

The Theory of the Lemon Markets in IS Research

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Abstract

The “lemon” problem was initially posed by Nobel Prize winner Akerlof in his seminal article of 1970 and showed how a market with unbalanced information, called information asymmetry, can lead to complete disappearance or to offerings with poor quality where bad products (lemons) wipe out the good ones. Empirical evidence for Akerlof’s theory came originally from the market of used cars, where the lemon is a well known problem. However the theoretical model of the “lemon” problem has proven also to be valid on other markets and in comparable situations like internal markets. The theory is also been used more and more in IS research especially since the emerging e-commerce initiatives and the continuous growth of e-markets and auctions. In this chapter we bring a description of the theory by presenting its nomological network and its linkages to other well known theories in IS research. The relevance for the theory is shown to explain phenomenon’s in the IS discipline. An overview is given of current and past IS articles using the Lemon Market theory (LMT) together with a bibliographical analysis of the references to the original Akerlof article.

Keywords: Lemon Market, Information asymmetry, Adverse Selection, Moral Hazard, Trust.

1 Introduction

The market for “Lemons” is a popular expression for a wide spread economic theory developed by Akerlof in his seminal paper of 1970 (Akerlof 1970). According this theory there can be incentive for sellers to market poor quality resulting in a reduction of the average quality and leading to a death spiral with eventually a complete market deterioration. The phenomenon of a “lemon” market arises on markets where there is information

asymmetry between buyer and seller and where the overall quality of goods and services offered is reflected to the entire group of sellers rather than on individual sellers. Lack of seller differentiation could force high-quality sellers to flee the market because their quality and reputation cannot be rewarded. Akerlof demonstrated his theory with examples from the used car market. Most of the empirical data for bringing evidence to the theory is coming from a used car market (Bond 1982). However the Lemon Market theory (LMT) is applied in a wide variety of similar market situations like electronic markets, wholesales automotive, and durable goods markets. LMT is predominantly applied in disciplines like economics, management, finance, and law. Although the LMT is well defined, its use in IS research is often vague and limited to a sole citation of the seminal article of the Nobel Prize winner Akerlof. Investigated phenomenon's in today's digital world by which the LMT is empirical tested are rather scarce. The strong ideas and explaining mechanisms in the theory are mostly taken for granted. Although the LMT is a grant theory with a lot of explanatory and generalizing power, its falsification and validity should be tested in every different empirical situation. However we can observe that the use of the LMT with empirical evidence in IS research is growing. The theory has surely gained attention in the strand of research on e-commerce with research topics like e-markets and auctions (Dewan and Hsu 2004, Pavlou and Gefen 2004, Lee et al 2010)

1 Dissection of the theory: its nomological network and constructs

The nomological network is a concept developed by Lee Cronbach and Paul Meehl in 1955 and is a graphical representation of a theory by means of his constructs and their causality relations (Cronbach and Meehl 1955). It is in essence a way of showing construct validity for the measures that are used to validate the theory. The nomological network includes the theoretical framework with the constructs, an empirical framework showing how the constructs can be measured, and specification of the linkages between these two frameworks. In this work we only focus on the theoretic-

cal framework. Figure 1 shows our nomological theoretical network of the LMT.

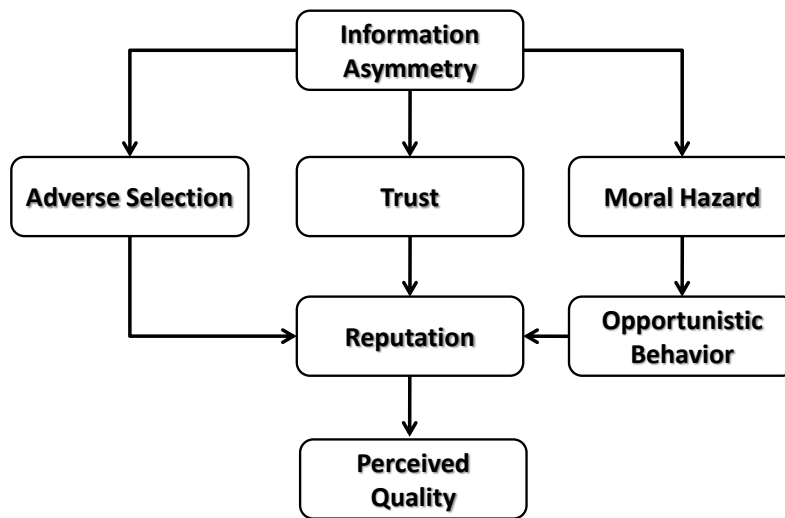


Figure 1. The nomological network for the Lemon Market theory

The level of analysis for the LMT is a market (external or internal) where two transacting parties meet. The parties can be firms or individuals. The basic independent construct for the LMT is information asymmetry. Information asymmetry is a condition which is well understood and a very frequent occurring phenomenon in all sorts of human and organizational interactions (Stiglitz 2000). Since a situation of asymmetric information can emerge in several ways it is also well researched in a broad variety of situations. For example: insurance markets, management (shareholders versus management) (Chiang and Venkatesh 1988), organizational activities (Aboody and Lev 2000), professional expertises (doctor-patient, lawyer-client) (Nayyar 1990) are different sources of information asymmetry.

Information asymmetry engender strategic possibilities that can easily be modelled. The most generic way to do so is by applying game theory. This

leads to capturing the richness of observations of real world phenomenon's. However there are some drawback by doing so. Milgrom and Roberts (1987) point at two serious questions on the modelling of information asymmetry environments. First is the assumption that equilibrium behaviour will prevail and secondly the bounded rationality of the participating parties. This leads to models with less predicting power than explanatory power.

We consider here two groups of transacting parties: buyers and sellers. The buyer is the less informed party and the seller is the most informed party. The transaction is considered to take place on a internal or external market. On a market a buyer interacts with a seller, and a contract or transaction is negotiated. Christozov et al. see information asymmetry as a natural property of any communication process between a sender and a receiver, when both actors have different background and expertise, use different "jargon" or possess different information regarding the content of the communication session (Christozov et al. 2009). When there is information asymmetry, the distribution of information between the transacting parties is unbalanced resulting in an imperfect market. Some authors refer to a situation of information asymmetry as a situation of imperfect information. This asymmetry can put one party at an advantage while placing the other at a disadvantage and makes the decision of a product risky for a prospective buyer (Afzal et al. 2009). Information asymmetry depends on the different capabilities and intellectual levels of the transacting actors and is therefore considered as a independent construct for the LMT.

Dependent constructs from information asymmetry are trust, adverse selection, and moral hazard. We discuss the three dependent constructs and their dependent constructs.

The concept of trust is subtle, diffuse and elusive. Although there is agreement on the importance of trust there also appears disagreement on a suitable definition of the construct (Bigley and Pearce 1998). Trust is a dependent construct and can be seen as a co-ordinating mechanism based on shared moral values and norm supporting collective co-operation and collaboration within uncertain environments (Reed 2001). Trust is the degree to which one party has confidence in another within the context of a

given prospect, decision or collaborative project. Blois gives a number of definitions of trust appearing in frequently quoted papers (Blois 1999). Trust/control relations between organizations can be seen as highly complex structures of social relations and processes which are needed for the generation and maintenance of collective action. The concept of trust is crucial in business interactions that are characterized by mutual dependency combined by with a lack of mutual control. Some researchers argue that trust is also reciprocal. According to Reed: '[...] the essential character of all trust relations is their reciprocal nature. Trust tends to evoke trust, distrust to evoke distrust.... As trust shrinks, distrust takes over.' (Reed 2001). The notion of trust is latent present in the seminal article of Akerlof as dishonesty. Information asymmetry may result in a misunderstanding or even erode existing trust between the participating actors.

Trust is related to reputation. The concept of reputation is commonly used in social life and economy. Wilson defines reputation as: "a characteristic or attribute ascribed to one person (or organization) by another person (or organization)" (Wilson 1985). Reputation theory indicate that uncertainty about the seller's honesty will affect the buyers' behavior (Kreps and Wilson 1982). Reputation can be formed by means of ratings by different buyers and can be seen as a measure that brings evidence a posteriori about the missed information or the hidden information and quality of the seller. When there is no proper reputation signaling mechanism on a market, there is incentive for a lemon market where it is preferable to offer low quality products and services (lemons) or no participation in the market at all in case of high quality sellers. In both cases the overall perceived quality is going down. According to Yamagishi and Matsuda (2002) reputation can provide an effective solution to the lemons problem when 1) it is shared by all or most traders in the market, 2) traders in fact base their behavior on it, and 3) the market is closed such that the trader who is excluded from it cannot find an alternative market.

The adverse selection is the second dependent construct of information asymmetry and is the process of selecting the wrong seller and consequently the least product quality. Adverse selection is a pre-contractual condition. Hidden information is sometimes used as a more practical term for the adverse selection. From the buyers point of view there is lack of

knowledge on the features of the product or service and the real capabilities of the seller which may result in a wrong decision to select and leading to failure. From the seller's point of view a wrong selection may result in the buyer's dissatisfaction and eroding the reputation and consequently a drop of perceived quality.

Moral hazard as the third dependent construct is a post-contractual condition and can arise from the seller's fraud or incapacity to deliver the real quality of the offering. Hidden action or hidden intention are sometimes used as more practical terms for moral hazard, although we see these terms more as metrics for opportunistic behavior which can arise from moral hazard. We take the moral hazard construct into account because even if the problem of adverse selection is overcome by selecting a good seller with fair quality offerings, post contractually the seller may start to shrink on quality. This can be the case on markets where service offerings are traded. For IS moral hazard happens when a the seller can gamble on a so called vendor lock, in which the buyer is confronted with high switching costs and forced to use the services of the existing IS vendor. Opportunistic behavior can erode reputation and leading to a drop of perceived quality.

A lemon market must be seen as a dynamic process involving positive and negative feedback coming from closed transactions. Like a cybernetic system negative feedback can stop a market becoming a lemon market and eventually stop the death spiral. Positive feedback enforces the lemon market dynamics which drives the good ones out of the market and accelerates the death spiral. New entrants can enter the market and eventually stop the spiral. This can also be done by better informed buyers or more honesty sellers. The market mechanism can eventually be regulated by exogenous triggers like governmental corrective initiatives.

For a market to become a lemon market there are constraints and an igniting condition is needed. The constraints for obtaining a lemon market are: 1) information asymmetry, a condition in which not all relevant information is known to all parties involved so prospective buyers can not accurately assess the value of a product or service before sale is made and sellers can more accurately assess the value of a product or service prior to sale, 2) Sellers have no credible ways of disclosing the real quality to buy-

ers, 3) the seller's quality is assessed by buyers acting as von Neumann-Morgenstein maximizers of expected utility. The igniting condition for a lemon market is that an incentive exists for the seller to market low quality products and services.

All parties participating in the communication process would benefit heavily from reducing information asymmetry and avoiding a lemon market. Quantifying the amount of information asymmetry in a communication process is not easy. It is also not straightforward to derive the amount of risk of misinforming, moral hazard and adverse selection.

3 Link with other theories

The attraction of the LMT comes from its high level of abstraction and its power to make strong generalizations. The theory is also applicable in other disciplines beside economics. It may come as no surprise that LMT is also used in IS research. Since its inception in 1970 this discipline has established a new field that comprises computer science, economics, engineering, organizational science, managerial science, operational research, business and information science. According to Gregor all IS theories gain only meaning in an objectivity existing in an abstract world of man-made entities (Gregor, 2006). We believe this holds also for the LMT. The LMT is mainly an explanatory theory although it contains also causality and the power to make generalizations. Besides this, LMT also encompasses ideas that provide ways to think about other more or less related theories. In our research we found that Agency Theory (Jensen and Mecklin 1976), Prospect Theory (Kahneman and Tversky 1979), and Organisational Trust Theory (Reed 2001) are closely related to LMT. We already discussed the nature of trust in the previous paragraph. The research on trust in Internet related issues like fraud, e-auctions and e-markets and the relation with a the lemon problem is numerous (Grazioli and Jarvenpaa 2000, Ba and Pavlou 2002, Pavlou and Gefen 2004, Pavlou and Dimoka 2006, Eymann et al. 2008, Hoffman et al. 2009). We briefly discuss here Agency and Prospect theory and their relations with the LMT.

Agency theory is central to Western management thinking and one of the cornerstones for the theory of the firm (Jensen and Meckling 1976). The (positivistic) agency theory is a well-known theory, largely used in the strand of research on IS and outsourcing (Dibbern et al. 2004). According to Pavlou et al. the LMT can be seen as an extension of the principal-agent perspective to markets of imperfect information (Pavlou et al. 2007). Besides asymmetric information and goal differences, there is an important third factor in agency problems: risk behavior differences. For example the implementation of an IS is highly risky since the outcome is not always stated in measurable outputs and only partly verifiable by organization members. The likelihood of failure looms large because of this outcome uncertainty. This gives rise to an entrepreneurial risk situated initially with the principal. The transfer of that risk to the agent is not straightforward since both parties' express risk behavior differences. The principal is assumed risk neutral and the agent risk averse. This assumption is based on the argument '[...] that agents are unable to diversify their employment [...] and principals, who are capable of diversifying their investments, should be risk neutral.' (Eisenhardt 1989). However it is assumed that the principal is risk averse when choosing for a "buy" option (Eisenhardt 1989). When principals are faced with adverse possibilities there is an overweighting of certainty (Kahneman and Tversky 1979). This is where the prospect theory give some explanation.

Prospect theory (PT) was developed by Tversky and Kahneman (Kahneman and Tversky 1989; Tversky and Kahneman 1986) as a falsification for the Expected Utility Theory (EUT) of Von Neumann and Morgenstern (Currim and Sarin 1989). PT has also been used in IS research (Koh et al. 2004; Rose and Rose 2004). It is our belief that on the issue of risk behavior differences the prospect theory is of special interest (Devos et al. 2008). Okada (2010) investigated the link between uncertainty, risk aversion and the seller's willingness to accept (WTA) versus the buyer's willingness to pay (WTP). They drawn on prospect theory to demonstrate that the discrepancy between the WTA and WTP increases with 1) the level of uncertainty about the exchange item's value and 2) the exchange parties' level of risk aversion.

The links of the LMT with the three mentioned theories are presented in figure 2. All four theories share the construct information asymmetry. LMT and Agency theory share the constructs moral hazard, opportunistic behavior and adverse selection. Adverse selection is also shared by PT. Reputation is shared by LMT and Trust theory.

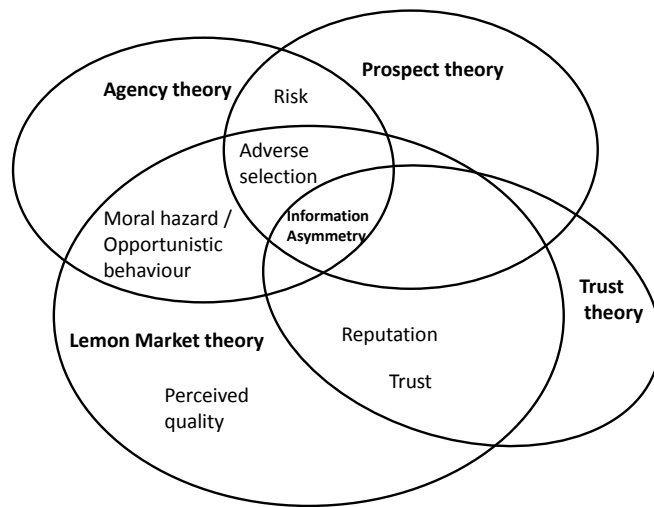


Figure 2. The links of the Lemon Market theory with Agency theory, Prospect theory and Trust theory.

There are however other theories who have shared constructs with LMT like auction theory, game theory and incomplete contract theory. Incomplete Contract Theory (ICT) formalise some ideas on opportunistic behaviour in the present of a risky investment between transacting parties. The theory was developed in the late 1980s by Hart and Moore (1988). Auction Theory (AT) provides explanation for market mechanisms like methods of price formation in environments with incomplete information. (Klemperer 1999). AT has gained a lot of interest in developing new auction forms like sell radio spectrum licences and set up new e-markets. The most generic theory which relates to LMT is probably game theory (GT). Markets can

easily be simulated in well-defined economic environments (symmetric vs asymmetric information) where they provide valuable testing grounds for GT (von Neumann and Morgenstern 1944).

4 Literature Overview of IS articles using LMT

Although a lot of IS scholars refer to the phenomenon of a lemon market in a variety of situations there is not a lot of research bringing empirical evidence of an actually lemon market as predicted by Akerlof. It is even unclear in some work to see how the theory is actually applied to explain the observations. The reference to the seminal paper of Akerlof seems to be reduced to only a citation. Some examples:

...[]We can, therefore, defer consideration of the ‘lemon’ problem associated with quality under asymmetric information. (Liao and Cheung 2002)

...[]Eventually, only the lowest-quality sellers would remain, a dynamic economist George Akerlof memorialized as the “market for lemons”. (Resnick et al 2000)

Some articles only have the seminal article of Akerlof as an entry in the reference list without further use in their work (Kambil and Ginsburg 1998; de Figueiredo 2000; Sakalaki and Kazi 2009).

The basic construct of the LMT, information asymmetry is actually well researched. This was shown on Internet exchanges for used goods like PDAs, digital cameras, audio players and laptops (Ghose 2009). Information asymmetry between buyer and seller creates the possibility of igniting a lemon market but is certainly not a sufficient condition. On an individual level, signs of the lemon market are mainly measured by adverse selection (Dewan and Hsu 2004). Afzal et al. (2009) showed that symmetric information highly valued a product in close proximity to the real worth of the product, while asymmetric information undervalued a product. Lee et al (2010) showed that opportunistic behaviours in online markets can be predicted. As the risk of fraud increases, buyers underestimate the value of

items in order to reduce the potential transaction risk. They conclude that this practice harms the honest and normal sellers and thus leading to a lemon market. To mitigate the lemon problem Lee and Yoo (2007) found that several auction markets have devised third party quality grading systems and limited auctions to only relatively higher quality products. Overby and Jap (2009) conducted an enquiry to investigate the adoption of e-channels in a market for products of uncertain quality (used vehicles). They found that quality uncertainty causes buyers to discount as a hedge against buying a lemon.

The market of IT security products and services seems to go in the direction of a lemon market. Since the security of software products is difficult to measure for users, vendors are unable to charge a premium for extra security due to the information asymmetry. Still the market for security products is very prosperous and is growing continuously (Bojanc & Jerman-Blazic, 2008).

Cremomini and Nizovtsev (2009) developed a quantitative model based on game theory to understand information security practices. In their conclusions they refer to Akerlof with: "This is consistent with existing theoretical research on economics of incomplete asymmetric information". It is however not shown how their findings are consistent with a real lemon Market as described by Akerlof.

Kim et al.(2010) investigated customers' perceptions of security and trust in e-payment systems and found that posting security statements in e-payment sites are likely to increase the chances of customers' purchasing and paying over the Internet. They argue that the basis for this proposition lays in the concept of information asymmetry and the role it plays in decision-making. The risk of leading to a lemon market is recognized as one of major problems in e-payment systems.

Brydon and Vining (2006) are bringing LMT in to show the failure of internal knowledge markets. They conclude that internal knowledge suppliers must maintain their reputation to prevent suppliers of high-quality knowledge not participating in the internal knowledge market.

In a research of creating business value by virtual communities, a type of virtual community is a transaction-oriented community where sellers and buyers are brought together like eBay. According to Spaulding (2010) transaction-oriented community becomes a lemon market when trust between the parties does not exist. Without trust, risk increases and prices deflate causing sellers with valuable goods to take their goods elsewhere. This is confirmed by a research on attacks and defense techniques for reputation systems (Hoffman et al. 2009).

Devos et al. (2009) investigated the outsourcing of IS projects in SMEs (Small and Medium-sized Enterprises) and found that the LMT offers an extra explanation for the adverse selection. They show that there is always incentive for adverse selection as long as the SME-principal is not willing to pay the cost to fade out the information asymmetry and thus creating an ideal environment for a lemon market. The market where SMEs buy IT is attractive for small independent software vendors (ISV) acting as business partners of top notch ERP suppliers, like SAP, Oracle or Microsoft Dynamics or IS/IT suppliers like IBM, Hewlett-Packard or Apple. However, the capability maturity level of the ISVs is often inadequate to match with the demands and complex challenges of an IS implementation in an SME environment. Since SMEs are not so well informed on the correct IT/IS capabilities of the ISVs as well as on the broad functionalities of the package software together with the efforts needed to adapt the software to the specific requirements of the users, a situation of severe information asymmetry occurs. They found that this leads almost always to opportunistic or even unethical behaviour on behalf of the ISV and that a lemon market occurs.

Eymann et al. (2008) apply LMT for Grid economies. Grid technologies are particular types of technological and organizational interactions within a computer network, describing supply and demand for computational and data services. Again a situation of information asymmetry occurs between the service providers having more information about availability and quality of the services they provide, and their users or clients. The asymmetrically distributed information leads to uncertainty about the optimal use of the Grid on the client side and consequently to imperfect markets.

Table 1 gives an overview of some IS articles using the LMT. The articles can also be found in the references. In the first column with mentioned the author(s). The second column is the research domain. The most researched domains are: e-commerce, IT security and IT outsourcing. The third column is the research topic which is a refinement of the research domain. The unit of analysis is shown in the fifth column and the sixth column shows the additional theories that are used in the article.

Authors	Research domain	Research Topic	Unit of analysis	Used Theories
Afzal et al. (2009)	Information	Product valuation	Group of students	
Bojanc and Jerman-Blazic (2008)	ICT security	Risk management	Organization	
Brydon and Vining (2006)	Knowledge Management	Internal market failure	Organization	
Cremonini and Nizovtsev (2009)	ICT security	Strategic Attackers	Security environment	Game theory
Devos et al. (2008)	IT outsourcing	IS failures	SME ((small and medium-sized organizations)	Agency theory, Prospect theory, Trust theory, Incomplete Contract theory
Devos et al. (2009)	IT outsourcing	Outsourced project management	SME	Agency theory, Prospect theory, Trust theory, Incomplete Contract theory
Dewan and Hsu (2004)	e-Commerce	Online Auction	Markets	Auction theories
Eymann (2008)	IT/IS	Grid environments	Grid markets	Trust
Gopal and Sivaramakrishnan (2008)	IT Outsourcing	Offshore software developing	Organisations	
Ghose (2009)	e-Commerce	Electronic trading of used goods	Market of used goods	
Hoffman et al. (2009)	ICT security	Attack and defense techniques	Organization	Trust
Kim et al. (2009)	e-Commerce	E-payment	Markets	Trust
Lee et al. (2010)	e-Commerce	Online Auction fraud	Markets	Auction theories
Lee and Yoo (2007)	e-Commerce	Electronic trading of physical goods	Markets	Auction theories
Overby and Jap (2009)	e-Commerce	Adoption of e-channels	Markets	
Pavlou and Gefen (2004)	e-Commerce	Online Auction and Institution-Based trust	Markets	Trust
Pavlou and Dimoka (2006)	e-Commerce	Online marketplaces and Trust and Reputation	Markets	Trust
Pavlou et al. (2007)	e-Commerce	Buyer-seller relationships	Consumers	Agency Theory
Spaulding (2010)	Internet	Virtual communities	Organization	Trust
Snir and Hitt (2001)	Information Economics	Contracts	Organization	Agency Theory
Whang (2010)	Adoption of IT	RFID	Supply chain	Diffusion and adoption
Wilson and Zillante (2010)	e-Commerce	Institutional designs (Two-sided multilateral negotiations and post-ed-offers)	Markets	

Table 1 – Overview of IS articles using the Lemon Market theory

5 Bibliographical analysis of the original Akerlof article

It was 40 years ago since Akerlof published his seminal article in the Quarterly Journal of Economics (Akerlof, 1970). So reviewing and profiling the existing literature citing this article is likely to be of use to researchers and practitioners. This will help to identify the strengths and weaknesses of the existing body of research and to provide clearness in the findings. Our objective therefore was to identify peer reviewed IS journals publishing articles based on the LMT. We limited our research to work published in the database provided by Thompson Scientific also known as the Web of Science.

As of the beginning of March 2010 the original Akerlof article was already cited more than 2200 times with a monthly growth of 15 – 20 newly citing publications (last access of the Web of Science database was end of June 2010 and showed 2285 citations). In table 2 we show the number of citing articles by subject area. The subject areas are chosen to be most favorable to publish IS related work, however one cannot exclude that other areas also publish such work. It is also well known that the IS discipline is far from mature and stable and has tentacles in a wide variety of referencing disciplines like business, economics, management and operational research. IT/IS has penetrated in almost every academic field!

Subject Area	Count	Percentage
Economics	824	51.08%
Business	231	14.32%
Business/Finance	184	11.41%
Management	176	10.91%
Law	130	8.06%
Agricultural, Economics & Policy	67	4.15%
Sociology	67	4.15%
Planning & Development	48	2.98%
Social Sciences, Mathematical Methods	47	2.91%
Environmental Studies	46	2.85%
Political Science	41	2.54%
Public Administration	33	2.05%
Information Science & Library Science	31	1.92%
Environmental Science	30	1.86%
Computer Sciences, Information Systems	29	1.80%
Health Policy & Services	29	1.80%
Health Care Sciences & Services	28	1.74%
Mathematics, Interdisciplinary Applications	28	1.74%
Operational Research & Management Science	26	1.61%

Table 2 – Number of articles citing the seminal Akerlof article by subject area (date of inquiry: 25th of March).

The subject areas in the Web of Science are not treated as mutual exclusive attributes, so articles can be present in more than one subject area. We limited our search to articles only and excluded proceeding papers, reviews, and editorial material. This left a total of 1613 refereed articles at the date of March 2010. We can observe in table 2 that the largest area is economics, being the originating area of the seminal Akerlof article, following by the derived disciplines business, finance and management.

The largest area within the IS discipline is Information Science & Library Science with 1.92% of the total articles or 31 refereed articles, followed by Computer Science, Information Systems with 1.80% and 29 articles. Again, it is not easy to reveal IS research articles in the Web of Science by subject area.

An alternative way to dig up IS research articles is done via a search by relevant IS journals, this is shown in table 3. A lot of IS scholars have their favorite IS journals, so a overview by journal title can be of interest. Again this alternative way gives only an indication and not a complete picture of the quantity of IS research articles citing the work of Akerlof, since a lot of IS research articles also are published in typical non-IS research journals like the Journal of Economic Perspectives, Management Science, and Organization Science.

Journal Title	Article count	Percentage
Information Systems Research (ISR)	7	0.61%
Decision Support Systems (DSS)	5	0.44%
Communications of the ACM (CACM)	4	0.35%
European Journal of Operational Research (EJOR)	4	0.35%
Electronic Commerce Research and Applications	3	0.26%
Information & Management (I&M)	3	0.26%
Journal of Management Information Systems (JMIS)	3	0.26%
MIS Quarterly (MISQ)	3	0.26%
Industrial Management & Data Systems	2	0.17%
Journal of Information Science	2	0.17%
J. of Organizational Computing and Electronic Commerce	2	0.17%
ACM Computing Surveys	1	0.09%
Concurrency and Computation-Practice & Experience	1	0.09%
IEEE Trans. on Knowledge And Data Engineering	1	0.09%
Information Processing & Management	1	0.09%
ACM Computing Surveys	1	0.09%
Concurrency and Computation-Practice & Experience	1	0.09%
IEEE Transactions on Knowledge and Data Engineering	1	0.09%
Information Processing & Management	1	0.09%
Information Research and Resource Reports	1	0.09%
Information Sciences	1	0.09%
Intern. J. of Information Management	1	0.09%
Intern. J. on Semantic Web and Information Systems	1	0.09%
J. of Experimental & Theoretical Artificial Intelligence	1	0.09%
Journal of Grid Computing	1	0.09%
Online Information Review	1	0.09%

Table 3 – Number of articles published in IS journals and citing the seminal Akerlof article.

The IS journal with the most citing articles is the Information Systems Research with 7 articles, followed by Decision Support 5 articles, Communications of the ACM (4 articles) and the European Journal of Operational Research together (4 articles). Table 3 illustrates that the articles are spread over a large group of different journals. The most publishing IS journals of work using the LMT lay within the basket of “pure MIS” journals: ISR (#7), DSS (#7), CACM (#4), MISQ (#3), (Rainer and Miller 2005).

In figure 3 we shown the evolution of the number of articles published per year. As can be seen the number is incrementing every year and the growth is exponential. The last year taken into consideration, for figure 3 was 2009 with a total number of 116 articles referring to Akerlof’s seminal work.

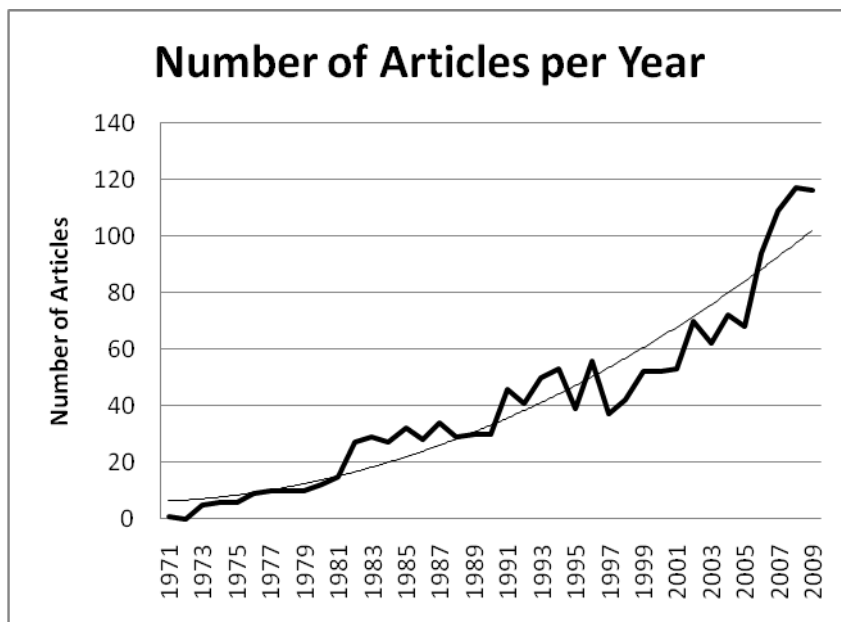


Figure 3 – Number of articles published per year and referring to Akerlof’s seminal work.

6 Conclusion

We have shown that the work of Akerlof has been acknowledged in a variety of disciplines including IS research. The lemon market is indeed a very frequent occurring phenomenon and has been applied by lot of scholars from different academic perspectives. The theory goes back to the essence of markets and human interactions. The emerging e-markets since the end of the last century has given a boost to the application of the theory. We have also shown that the theory has a much broader application domain than e-commerce.

Since the LMT is a meta-theory with a very high level of abstraction it provides way of thinking about other theories and has also links to other theories. We show that Agency theory is one of them with probably the same strength and authority than the LMT. Prospect theory and the theory of organizational trust are also very strongly linked and can provide measures for constructs of the LMT.

The scarcity of empirical evidence of the LMT in IS research is probably the major drawback. Although the theory has strong explanatory power, every empirical situation has its own specific nature which should be carefully and rigorously investigated. The relevance of the LMT lays in its nomological power to make strong generalizing laws.

Finally we think that this chapter can help researcher to find adequate information on the LMT and we hope that it can be of use to new research initiatives in domains as described in this article.

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List of abbreviations

ACM	Association of Computing Machinery
AT	Auction Theory
CACM	Communications of the ACM
DSS	Decision Systems Research
EJOR	European Journal of Operational Research
ERP	Enterprise Resource Planning
EUT	Expected Utility Theory
GT	Game Theory
ICT	Incomplete Contract Theory
IEEE	Institute of Electrical and Electronics Engineers
IS	Information Systems
ISR	Information System Research
ISV	Independent Software Vendor

IT	Information Technology
I&M	Information & Management
JMIS	Journal of Management Information Systems
LMT	Lemon Market Theory
MIS	Management Information System
MISQ	MIS Quarterly
PDA	Personal Digital Assistant
PT	Prospect Theory
RFID	Radio Frequency Identification
SME	Small and Medium-sized Enterprise
WTA	willingness to accept
WTP	willingsness to pay