The methodological approach of this paper is to study cases of quality management already performed by intermediaries, in order to derive a framework with generic functions that could be used to evaluate or design intermediation. The case studies in this paper are therefore used not for quantitative research but for interpretation as a means of qualitative research.

To do this, Section 2 will illustrate why quality management is necessary in electronic markets. Then, in Section 3, the notion and the fundamental building blocks of quality management through electronic market intermediaries are defined. Section 4 will introduce two case studies for quality management, which are used in Section 5 to develop the general framework. Finally in Section 6, the findings will be reviewed.

2. The need for quality management

Why is quality management a critical issue in electronic markets? To answer this question, first the effects of quality uncertainty on market mechanisms in general needs to be investigated, then the discussion will focus on specific considerations within electronic markets.

2.1. Lemon markets

Akerlof introduced in his seminal paper on quality uncertainty the term 'lemon markets' to characterise market conditions, where bad quality drives out good quality [4]. His example is a market for used cars.

Let's assume demand is a function of the price and the average quality of the cars.

Demand = Demand(Price, Quality)

Both, the average quality and the supply for cars are also dependent of the price:

Quality = Quality(Price)

Supply = Supply(Price)

In the market equilibrium, supply must equal demand for the given average quality and as the price falls, normally the quality will also fall.

Supply(Price) = Demand(Price, Quality(Price))

Providers offering higher quality have no incentive to participate in this market where demand is dependent on the average quality, as their quality is not rewarded with higher prices. Therefore providers offering good quality will leave, lowering again the average level of quality, which will result in lower prices a.s.o. In Akerlof's example: bad cars (lemons) drive out good cars because they sell the same price.

The fundamental problem characterised by Akerlof is information asymmetry. Providers know more about the quality of their offers than consumers do. Respectively consumers suffer uncertainty because they cannot assess the quality of an offered product or service and incorporate this uncertainty into their valuation.

Negative effects of this information asymmetry are costs of dishonesty (driving out legitimate business) and market failures.

2.2. Electronic lemon markets

The problem of information asymmetry can even worsen or occur more frequently in electronic markets than in traditional markets [5]. First of all, the consumer cannot physically inspect the goods to purchase. Electronic markets are virtual exchanges, accordingly the object of exchange is not physically present. The

separation of product movement and market transaction processing imposes new risks [6]. Consumers have to rely on the information presented in the electronic market to assess the quality. Often experience goods (such as music or news) are offered as digital goods on electronic markets. The quality of these products becomes known only after consumption - and usually they are purchased only once [7]. In many such cases providers do not want to offer product information prior to the purchase, because the information is the product itself. In contrast to this, search goods are goods whose quality can be learned without using them - an advertisement might be sufficient.

Another specific characteristic of electronic markets is, that the barriers to enter are generally low. It is very easy and cheap to start a business and sell online. Services such as *Bigstep.com* allow users to set up a shop for free, including catalogue, credit card billing etc. just by pointing and clicking. *Bigstep.com* then hosts the shop and charges for executed transactions. In the same line, *Amazon.com* also offers the *zShop* service for free. This service manages under the roof of *Amazon* online storefronts for retailers and independent sellers world-wide. Finally auction sites enable users to run auctions for basically any kind of items they want to sell. Referring back to the quality issue, the problem is that in traditional markets a business has to invest significantly to enter the market (renting store floor, advertising, recruiting sales clerks...) and is to some extent physically present. This investment can be used to signal quality (costly to fake principle, see for example [8]). If there are no investments and especially sunk costs necessary to act as provider on the market, consumers might not trust the provider to be still present, if the quality is not as expected and they want to complain or return the product. This risk will be incorporated by the consumers and eventually lower their overall assessment of the average quality in the market.

The conclusion is, that additional information asymmetries and uncertainties can be identified in electronic markets, which render the lemon market scenario to be even more probable than in traditional markets.

However, it is often stated, that electronic markets tend to have a higher transparency (information about products, providers, past quotes etc.) than traditional markets [9]. If this is the case (this hypothesis is subject to an ongoing scientific discussion), then potential to diminish the information asymmetry for consumers can also be identified. The quality management functions discussed in this paper certainly are a contribution to increase transparency and therefore to reduce uncertainty.

3. Definitions

The goal of this section is to define the term *quality management through electronic market intermediaries*. To do this, *electronic market intermediaries* are defined first, then the fundamental dimensions of *quality management* are outlined before the two concepts are merged.

3.1. Electronic market intermediaries

An electronic market is an information and communication technology medium for the exchange of goods and services¹ between agents, coordinated by supply and demand forces [10]. Agents therefore include provider organisations and consumer organisations. A medium has channels for the agents to interact and a logical space. Several layers within electronic markets can be identified:

- Community layer
- Implementation layer
- Transaction layer
- Infrastructure layer

An intermediary can replace direct communication between providers and consumers, thus minimising the necessary number of interfaces and the overall amount of communication [11]. A single consumer only interacts with the intermediary, who then has the communication connections and interfaces to all providers and vice versa. Beyond this institutional benefit, the goal of intermediaries is to support the market exchange, usually by offering additional services (comparison engines, notification...).

The distinction between a market and an intermediary can be confusing because often intermediaries implement their own market, thereby structuring the logical space of the medium, implementing processes etc. If for instance an intermediary for private line insurance decides to offer its service using an electronic medium, it will implement an electronic market for private line insurance where direct communication between

¹ For the purpose of this paper, goods and/or services will be summarised with the term 'products'.

consumers and providers is never an option. On the other hand there are intermediaries such as comparison engines that interact with many marketplaces (which again might be created by other intermediaries, consumers or providers) and then for example direct the consumer to the marketplace with the ‘best’ provider to execute the transaction.

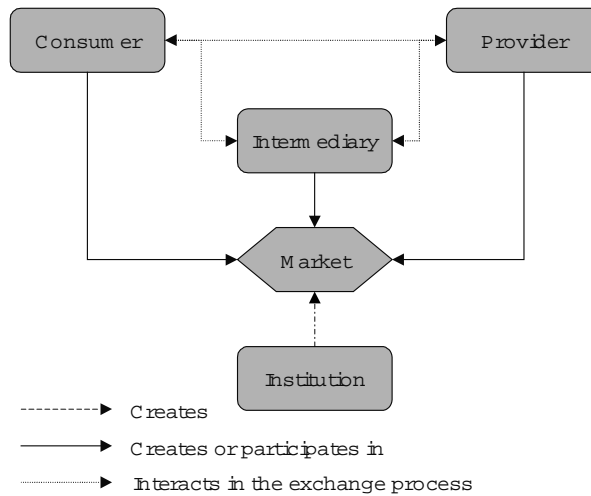


Figure 1: Agents and markets

As the boundaries between markets and intermediaries are fuzzy, the following definition will be used in this paper: Agents create markets. Every market, which is not created and managed by a consumer, provider organisation or public institution, is created by an intermediary.

Intermediaries can also act as agents in other markets. If intermediaries for example combine basic components (e.g. financial services) of several providers to a new product, or bundle them with their own service, then intermediaries are meta-provider agents. For the purpose of this paper, these cases of intermediation are excluded (see next section). Electronic market intermediaries are therefore intermediaries that either run an electronic market or participate in an electronic market.

3.2. Quality Management

Quality can be defined in many different ways. The definition can refer, for example, to the transcendental, product-oriented, user-oriented, production-oriented or value-oriented approach [12].

For this paper the product-oriented and the user-oriented approach will be used. The product-oriented definition is objective. It assumes that there are objective measures of quality that allow comparing one good to the other on some scale. For the user-oriented definition, those goods or services have the highest quality, that best suit the requirements of the user (‘fitness for use’). This approach is also reflected in the ISO 8402 definition where quality is the totality of features and characteristics of an entity that bear on its ability to satisfy stated or implied needs.

Quality management from a simplistic viewpoint, as any other management task, comprises setting goals for a system, monitoring, and improving the performance of the system (quality). For the purpose of this paper, improving quality is equivalent to reducing quality uncertainty. This control-cycle view is reflected in Figure 2:

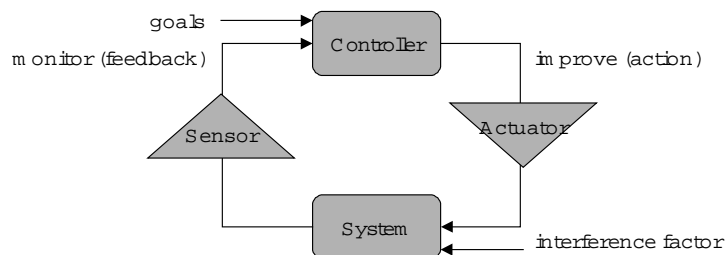


Figure 2: Management as control cycle

Other approaches extend the scope of quality management to a general corporate philosophy often referred to as total quality management (TQM). Quality in this concept becomes part of every business activity and responsibility of every employee, usually highlighted in messages such as ‘the next process is your customer’ or ‘quality first’ [13]. TQM includes the control cycle activities mentioned and is driven by the same user-oriented view of quality as used in this paper.

3.3. Quality management through electronic market intermediaries

In isolated views, two concepts have already been defined: electronic market intermediaries and quality management. Combined, they define subjective goals of a task (what needs to be performed) and the task performer. From a model perspective, the definition of a task also includes a task object and formal goals [14]. The latter specify ‘how’ a task should be performed. Formal goals for the task of quality management performed by electronic market intermediaries are to achieve the lowest possible quality uncertainty with lowest possible cost. Low cost are necessary to conserve one of the primary success factors of electronic markets – low transaction cost.

Then what is the task object? Unless the intermediary is a meta-provider (see previous section) the intermediary is an agent acting between a provider and a consumer, and therefore cannot control or improve directly the quality of the products itself. This is subject to the quality management of the provider. An intermediary can only provide indirect quality feedback, which allows the provider organisation to control its quality.

However, it can set quality goals that providers need to achieve in order to qualify for offering through the intermediary to the consumer and correspondingly assess these quality criteria in an objective way (product-oriented definition of quality). By rejecting then offers below the standard, the overall quality of the goods offered in this market is improved indirectly.

Additionally the quality of another type of objects can also be managed through an intermediary – the information exchanged in the trading process between consumers and providers. The quality of this information is critical to the market success, as it is the only representation of the product in an electronic market (see Section 2.2). Quality then addresses the usability of the information for the end user (user-oriented definition of quality).

To be more precise, the trading information can be categorised according to the phases of a market transaction [10]:

- Knowledge phase – advertisements, profiles...
- Intention phase – offers, counteroffers, inquiries...
- Agreement phase – contracts, signatures...
- Settlement phase – bills, confirmations...

This trading information has to suit the requirements of the user. This means, for example, that a contract needs to be complete, valid and enforceable [15] or that order information is accurate and up-to-date. For this task object the provider can not only improve quality indirectly but also directly, for instance by structuring the information etc. (see Section 5.4.2). The consumer can then directly compare the quality of the trading information obtained by this intermediary with the quality of trading information from another intermediary.

In summary, two task objects in electronic markets can be subject to quality management: the objects of exchange themselves and the trading information concerned with these objects. The next section features examples for each of these two cases.

4. Case studies

Two case studies are presented in this section, *eBay* to illustrate monitoring and improving of trading quality information based on the user-oriented quality approach, *AUCNET* to demonstrate how this issue of information quality can be combined with objective quality ratings for the products traded.

4.1. eBay

eBay is currently the most popular online auction site. In Q3 1999 *eBay* had six million registered users, 1.5 billion page views per month, 2.7 million items for sale and 60 million auctions completed [16]. Ac-

According to the definition in the previous section, eBay is an intermediary because it replaces direct communication between consumers and providers and offers value-added services such as directories, featured galleries, insurance etc. eBay is also the type of intermediary, which created its own electronic market. Other intermediaries in the auction business such as *AuctionSam* rely on multiple markets, checking for example the price of a product across auctions running in different electronic markets.

Referring back to the characterisation of electronic lemon markets, the risks for the *eBay* case are as follows:

- Selling something on *eBay* is very simple and cheap. The only requirement to register as a buyer or seller is to provide an email address or a credit card number.
- The description of products is limited to plain text, a categorisation, optional URLs to pictures and HTML tags for formatting.
- A large number of the items sold on *eBay* are second hand items and therefore, because of their uniqueness, experience goods.

For these reasons, information asymmetry is strong: providers know much more about the quality of the product they offer than the consumers. Additionally the risk of fraud is very high regarding loose authentication requirements. If *eBay* users make bad experiences, e.g. the condition of a product is not as described or the provider never shipped the product, then they will incorporate these experiences in their valuations. This means they are aware that there is a danger to buy a lemon. If lemons cannot be differentiated from good products, this risk will result in a general lower valuation of offers. Then providers of good quality will not offer their products on *eBay* and the vicious cycle pattern of the lemon market is initiated.

How is *eBay* addressing this danger? One of the first measures that *eBay* took was to establish a feedback system. After each transaction, providers and consumers can rate the trading partner and leave a comment. These post-sale feedbacks are then accessible for other users and summarised in the *eBay* ID card. This measure combines the monitoring task with means to improve the quality of trade information (in this case information about consumers or providers).

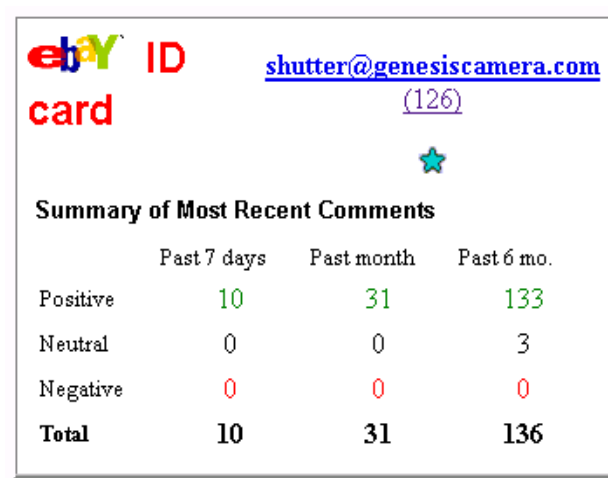


Figure 3: eBay ID card

eBay is also investing huge efforts in offer monitoring. The correct classification according to the directory structure of eBay has to be verified for every new auction item. This is also the case for the content of the offers as *eBay* continuously struggles to close auctions for items which are not legal for sale (weapons, organs, drugs etc.) or are not authorised to be sold (jokes, advertisements...).

Just recently, *eBay* announced a new policy, which insures every *eBay* user free of charge to claim up to \$200 if damages were suffered through eBay transactions. This measure clearly aims at still remaining uncertainty.

Overall, *eBay's* quality management approach is symmetric, addressing consumers as well as providers. Feedback and insurance are available to both types of market participants, taking into account that if there are consumers of bad quality too, providers might incorporate that risk with higher prices, thus the lemon market effect could strike again.

4.2. AUCNET

The *AUCNET* case is studied very extensively (see for example [17]). The founder of *AUCNET* had the vision to become an intermediary for second-hand car dealers, which sell and buy inventory in the wholesale market in Japan. Direct trading of used cars is rather difficult in Japan due to complex regulations. Car dealers therefore control the market. If a consumer desires a used car, which is not in the inventory, the dealer generally purchases the car at an auto auction. *AUCNET* is such an auction site.

In 1996 approximately 120000 cars were sold through *AUCNET*, which resulted in a market-share of 6.19%. 4850 dealers (out of 20000 overall) participate in the network. Since Akerlof also used the second-hand car market to illustrate the quality uncertainty problem, the general threat for the success of *AUCNET* as an intermediary is clear. The special characteristics of the electronic exchange medium worsen the situation at least to that extent, that online presentations of cars are obviously far less convincing than the experience of test-driving or kicking the tires.

This was also the reason of failure for the slide auction [18]. This auction project showed slides of cars for sale at the auction to overcome the limitation of physical transportation of cars to the auction sites and related return costs if no sale took place. But the project never succeeded, mainly because the dealers could not assess the quality of the cars on the basis of slides and therefore were reluctant to participate.

Hence, the challenge for *AUCNET* was to ease information asymmetry and to reduce uncertainty. The following measures were taken to establish trust for the information provided by *AUCNET*:

- Certified mechanics evaluate cars and summarise their quality rank with a single number between one and ten. Cars whose inspection rates are lower than four cannot be sold on *AUCNET*. More detailed results of the inspection are also available to interested buyers.
- Every winning bid has to be confirmed by the bidder immediately. If this is not the case, any further bids are blocked.
- The execution of transactions is subject to severe institutional rules that legitimise electronic contracts and protect dealers from fraud. If the contract is violated for instance by not shipping the car within a specified timeframe, the seller has to pay a fine or is even excluded from the system. On the other side, sellers are guaranteed payment by *AUCNET*.

The *AUCNET* case study demonstrates how an objective quality rating can be combined with institutional rules to guarantee high quality of trading information such as bids or contracts. As a result of this intensive quality management, the prices of cars sold via *AUCNET* are even higher than the prices of comparable used cars sold through traditional channels. This can be explained by the fact that dealers do not have to incorporate return costs in the decision to accept a bid and therefore are able to keep high reservation prices [19]. Buyers on the other hand, enjoy a broader variety of supply and high quality of trading information, which they are willing to support with higher prices.

4.3. Summary

Regarding the quality management functions implemented by both, *eBay* and *AUCNET*, the dangerous effect of quality uncertainty seems to be real in electronic markets. The case studies sketch sample measures that can be taken, to address information asymmetry. However, in both cases there is a potential for additional quality management functions, if the danger of a lemon market is still present. *eBay* could for instance implement strict settlement policies comparable to those in the *AUCNET* case whereas *AUCNET* could also use recommendation systems to gather consumer feedback more systematically.

The following section presents, abstracted from the view of single case studies, generic quality management functions that intermediaries can apply to avoid lemon markets. The main focus is on quality management functions that address the quality of trading information.

5. Quality Management Functions

Discussing the negative effects of lemon markets, Akerlof already suggested several counter-institutions: guarantees, licenses, and brand names.

The focus of this section is on specific counter-institutions, which can be created by electronic market intermediaries. But, these quality management functions should not be viewed isolated from corresponding

measures by other agents that join, regulate or create markets. Therefore framing quality management functions by providers, consumers and electronic commerce institutions are briefly characterised on a high level before functions in the scope of intermediaries are discussed in more detail.

5.1. Providers

Provider organisations can directly improve the quality of their goods or services and thereby also address quality uncertainty. Next to applying TQM principles, providers might join quality initiatives such as ISO 9000 and certify their manufacturing or development processes.

Two main instruments against quality uncertainty were already mentioned: brands and guarantees. Guarantees are an obvious institution to ensure the consumer of some normal expected quality [4]. Brands on the other hand, enable the consumer to retaliate with avoidance of future purchases if the experienced quality is below the expectations.

5.2. Consumers

Consumers typically do perform quality management by creating consumer organisations. *Accompany.com* [20], for example, aggregates demand for listed consumer products in order to achieve better prices. In the same way, consumers could use their combined purchasing power to either force providers to improve the quality of products or to share the risk of getting lemons. In another example, consumers can establish 'self-protection' organisations such as the *Verbraucherschutz* in Germany [21], which provide legal assistance or consulting if for instance the quality of a product is not as promised or expected.

In some cases these consumer organisations also provide objective quality ratings (for example the *Stiftung Warentest*) for products in certain areas and publish corresponding recommendations.

5.3. Institutions

The term institutions used in this section refers to agents, which are independent public third parties, that regulate or monitor electronic commerce across markets, providers and product areas for reasons of fairness or legal compliance. Quality management functions of this kind can be illustrated with the example of the Better Business Bureau, which recently launched *BBBOnline*. This service is a wholly owned subsidiary of the Council of Better Business Bureaus whose mission is to promote trust and confidence on the Internet through the *BBBOnline* Reliability program. *BBBOnline* [22] certifies businesses to be 'reliable' if they:

- become a member of the appropriate local Better Business Bureau,
- provide the BBB with information regarding company ownership and management, which will be verified by the BBB in a visit to the company's physical premises,
- are in business a minimum of one year,
- have a satisfactory complaint handling record with the BBB,
- agree to participate in the BBB's advertising self-regulation program, and correct or withdraw online advertising when challenged by the BBB, and
- respond promptly to all consumer complaints.

Such a certification program in principle has the same goals as the licensing of lawyers or doctors – ownership of the certificate indicates a certain level of proficiency and respectively signals a certain level of quality.

5.4. Intermediaries

Providers, consumers and institutions can perform quality management functions. But the scope for these agents is reduced to measures, which are not taking into account specific aspects of certain markets or product areas and apply to all consumers and providers. This is where intermediaries can come into action. Intermediaries are third parties that facilitate directly the exchange between consumers and providers and thereby have the opportunity to apply quality management to the trading objects themselves and to the information about these objects.

The following section is structured according to the objects of quality management, trading object and trading information.

5.4.1. Quality of the trading object

To define quality goals for trading objects, an intermediary can establish an objective rating system comparable to the one used by AUCNET. Only objects that match certain criteria are accepted to the market (similar to licensing practices in other areas). Monitoring quality in this approach is then the task of assessing the quality of offered products and collecting feedback from consumers about the experienced quality of the products purchased. Improving quality is performed through the exclusion of products or offers with low quality and the adjustment of the quality goals.

If the intermediary is only facilitating the exchange and not replacing totally the communication between consumer and provider, the objective rating is comparable to the benchmarkings and recommendations given in magazines for computers, stereo components or cars etc. By testing thoroughly, these magazines reduce the quality uncertainty problem for potential consumers who do not have the expertise to perform these comparisons themselves.

To perform an objective and credible rating a lot of expertise and initial investment is necessary. As an alternative, intermediaries can additionally or complementing to providers create their own brands and offer their own guarantees (see the *AUCNET* case-study) to address quality uncertainty issues. Establishing an intermediary brand can be a very effective measure in electronic markets, where providers are frequently changing or rather new entrants without strong brand image whereas the intermediary has a long market presence. Examples for such strong intermediary brands can for instance be seen in the corporate insurance market where brokers like *AON* have been active in the market for a long time.

Another approach suggested for intermediaries to improve the quality of the products is the use of short-term but renewable contracts [5]. Trade in this scenario occurs under the guarantee that the intermediary will terminate the contract if it receives a certain number of complaints. This measure forces the providers to constantly supply high quality products.

5.4.2. Quality of the trading information

Regarding the quality of the trading information, defining goals mainly addresses the structuring of the logical space of the electronic market with standards. The syntax (for example with XML DTDs) of offers, contracts etc. can be defined by an intermediary as well as the semantics (for example with domain ontologies). An intermediary could for instance generate an offer structure, which requires a mandatory expiry date and delivery date. The semantic definition then specifies whether the delivery date means the day when shipping is initiated (the product leaves the premises of the provider) or the date when the product arrives at the consumer location, thus indirectly defining the behaviour of the agents. The setting of such goals enforces a compatible quality of offer information that consumers can expect from every offer.

The monitoring task comprises checking trading information for compliance with the standards defined and collecting consumer and provider feedback. The latter function can be supported using so-called collaborative reputation systems [23]. These systems support, for example, pair-wise post-settlement ratings that result in a global reputation value for each consumer and provider, similar to the simple rating mechanism implemented by *eBay* (see Section 4.1).

Improving quality first of all means in an indirect way to reject trading information, which does not comply with standards defined. In contrast to previous section an offer is rejected in this case not because of missed quality standards of the trading object but missed quality standards (accuracy, completeness...) of the information provided about this trading object.

Beyond rejecting low-quality trading information, intermediaries can as well use the trading information either collected over time or received by the providers and consumers on a case-by-case basis to offer additional services such as decision support. This dimension of quality improvement is performed, for example, by comparison shopping engines (see [24] or [25]). These intermediaries allow consumers to compare offers based on, for example, multi-attribute utility theory or conjoint analysis, thus improving directly the usefulness of the trading information to the consumer. By offering such services the intermediary can exploit the experience gathered with consumers during past trades by pre-tuning the preference structure according to a consumer classification based on an initial interview (see for example [26]).

6. Summary

Theoretical reasoning and the observations in the case studies suggest that the threat of electronic lemon markets is real. But the problem of information asymmetry, which results in quality uncertainty, can be addressed by several agents performing quality management for the products offered in an electronic market as well as for the information about these products. Figure 4 outlines the overall scope of quality management functions as discussed in this paper.

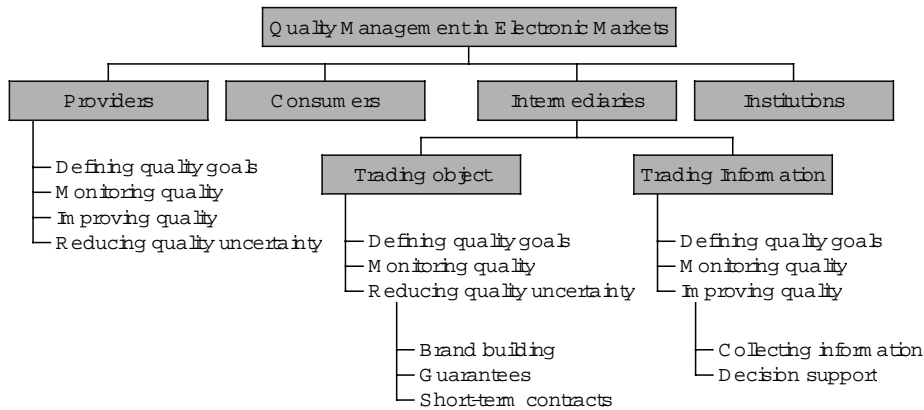


Figure 4: Scope of quality management

Not all functions make sense in every electronic market case. The need and the decision to apply quality management is dependent on the domain of commerce (value and nature of the exchange object, market participants etc.). Sometimes one measure will do. In other cases only the combination of several quality management functions, maybe performed by different agents, will prevent market failure.

An important issue that needs to be considered is cost. Lowest possible costs have already been defined as formal goal of quality management in Section 3.2. If the costs for quality management accumulate in such a way, that transaction cost benefits of electronic markets are jeopardised, then performing the exchange in traditional markets is advantageous.

What can be expected from the future? Certainly the means to present products through electronic media will improve. New efficient implementations for audio, video and 3D presentations such as the HotMedia framework [27] are currently being developed. These technologies will allow providers and intermediaries to communicate more comprehensive product information, thus reducing the information asymmetry.

Another area of related research interest is currently the support for negotiating and contracting in electronic markets [28],[29]. Electronic negotiation technologies could enable consumers to discuss their issues of quality uncertainty directly with providers in order to reach a mutual satisfying agreement. This also opens up the possibility for providers to react with counter-institutions in a more flexible way, depending on specific needs of the consumer.

Research in electronic contracting on the other hand addresses issue of trust. Electronic contracts need to be legally binding, which requires that the history of the agreement process can be reviewed, that changes to the contract are only possible if authorised by all parties etc. This is necessary to reduce the overall risks involved in electronic commerce, where trading partners can be unknown or might originate from different cultures.

In essence, the whole discussion of quality management is also a discussion of trust. If the consumers trust the providers and the providers honestly reveal information about their products, then quality uncertainty is not an issue. Lemons can be identified as lemons and good quality will be rewarded.

Glossary

- **Electronic market intermediaries**
Agents supporting the exchange of products and services between providers and consumers, which either create their own electronic market or operate on electronic markets run by other agents.
- **Quality**
From a user-oriented perspective, quality is the fitness for use of a certain product or the information about this product. From a product-oriented perspective, an objective measure, which allows comparing products on a certain scale.
- **Quality Management**
The control cycle of setting quality goals, monitoring quality and both, improving quality as well as reducing quality uncertainty.
- **Lemon Market**
In a lemon market, consumers have no means to differentiate products with good quality from products with bad quality and therefore are willing only to pay the average price. This drives out providers of good quality and leaves only lemons (products with bad quality), eventually resulting in market failure.

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