

# **Making Consumer Knowledge Available and Useful**

## **The Case of the Computer Games Industry**

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## **Abstract**

*Firms rely on an external organization to complement the relevant parts of their own knowledge base. In the present paper it is argued that consumers might form part of such an organization because they represent productive knowledge suitable and valuable for firm's purposes. But, as most knowledge, consumer's knowledge is dispersed and often fallible. Taking advantage of consumer knowledge revolves around coordination. In the paper it is argued that a technical innovation - the Internet – together with a social innovation – characterized by incentives and authority - allow firms to coordinate consumer knowledge and make it valid for processes of innovation in product design. In the paper is developed a micro-level notion of the consumer as being an active individual capable of acquiring knowledge (experience and skills) by way of consumption and use. Further is presented a concept of end-consumer producer interaction explaining under which conditions consumer's knowledge can be swapped over to producers and in which situations consumer knowledge might prove to be useful for producer purposes. A specific empirical example of a firm from the emergent industry of computer games show how systematic sourcing of consumer knowledge in several cases has assisted the firm in improving its product design.*

**Key words:** External organization, consumer knowledge, coordination, end-consumer – producer interaction, innovation, computer games industry.

## 1) Introduction

It has been recognized - at least since Marshall - the importance for firms of supplementing their own knowledge with an external organization. In order to develop new tangible or intangible products or processes firms need to complement the relevant parts of their own knowledge base with knowledge residing elsewhere. Consumers constitute a stock of knowledge (experience and skills<sup>1</sup>) gained through the process of consumption. Knowledge comprised by consumers is complementary to producer's knowledge and represents a - not often released - potential for innovation in product design. Since Hayek (1945) it has been acknowledged that knowledge is dispersed and that making something useful out of it revolves around co-ordination. This also goes for consumer knowledge. Further, knowledge is not only dispersed, it is often also fallible and very seldom it comes in "ready to use" packages. This is most certainly the case with consumer knowledge. The question is then, why some firms (in the real world) manage to take advantage of consumer knowledge - despite its difficulties of dispersion and unreliable quality. This is the question that the present paper deals with. From this perspective the paper investigates a situation where valuable productive knowledge is dispersed - embedded in consumers, but where novel opportunities created by innovations in Information and Communication Technology (ICT) establish ways in which it can be made available - at low cost. The paper then looks at the opportunities arising when dispersed consumer knowledge is pooled into a concentrate. The answer to the question will be sought in an empirical example from the emergent industry of computer games. Along with the surfacing of the Internet and the on-line age certain firms within this industry are increasingly becoming aware of the potential advantages of collecting consumer knowledge. Some have managed to develop useful associations with consumers by exploiting opportunities represented by novel Information and Communication Technologies. A specific study of a firm, its products, and "its" consumers show how consumer feedback in several cases has assisted the firm in improving its product design. Finally is argued that a social innovation - complementary to the technical innovation of the Internet - is in fact responsible for the efficient and meaningful use of this technology itself. The social innovation - called "the moderator reward function" - has allowed producers to establish a weak authority relationship to consumers. Solely by the joint employment of the technical innovation and the social innovation it is possible to access valuable consumer knowledge.

Until the present point in time innovation studies in economics have focused almost exclusively on the supply-side and have not developed any clear notions of demands-side

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<sup>1</sup> For an extension on the issue of knowledge, experience and skills as constituting "capabilities", see Richardson (1972).

dynamics. Further only little effort (if any at all) has been devoted to develop an understanding of the possible interplay between individual consumer action at the micro-level and innovation dynamics on the supply-side. As a response the present paper intends to develop a framework in which the consumer is considered an active individual who acquire knowledge, experience, and skills by way of consumption and use. Further, the framework contains a concept of interaction between end-consumers and producer, explaining under which conditions consumer knowledge can be swapped over to producers and in which situations consumer knowledge might prove to be useful for producer purposes.

The remainder of the paper is divided into 5 sections. In section 2 is created a notion of a consumer who builds up competence through consumption acts. Subsequently in section 3, is constructed a concept of end-consumers – producer interaction. Section 4) is concerned with the idea that developments within ICT represent new opportunities fueling consumer - producer interaction. The final section 5 presents an empirical study of consumer – producer relations within the computer games industry. It emphasizes that certain social elements structure these relations.

## **2) The growth and dispersion of consumer knowledge**

One of the foundations of Smiths “Wealth of Nations” (1776) is the principle of a division of labor. The key feature of the theory is the recognition that as knowledge develops it becomes more specialized. The specialization leads to the perception of anomalies that would be passed over in a broader perspective, and thus to an acceleration of the growth of knowledge. It follows that the division of labor leads to a growth of knowledge. In other words: knowledge grow by division (Loasby, 2000: 6-8). With the growth of knowledge new economic activity become possible, the economic progresses, and the resulting extension of the market makes the process self reinforcing (Young, 1928: 540).

As specialization deepens the dependence of one specialist becomes increasingly dependent on the goods and services provided by other specialists. This also applies for knowledge. As specialization deepens other people’s knowledge becomes increasingly important in production, in consumption and in decision making. The dependence on other people’s knowledge leads us to think that there must exist some sort of interdependencies between actors. Since actors activities are subdivided into specialized fields and no actor alone can be considered capable of creating a final outcome one must assume that interdependencies between actors are very relevant (Loasby, 2000: 6-8). Extensive systems of specialization are characterized by pervasive systems of interdependencies. With the extension of systems of specialization - and consequently extension of systems of interdependencies – requirements for

coordination increase. In other words; the division of labor necessitate the existence of means by which specialized activities can be properly coordinated. Coordination of exchange and interaction allow specialized entities to acquire complementary tangibles, intangibles and bits of knowledge necessary to carry out their activities.

The idea that the division of knowledge is a device for developing knowledge was presented by Smith's theory of economic growth already almost 250 years ago. It constitutes the foundation of the capability view of the firm. Specialization aims at freeing resources to be relocated in developing core capabilities and in enhancing the internal learning processes (Maskell, 2000). The pioneer of the capability thought, G.B. Richardson suggests that;

*“it is convenient to think of industry as carrying out an indefinite large number of activities, activities related to the discovery and estimation of future wants, to research, development and design, to the execution and co-ordination of processes of physical transformation, marketing of goods, and so on. And we have to recognise that these activities have to be carried out by organisations with appropriate capabilities or, in other words, with appropriate knowledge, experience and skills” (Richardson, 1972: 888).*

According to Hodgson the capability view<sup>2</sup> sees the existence, structure and boundaries of the firm as explained in some way by the associated existence of individual or team capabilities – such as skills and tacit knowledge – which are in some way fostered and maintained by that organization (Hodgson, 1999: 247-8). Seen in the most commonly employed perspective – the firm perspective, the term capabilities emphasizes the key role of strategic management in appropriately adapting, integrating, and re-configuring internal and external organizational skills, resources, and functional competencies toward a changing environment (Teece, et. al. 1990).

The capability theory seeks to explain what any particular firm does by what its decision-makers believe that they know, what they believe they have learnt, and what they believe can now do. It intends to explain the evolution of a firm's activities by the evolution of its knowledge and skills (Loasby, 1998). As they appear in the literature, capabilities are

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<sup>2</sup> This class of approaches emphasizes building competitive advantage through capturing entrepreneurial rents stemming from firm level efficiency advantages. These approaches, derived from earlier discussions of corporate strength and weaknesses have taken on new life. Resulting from these is “the resource-based view” (Teece et.al. 1990). The resource-based view emphasizes firm specific capabilities and assets and the existence of isolation mechanisms as the fundamental determinants of firm performance (Penrose 1959, Rumelt 1984, Wernerfelt 1984).

aggregate concepts that may be located in firms, among firms and even in industrial districts (Foss, 1999). However, it still have to be sorted how capabilities at these levels is connected to individual action at the micro-level.

### **Consumers alive?**

The intention with this paper is to develop a framework able to deal with the influence that end-consumers have - or potentially could have - on firms' innovative capabilities. But, the intention is further to apply "the basics" of the capability view itself, to develop an understanding of the micro-level entity of the consumer. I argue that related to certain industries there exists even very competent<sup>3</sup> end-consumers. These consumers are holding relatively valuable productive knowledge or at least knowledge that can be converted into productive knowledge by firms. It is knowledge that - if applied - would provide the firms with new and valuable inputs to the innovation process. In that way consumers can be thought of as constituents of firm's external organization – a source of innovation.

Innovation studies in economics often focus on supply side and give a passive role to consumers. Consumers are most commonly considered inactive containers of needs and preferences which producers have to gain information about, in order to know what qualities and quantities to produce. Only few and very sporadic attempts to develop the idea that users or suppliers themselves might possess innovative potential can be observed. Although both Lundvall (1985) and von Hippel (1988) have presented frameworks including users and suppliers as sources of innovation they do not explicitly consider consumers as a source of innovation, but confine themselves to consider business-to-business relations. End-consumers are still only considered as having needs and preferences that producers must meet. Solely, within the discipline of marketing it is generally acknowledged that there is more to end-consumers than merely "preference signals" revealed through the buying act. I argue, that consumers - through all times – have been capable of acquiring knowledge, experience and skills and individually innovating, in order to satisfy present wants and to materialize imagined possibilities.

One must suspect that the ignorance towards consumer action can be explained by the fact that it has not – until recently - been possible to pin down the economic significance of this phenomenon. A conceptualization of end-consumers as active and capable individuals remains to be developed.

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<sup>3</sup> To avoid the usual confusions of terms and definitions within this field I employ the term capability to aggregate phenomena such as firm, and the term competence to the human individual (and perhaps in the future to some animals).

## **The competent consumer**

Developing competence is for the consumer a matter of acquiring knowledge, experience and skills - in the sense advocated for by Richardson (1972). The consumer acquires knowledge, experience and skills in order to utilize goods in the production of satisfaction and joy in the sense suggested by Scitovsky (1976)<sup>4</sup>.

Through the act of consumption or the use of products consumers acquire knowledge, experience and skills. So, over time they build up particular bodies of knowledge, experience and skills. The knowledge, experience, and skills that consumers acquire relates to the particular product in question (but also to the additional devices required for its consumption). Consumers notice peculiarities of a product and they imagine scope for improvement through the daily use of a product. The more they consume or use a given product the more knowledge, experience and skill they accumulate related to this product. Knowledge of a product and its use can in addition be acquired through interaction with others (consumers as well as producers) who also possess knowledge of that product. Experience and skills can only be gained through consumption and use. Thus, consumers represent product related knowledge, experience and skill of consumption and use - and additionally knowledge sourced from interaction.

Consumers specialize in consumption and use of one (seldom in more than a few) particular brand within a range of brands. In this way the consumer minimizes cost of search of acquiring it, uncertainty of quality, and accumulate knowledge of how to use or consume it in the most satisfying way. Learning to use a product or consume it in a satisfying manner takes time and effort. In some cases only little, but in some cases more. The point is that change of product or brand is not costless and further it involves uncertainty. The new product and its use must be learned in order to gain optimal levels of satisfaction. The more effort and time that consumers have "invested" in this learning process the higher the sunk costs of consumption and use.

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<sup>4</sup> Tibor Scitovsky suggests a model of economic behavior concerning consumers who are maximizing joy via consumption. He departs from standard utility approach for the reason that it lacks attention to novelty, interdependence and habits in consumer behavior. The fundamental assumption in Scitovsky's theory is that humans seek optimal levels of arousal. The quantity of arousal depends on the stimulation that the nervous system receives from outside through the senses and from within the brain. Too high arousal levels gives rise to stress and discomfort and to low levels of arousal gives rise to boredom. Consequently the individual will seek to adjust and induce actions to try to reduce or elevate the levels of arousal. In order for a creative activity to generate the delight of novelty it must exceed a certain level of complexity. With complexity, the consumer finds incentives for discovery of new aspect of the activity. On the other hand, maximum enjoyment of a complex activity requires some degree of familiarity with this activity. The familiarity comes with consumption. On the other hand the activity should also not be so complex as to be incomprehensible. It follows that a flow of information that is either too easy or too difficult is less satisfying than something in between and that the most satisfying is the information flow that fully fit into place with the brain's information processing capacity (Scitovsky, 1976).

Although consumers are capable of imagining scope for improvement and innovation in a particular product they do not acquire the same insight into production activities as producers. Producers spend their time producing therefore they accumulate knowledge of production. Consumers spend their time consuming and using and therefore they accumulate knowledge of consumption and use. Bodies of knowledge accumulated by consumers are therefore distinct from those held by producers - but nevertheless valuable to producers. Consumers represent particular bodies of knowledge, which are dissimilar, but nevertheless, complementary to those of producers.

Since knowledge-accumulation relates to the particular product in question different consumers will possess bodies of knowledge (experience and skills), which are similar. But, individuals are influenced differently<sup>5</sup>, and individuals also possess different perception capacity, deviating insights and dissimilar approaches. Thus, through consumption and use every consumer follows unique pathways leading him into a particular specialization. Therefore the results - even when handling the same object - will be a variety of outcomes of knowledge, experience and skills. Nevertheless, personal pathways are restricted by the space of possibilities that the product offers. It follows, that on the one hand consumer's bodies of knowledge related to a given product are similar, but on the other they can never be identical. Consumers represent bodies of knowledge which similar, but not identical. On this basis one can assume that product related bodies of knowledge assembled through consumption and use will be sufficiently similar to allow for meaningful interaction, but also sufficiently diverse to generate out come variety when action is taken.

Numerous consumers represent a potential of knowledge, experience and skills of a particular products consumption- and use-features far greater than producers could ever acquire out of their own activities, testing etc. Numerous consumers constitute a giant test bed or lets say laboratory for imagined improvement and real innovation of products.

Imagine the case of racing bikes. Who holds knowledge, experience and skills related to the use of this product? Cyclists do - of course. Salesmen and producers of racing bikes also hold - although different - knowledge related to the product. The cyclist acquires knowledge, experience and skills over time. Knowledge experience and skills he gains through use. Knowledge he can also acquire through discussing racing-bike matters with his fellow cyclists who he meets on training rides everyday, and further by watching more experienced cyclists handle their equipment. Competent cyclists - eager to cut marginal split seconds - imagine

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<sup>5</sup> The tendency to variation occur due to the fact that "every locality has its incidents of its own, which affect in various way the methods of arrangements of every class of business that is carried out on it: and even in the same place and at the same trade no two persons pursuing the same aims will adopt exactly the same routes" (Marshall, 1925: 355).

scope for improvement and redesign of racing-bikes. Some cyclists even carry out improvements themselves.

### **Dispersed knowledge**

Since consumer knowledge is obviously embodied in a myriad of individual consumers, scattered in space, it follows that consumer knowledge – like most other knowledge – is highly dispersed. Any contribution to the discussion on distributed systems of knowledge is likely to begin with acknowledging Freidrich A. von Hayek. Though others have influenced the subject, he was to become commonly accepted as the first who explicitly recognized how knowledge “never exists in concentrated or integrate form, but solely as the dispersed bits of incomplete and frequently contradictory knowledge which all the separate individuals possess” (Hayek, 1945: 519).

Hayek was preoccupied with the way to manage the knowledge base of the modern economy most efficiently, or more exactly with the way in which it was possible to optimize the utilization of knowledge dispersed among a great number of individual actors. Hayek developed his theory of the market as an ongoing process of discovery where dispersed knowledge becomes mobilized. His main conclusion was that the most productive use of dispersed knowledge was unlikely to be found by setting up a central planning board to assemble and organize all knowledge before deciding on its use. In this vein Hayek argued that the attempt to coordinate through centralization necessarily inhibit many of potential benefits of the division of knowledge. On this basis he abandoned the vision of governmental planning.

*“If we can agree that the economic problem of society is mainly one of rapid adaptation to changes in particular circumstances of time and place, it would seem to follow that the ultimate decisions must be left to the people who are familiar with these circumstances, who know directly of the relevant changes and the resources immediately available to meet them” (Hayek, 1945: 524-526)*

Hayek’s inquiry let him to focus on knowledge already dispersed. At the same time he deployed less thought to the question of how knowledge becomes dispersed in the first place. It thus appear that Hayek did not really acknowledge a theory of the division of labor and its implications for the growth of knowledge. Nonetheless, an answer to the question of knowledge dispersion is to be found in the bare fact that knowledge emerge and grows in separate places. Knowledge grows in specializng entities - such as firms of individuals – which are necessarily not all located at the same spot. Taken into the consumer concept it means that consumer knowledge grows as seperated individuals specializes in consumption and use.

### 3) The concept of End-consumer - Producer Interaction

Innovation studies have almost entirely focused on simplified models of innovation in which innovation is considered a linear pathway from science and research through development to production and finally to marketing - without considering neither end-consumers behavior nor their possible influence on producer's ability to foster innovations. But, "*innovation is not a linear process*" (Kline, 1985). Actually, to account for these processes one should allow certain feedback mechanisms to be understood. Feedback mechanisms occur between all of the blocks sketched in figure 1 below. In this paper I exclusively focus on feedback initiating on the consumer side.

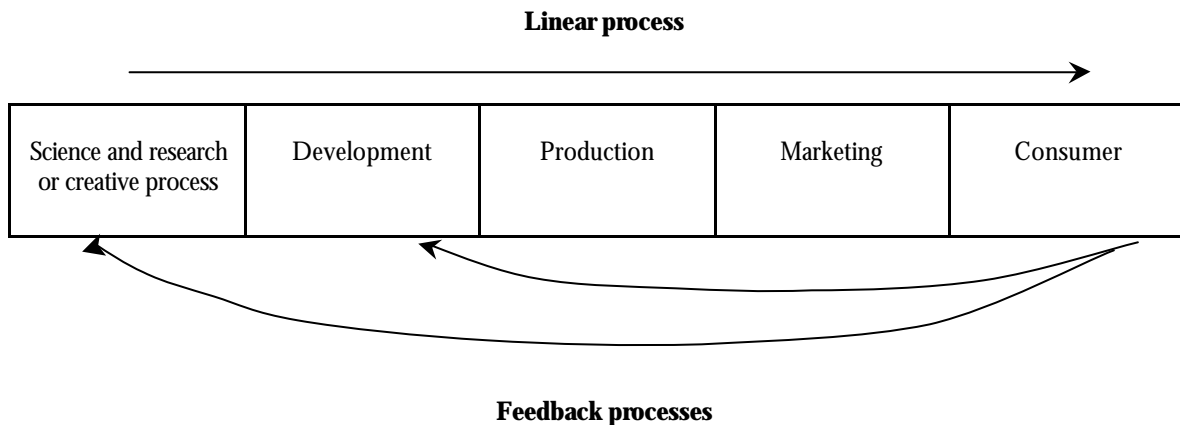


Fig.1

The concept of end-consumer – producer interaction I am introducing is a very simple concept that rests on only two conditions. Primarily, it requires that there must be some kind of interaction between end-consumers and producers of the goods or service in question – if any knowledge is to be swapped over. Secondly, the concept requires a re-conceptualization of the notion of the consumer in line with the one already presented. Within the end-consumer - producer interaction concept consumers are thought of as active individuals with varying degrees of competencies. It is intended to demonstrate that firm's opportunities of benefiting from consumers knowledge increase concurrently with 1) the intensity of interaction between consumers and producer, 2) and with the increase in consumers competence level. Increase in

intensity of consumer - producer interaction is not alone sufficient. Interaction in itself does not guarantee content. On the other hand, content alone is neither sufficient. Within this concept content is worthless if it is not transferred. Optimally, the intensity of interaction and consumer competence stands in a 1:1 relationship.

Primarily, firms are dependent on its number consumer's who are able (and willing) to engage in interaction with them. The higher the cost of interaction with producers the more reluctant consumers will be to make their knowledge available. So, the available interfaces between the parts must be considered. Secondly, some degree of competence at the consumer level is necessary in order for knowledge to be valuable for the firm. The higher degree of interaction the firm have with highly competent consumes the better it leaves the firm to take advantage of consumer generated knowledge and thereby for innovation.

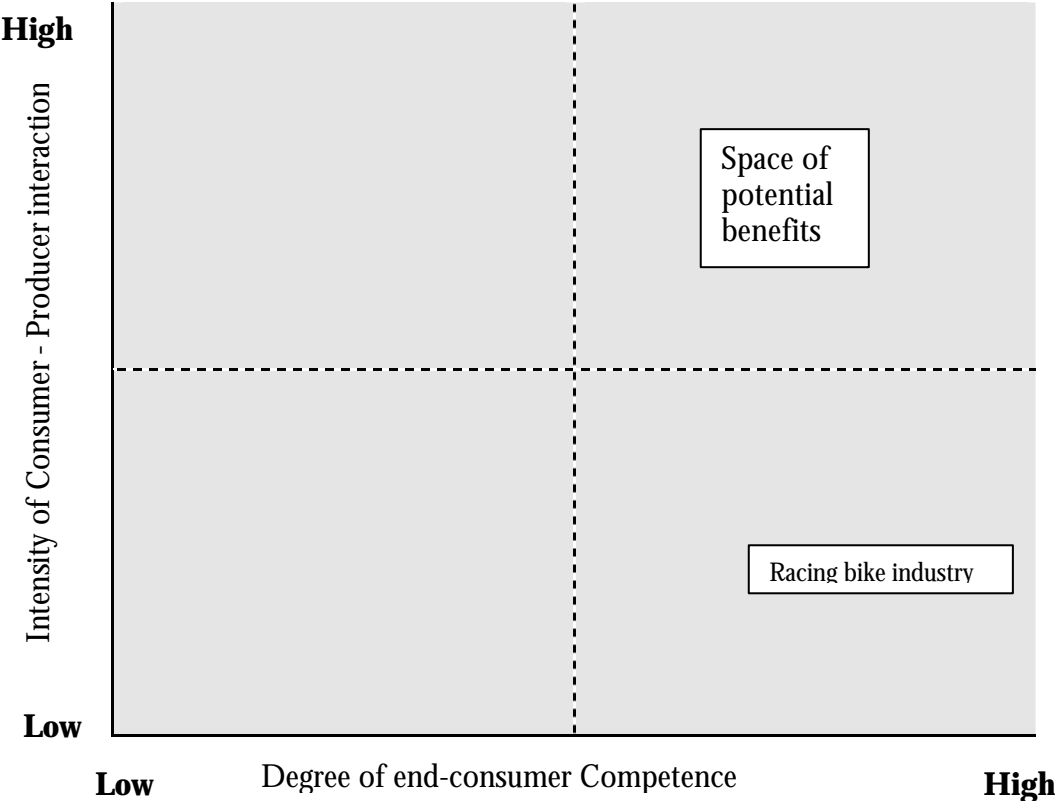
The benefits of interaction between end-consumers and producers vary among firms and industries according to interfaces available and according to degree of consumer competence. Certain firms or industries obtain only little or no feedback from end-consumers, simply because there exist no interface to connect the two entities. Other firms or industries get lots of feedback but of no value because their consumers are not competent. But we can also imagine the situation in which the presence of technologies allowing for efficient communication coincide with a crowd of competent consumers.

Lets again think of the racing bike example for a second. Sometimes cyclists tell salesmen or producers about their ideas. Ideas for improvement<sup>6</sup> of racing bikes may often be exchanged in the bike shop where bikers meet to buy bits and parts. In that way the owner or salesman gets knowledge back from cyclists. Knowledge held by consumers may in such manner be feeded upward and back into the valuechain and further, possibly make way for improvement or innovation of a particular brand of racing bikes. But, even if consumers in this industry are competent and their bodies of knowledge are perfectly complementary to racing bike producers, the interface - word of mouth – is still in the primitive mode and thus, it does not allow for a systematic knowledge sourcing.

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<sup>6</sup> ...or even knowledge of existing innovation made on the consumer-side.

Fig. 2: The degree of end-consumer – producer interaction intensity and the degree of end-consumers competence.



In figure 2 firms located in the North East corner of the quadrant are in the best position to take advantage of consumer generated knowledge.

**4) The interface opportunity**

Technologies change the way consumer knowledge can be made available. Existing Information and Communication Technologies affect the diffusion of knowledge and information and have - especially since second half of the 1990'ties - drastically altered the circumstances of time and space.

Unsurprisingly, in the primitive mode the more numerous and the more spatially scattered the population to be reached by a particular message the more costly communication turn out to be. And further, the more costly it will be for somebody to gather messages from that population. ICT extends the space within which it is feasible to source knowledge

dispersed - to a global scale. It also decreases the costs of coordination of knowledge in general.

Pooling consumer knowledge in the primitive mode is a time consuming process and therefore perhaps not even feasible since consumer's knowledge loses its actuality over time. Consumer knowledge is only of temporary complementary to producer's knowledge. Passed a certain time window a given body of consumer knowledge loses its complementarity to producer knowledge since producer knowledge necessarily progresses as product developments move ahead. It is what I call "*the problem of only temporary complementarity of consumer knowledge to real production processes*". It follows, that the longer the time for consumer feedback to arrive to the firm the less valuable this knowledge is likely to be for the firm. ICT allows for an almost time (and space-) frictionless mode of coordination that potentially speeds up feedback processes. Therefore its implications are extensive for consumers - producer relations.

ICT has many other implications which should be taken into account which given the space constrains of this paper must be excluded. However, one important comment should be made. It is that, succeeding to communicate via ICT is essentially very dependent of clear articulation and proper codification to the particular subculture that is addressed. Generally much know-how is very poorly articulated and often tacit. Since any complete codification (made by the sender) should encompass all the possible situations encountered by code users (receiver), no universal code can go beyond generalities; the more specific the guidance the narrower is likely to be the range of application (Loasby, 1999: 66).

Since the ICT-media does not allow for body language or other sensory perceptions, transfer of tacit knowledge would in this regard be close to non-sense. Meaningful knowledge exchange and communication by ICT in general requires codification efforts, low degree of disparity of knowledge, which basically means common reference points between sender and receiver.

### **Summing up:**

I have argued in the first part of this paper that it is convenient to think of the consumer as an active individual. Such an interpretation has lacked within innovation studies in economics. Therefore I have suggested the notion of a competent consumer. This consumer is characterized by its ability to accumulate knowledge (experience and skills) through acts of consumption and use. In this sense the competent consumer acquires bodies of knowledge of consumption and use, which are complementary to producers knowledge but similar to those of fellow consumers. Where consumers and producers interact producers may achieve results. I argued that in the case of end-consumer – producer feedback achievements on the producer

side depend on the degree of interaction between the two entities and on the degree of consumer's competence. Finally in the first part of the paper I indicated that technological development - within ICT - affects strongly the means by, which consumer knowledge can be made available.

The opportunities related to the use of consumer knowledge are often ignored, but might well be a crucial factor for continued innovation that brings some firms ahead of the competition. The emergent ICT age has introduced new set of opportunities, which must be explored in order to sustain competitiveness. I suspect that productive organizations of consumers can be obtained. Making consumer knowledge useful is first and foremost a question of managerial time investments. Firms face a variety of options to choose from when making investments in managerial time. I harbor suspicion that diverting managerial time to explore the benefits from consumer contact is a feasible - and possibly superior - strategy that remains to be seen. To allow consumers to engage in product improvement development this way permits firms to improve product design much faster and in a fashion more targeted to markets than before.

The remaining section 5 of the paper presents some observations of the relationship between producers and consumers. An example is drawn from the industry of computer games. It has been chosen because it provides us with a particularly illustrative example of the phenomena. It starts with a very brief overview of the industry of computer games introducing the argument that the industry has enter a new paradigm – characterized by the on-line-age. Then a particular example of a firm and its relations to consumers is presented. It shows that consumers have been involved in improvement of the particular product. I trace a core group of competent consumers who are responsible for the main part of meaningful interaction leading to result of product improvement on the producer side. This section will show that firms receive feedback of varying quality and therefore also of varying utility for firm purposes. Finally it is noticed that for interaction to bring about the desired results coordination is essential. It takes time as well as managerial efforts to undertake the stages needed to build relationships - between consumers and producers - capable of transmitting complex knowledge. ICT is vehicle for coordination, but nothing more. It does not do the job. Certain social - and socializing - elements must be in place. In this vein the final part of the paper will argue that alignment of incentives and additionally “the moderator reward function” are preconditions for bringing about beneficial outcomes of consumers – producers interaction.

## **5) The computer games industry**

Currently the computer games industry is growing at its fastest rate (ScreenDigest, 2000). Despite fast growth the industry still resembles an immature evolving business. At present the industry is going through a “bloody mess” driven by buy-outs and mergers where major players seek to secure their futures. The current selection process is leading into new organizational forms, which seems to be more efficient than before. Regardless of growing markets<sup>7</sup> the producers of games face massive obstacles and uncertainty. The changes in the industry have resulted in increasing development cost. The amount of sales required in order to break even has tripled within five years and only 7 percent of games presented on the market make a profit. However, those who make it generate enormous profits. Due to constant product introductions games are regarded as old already after only six weeks. The typical consumer spends only seven to eight months with his game. These facts, leaves firms under pressure for constant improvements in product design and innovation in general.

### **Towards the on-line age in computer games**

The computer games industry was really invented in the early 1980ties. Prior to that time an immature evolving business of computer games became apparent. It started in 1961 when MIT received the new model computer PDP-1 from the Digital Equipment Corporation. Its manufactures hoped that MIT’s electrical engineering department would be able to do something interesting with it – win the space race, breed artificial intelligent robots, or at least revolutionize information processing for the greater glory of America. Within a year, the computing pioneers at MIT had done none of these things. But one of them had written the world’s first computer game<sup>8</sup> (Herz, 1997: 5).

Since these initial “primitive blips” the computer games industry has gone through several stages. The most significant have been related to the development of different consoles<sup>9</sup>, games for PC, and the introduction of 3D graphics. The changes which marks new stages in the computer games industry have each time altered the competitive parameter for

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<sup>7</sup> The computer games industry is the fastest growing segment of the U.S. entertainment industry. The U.S. entertainment software sales topped 10 billion US \$ in the year 2000. In 1999, unit sales in the U.S. were up 19 per cent over 1998 levels. It was the fourth consecutive year of double-digit growth for the industry, and an increase of more than 100 per cent since 1996. During the same period the US economy showed an average GDP growth of 4,2 per cent (The Economist). 60 per cent of all Americans play computer games, or about 145 million people. 215 million games were sold in the U.S. in 1999, which is about two for every household.

<sup>8</sup> In the spirit of the cold war he dubbed it “Spacewar”.

<sup>9</sup> A well known example of a console is Sony Playstation.

the firms of the industry and following left those who adapted fastest in a leading position for the next paradigm<sup>10</sup>.

In the most recent and unfolding stage - characterized by the surfacing of the Internet - the industry is revolutionized yet again. At the present moment most computer games are marketed in electronic form via the Internet, an increasing number of games are played on-line, and consumers communicate with each other and with producers at an increasing intensity via on-line facilities. The first step toward the on-line age was taken in late part of 1993<sup>11</sup> with the game Doom. It marked the beginning of the present paradigm - the on-line age in computer games.

One of the most significant features of the on-line age in computer games is that it changes the way that consumers interact with each other and with the producers of computer games. On-line communities are sites on the Internet where interaction among numerous individuals can occur. They can be regarded as virtual hubs for knowledge and information exchange, chat, and discussion. Albeit consumers might be separated by extensive physical distance ICT allows for high degrees of interaction. An on-line community is a site on the Internet, which serves as a club for its members. There exist innumerable types of on-line communities. In theory as many as there exist topics of discussion. They are either open for everybody like a public place or of a more private nature, such as Rotary Societies or card clubs.

A brief survey (April 2001) of ten on-line communities related different genres of computer games reveals some quantitative dimensions of the phenomena. Each of the ten on-line communities in the survey had currently in between 2.000 and 58.000 members. The total number of members of these on-line communities was approximately 105.000, growing with a total rate of approximately 1.400 members a week.

To consumers of computer games on-line communities represent a “playground” where to exchange viewpoints, gossip, and in general enjoy interacting for its own sake. In this perspective the on-line community is an additional feature to the product that consumers

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<sup>10</sup> Adapting fastest mean being able fastest to take advantage of new technological opportunities. Or precisely, being able to reap the maximum benefits in software creation out of opportunities in the constantly evolving hardware solutions. That ability entails a great deal of foresight of predicting. Knowing - or guessing - when new hardware - of several categories - will be made available to consumers is crucial. Further, the ability to predict what this new hardware will be able to do is important.

<sup>11</sup> On December 10, 1993 at the University of Wisconsin hysteric crowds of students downloaded the first version cult-game Doom. This happened when Id Software was putting a free shareware version on the Internet starting with the Wisconsin ftp site. Bits and pieces of Id Software's apocalyptic computer game had been floating around on the Net for month - screen shots and a demo version. College kids had been playing the an early test version in networked multiplayer matches from computer science buildings around the U.S. Up to four people could play from remote locations, using the high speed T1 line or on a college localnet. It was the most brutally frightening game anyone had ever seen (Herz, 1997: 83).

already bought that allows them – if successfully employed - to search out more from the product and thereby to optimize joy. Seen isolated the playground is a fun service for consumers. I call the chitchat going on here for “playground gossip”. Nevertheless, consumers also exchange knowledge of interest for firms, in the sense that it reveals consumer’s preferences and ideas, and more importantly knowledge of problems of product design and suggestions for their solution.

To producers of computer games on-line communities are places where they can interact with their consumers, make announcements or simply watch what is going on among consumers. Computer games producers are to an increasing degree starting use on-line communities as sources for valuable feedback on various topics concerning their own products in a way, which was no possible before.

*“Before the on-line community? we only got response from those who found it worth picking up the phone or writing a letter. In that way you’ll only get feedback from extremely happy or extremely angry customers” (Director of New Business Development at Bethesda Softworks, March 2000).*

### **The categories of feedback**

Different categories of feedback are not equally useful for innovation purposes in the firm. On the basis of the empirical study it became clear that the feedback from consumers must be divided into two categories. The first category I call “flimsy feedback”. It reflects consumer’s preferences and dislikes, such as; which features consumers like best, complains and so on. But, flimsy feedback contains no direct suggestions or solutions and too much of it might be considered noise. The second category is what might be called “focal feedback”. It brings with it several useful answers to firm’s prayers. Primarily it brings solutions to firm’s problems in form of direct problem solving on technical issues such as detecting and - sometimes even - solving errors and mistakes in product design made by the producer<sup>12</sup>. Consumers act as a “quality control on the side” when they detect bugs and report them. Further, and equally as important consumers reveal – “home brewed” – small innovations and improvements that they have prepared for the game. For producers feedback of this kind is valuable for direct improvement in product design.

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<sup>12</sup> Within software environments errors in software-programs are called “bugs”. Finding these errors is called “bug-detecting” and the following process of improving upon errors is called “de-bugging”.

### The computer game firm and its external organization of consumers

As an illustration of the consumer - producer interaction and its outcomes I introduce findings from a study of a firm - Bethesda Softworks, its product, and its on-line community constituted by its consumers. Bethesda Softworks, is a game-publisher based in Maryland (U.S.). It's product the game "Seadogs" is one of several games invented and published by this firm. The game - a so-called "role-playing game" - and its story revolve around pirate life in the 16<sup>th</sup> century. To their own surprise Bethesda Softworks find themselves as one of the only publishers within this specific segment of role-playing games and pirate stories. The Russian software-development company Akella has undertaken the technical development. The game was released in the middle of October 2000. Three month prior to product release Bethesda Softworks chose to launch the on-line community called "Seadogs Forum". It was initially supposed to work as a discussion forum serving communication among the firm development department and its beta-testers during the test period, and further - as an additional spin-off - to fuel interest among potential consumers. The interest in the game prior to its release was substantial. As early as two weeks before product release 225 members<sup>13</sup> had entered the Seadogs Forum and their activity had at that time already resulted in 1.083 messages. In April 2001 - approximately six month after the product release - the forum comprises 1935 members.<sup>14</sup> As it becomes apparent in Figure 3, the largest proportion of members has arrived in the month following the product release where consumers start to play the game.

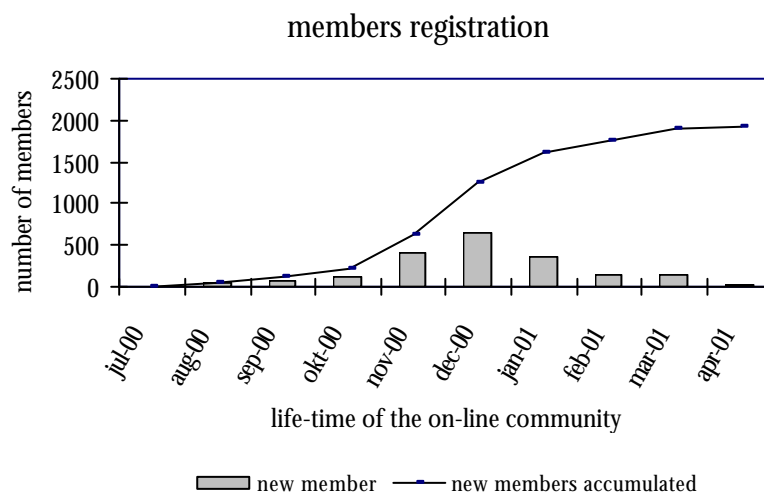


Fig. 3

<sup>13</sup> I employ the term "member" as synonymous to consumers in cases when Bethesda Softwork's consumers are enrolled in Seadogs Forum.

<sup>14</sup> The proportion of consumers who have chosen to become members of the Seadogs Forum obviously represents only a minor segment of the total number of the consumer who bought the game.

Over time the Seadogs Forum has accumulated members originating from most parts of the world. The 1.935 individual members of Seadogs Forum represent 49 countries and can therefore be said to have a high degree of dispersion<sup>15</sup>. Despite the fact of their dispersion, this proportion of Bethesda Softwork's consumers interact with each other, with publishers in Maryland, and with software developers in Moscow on a continuous basis. Within the Seadogs Forum the response rate on the topics posted (questions asked or suggestions made) on the Seadog Forum is 86,3%. In average when a new topic is posted it gets four responses. This makes the probability of getting a reply to questions or suggestions high. The qualities of feedback on Seadogs Forum is on average distributed with 36 per cent flimsy feedback, 41 per cent focal feedback and a rest of 23 per cent playground gossip.

### **Tracing the competent consumer**

As an approximation for competence of Bethesda Softwork's consumers I use three criteria. The candidates must pass a threshold related to each of the three criteria to pass the competence test,

1) the total *number of messages* posted by the consumer in his membership time on the Seadogs Forum. This depicts the member's rate of activity, experience, and rate of interaction through which he is assumed to have gained knowledge. A minimum of 30 messages is required to enter as a candidate for the "consumer competence group".

2) consumer's *membership time* of the Seadogs Forum; reflects experience-time in the on-line community, and in most cases also experience time with the game. This is due to the fact that most of the consumers becomes members just after having purchased the game. A minimum of one-month membership is required.

3) a *valuation of outcomes* of the individual's interactions. That is if their interactions have resulted in potential solutions or other meaningful outcomes for firm use. To meet the criteria the individual's respective amount of emitted playground gossip and flimsy feedback is required to be below the average values of the Seadogs Forum in general. At the same time the amount of focal feedback must be above the average value of emitted focal feedback in Seadogs Forum in general. In this particular case it means that a maximum 23 per cent playground gossip and 36 per cent flimsy feedback is allowed, while a minimum of 41 per cent of focal feedback is required.

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<sup>15</sup> Member - top scorer is the U.S. where 70% of members are located, followed by Canada representing 8%, and third with 3,5% the U.K. But, we also find members in Zimbabwe, the West Indies, and even one in Aalborg.

On this background we find on the Seadogs Forum that 202 members pass the first test. Most of them have posted far more than 30 messages, a few up to 700. In the second test 6 members are taken out leaving us with 196. In the third test 11 members fall, so the resulting group of competent consumers on Seadogs Forum is consisting of 185 individuals. Thus, the group of competent consumers on Seadog Forum makes up approximately 9,5 percent of the total number of members. Despite its relatively small size the competence group is responsible for 14.088 out of a total of 27.707 messages posted in the Seadogs Forum’s lifetime. It means that a core member group of 9,5 percent accounts for no less than 51 percent of the total activity.

By analyzing the quality of feedback in an equal number of randomly selected messages taken respectively from the competence group and then for the rest group of “non-competent” a difference in the average values of quality of feedback between the two groups became apparent.

**Fig. 4: The composition of feedback qualities of different groups of consumers (in per cent)**

	<b>Playground gossip</b>	<b>Flimsy feedback</b>	<b>Focal feedback</b>
<b>Competence Group</b>	16	27	57
<b>Non-competence Group</b>	36	43	21
<b>All</b>	23	36	41

The disparity of the feedback qualities between the competence group and the non-competence Group is remarkable. It shows that feedback originating from the competence group as a whole is much more focused than the feedback coming from the rest group.

**Feedback effects**

By way of consumer feedback Bethesda Softworks and Akella have been able to resolve at least thirty-two more or less serious problems related to the product design and – further - of adding thirteen new features improving the experience of playing the game. This happened within the first fifth teen weeks following product release. On basis of this consumer-generated knowledge, so-called patch-files have been created and made available - on-line and free of charge – to consumers. In this fashion consumer’s effort has been rewarded with an improved product – and thus with more joy.

The first of a total of four patch-files was released six weeks after the product had been marketed. It contained twenty-two solutions and added seven improving features. The second patch-file came after eight weeks. It contained three solutions and two added features. The

third was made available after twelve weeks and brought four solutions and two added features. Finally the fourth was launched in February 8, 2001 fifth teen weeks after the product release and enclosed three solutions and two added features. The trend is that most corrections were done on a short notice in the very beginning of product life-time. The last corrections served more for perfecting the product to a satisfying degree.

Bethesda Softworks' consumers are numerous. They count – of course - many more than those 1935 individuals who chose to participate in Seadogs Forum. However, by means of the Seadogs Forum, Bethesda Softworks have been able to create product testbed far larger than Bethesda softworks could ever achieve by other means. Despite the fact that Bethesda Softworks spent more than three month having beta-testers detecting the product prior to the product release, consumers immediately noticed remaining errors or inaccuracy in product design which beta-tester had overseen or have practically could do nothing to discover<sup>16</sup>.

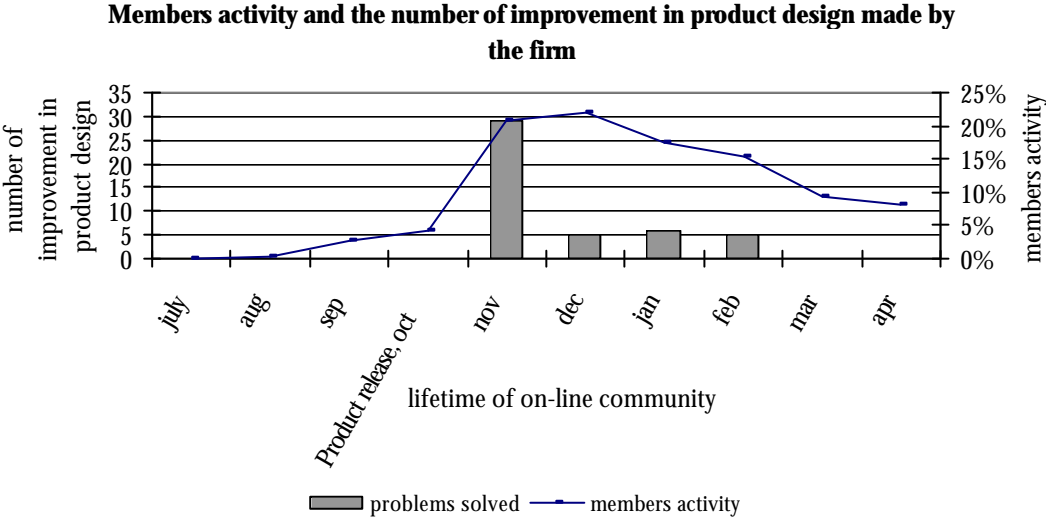


Fig. 5

As figure 5 illustrates, the activity (messages posted) in Seadogs Forum reaches its highest level in the two month immediately after product release. It is also in this period most of Bethesda Softwork makes the improvement on the basis of consumer feedback. Approximately forty per cent of the feedback that the firm has received is allocated during the first ten weeks. I find it reasonable to believe that timing of feedback also plays an essential role for explaining why

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<sup>16</sup> Many of the problems solved are related to the interface between the game software and specific computer configurations. Even through intensive testing it is almost impossible for the firms to take into account all the different combinations of hardware configurations on which the game will be installed and played. The scope for errors is extensive – and expanding, as up-to-the-minute hardware enters private homes.

consumer knowledge has been useful for product improvement. It is not likely that the feedback obtained by Bethesda Softworks would have been useful in the same way outside this time-window. With a product lifecycle of typically seven to eight months it is reasonable to assume that consumers feedback should fall within the first few months if improvement should take effects before the product starts to lose its appeal with consumers. I find it reasonable to argue that the instantaneousness of feedback which we observe in the case of the Seadogs Forum have left Bethesda Softworks with an important advantage in relation to other firms which do not – successfully - employ on-line communities.

### **Summing up:**

So far, this second part of this paper has demonstrated that dispersed consumers knowledge can be pooled. Consumers of the Seadogs game are dispersed in 49 countries. Nevertheless, by the Seadogs Forum they interact continuously and intensely in the period studied. Quality of feedback affects firm's possible outcome of interaction with consumers. Flimsy feedback works as a "preference revealer" but is generally difficult to implement it on the producer side. Focal feedback effects are valid for direct improvement in product design. The latter is most valuable for firm's purposes. A competence group of Seadogs-consumers was traced. It resulted in a group of 185 competent consumers constituting 9,5 per cent of the total numbers of consumers located on the Seadogs Forums. This small group has by far been the most active and have further emitted significant higher levels of quality feedback than the rest-group. Competent consumers and focal feedback coincide. Consumer feedback have resulted in a number of improvements of product design, which the firm benefit from. I argued that it is likely that timing of the feedback of consumers knowledge plays an important role for the usefulness of this knowledge for producer purposes. In this case consumers feedback activity coincide with the number of improvements that producers were able to carry out by way of consumers knowledge.

### **Coordination consumers, a question of incentives and "helpful authority"**

An important gap in this story remains to be closed. So far, I have told a story of knowledge, and about how knowledge can be pooled by the employment of technological devices. I have said nothing of essential social - and socializing - elements, which explain how consumer knowledge is in fact being coordinated. The underlying argument in this final part of the paper is that a social innovation - complementary to the technical innovation of the Internet - is in fact responsible for the efficient and meaningful use of this technological innovation itself.

Without the social element interaction turns into anarchy, it becomes noisy – and it dies out. The social innovation consists of a combination of incentives and authority carried out by “the moderator reward function”. Jointly, the technical innovation and the social innovation make way for interaction with meaningful outcomes. Only in the presence of both these elements access to consumers knowledge can be made into something useful. In the remaining pages I will argue that alignment of incentives and monitoring are preconditions for successful integration of consumer knowledge. Further I show how this is done in the case of Seadogs Forum.

Consumers must have some guiding principles in order to produce beneficial result for firms. The alignment of incentives<sup>17</sup> is critical and explains why interaction and knowledge exchange takes place in the first instance. When interaction is achieved the need for reducing the amount of noise (useless knowledge, chitchat and gossip) coming from the consumer organization is crucial. Noise generally decreases with the increase in consumer competence, but far from all consumers engaging in interaction are competent; noise is unavoidable. When incentives are not sufficient for interaction to bring about meaningful results, monitoring - or lets say - “help authority” is required to guide consumer’s actions and interaction. Monitoring combined with the exclusive right to revise relationships allows the execution of authority. However, in the present case of consumers – producer relationships it is important that authority also contain the exclusive right to alter incentives themselves. If consumers are not performing according to the aspiration of producers, penalty or exclusion is not likely to be the first consequences. The producer needs consumers to volunteer (to provide his knowledge free of charge) and this makes their relationship distinct from for example employment relations. The unique authority relationship between consumers and producers is limited due to the fact that consumers can leave the relationship at costs close to zero. Thus, for producers it takes “more carrot than stick” to establish an efficient mode of coordination in relation to consumers. *“It is the system of rewards that stimulate a productivity response”* (Alchain and Demsetz, 1972). This also goes for consumers. The optimal mode of coordination is what I call “coordination with a little hierarchy” monitored by a “helpful authority”. The most advantageous solution to the authority executions is when the acceptance of direction can be

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17 In many cases incentives for getting consumers to engage into interaction with producers are weak or even inadequate. Getting people to respond to questionnaires – a problem known to selected branches of economists – is a hard job. Why? It is because the creation of incentives for respondent to actually engage in the process is difficult. Nevertheless, firms constantly engage in that sort of activities, because outcomes are valuable. The incentive for consumers to exchange knowledge is not exactly that “you get what you pay for” over the short run. It is rather based on a long run “payback” expectation; that in giving away their knowledge they must expect some knowledge or visible acknowledgements or improvement of the product to return in the future.

achieved by the incentive structure itself, or when guidance and direction is welcomed by consumers (inspiration: Loasby, 1999: 47).

### **Incentives and “The moderator-reward-function”.**

The alignment of incentives that we find in the Seadog Forums is similar to those in many on-line communities in general. Knowledge can be obtained - but knowledge must also be given away. In order for the consumer to access the knowledge base of the on-line community, knowledge must be returned. A moderator employed by the computer games firm controls that actors stick to the rules. Incentives are designed by the moderators and are currently re-designed according to the experience that moderators gain.

The moderator acts as a gatekeeper between the firm and consumers. Above all he serves, as the one who assures and encourage that quality of the knowledge exchanged reaches a certain level in the first place. Further he assures that this level is maintained and that noise is kept low. He selects among the messages posted by the members; useful from the useless ones. Moderators upgrade or downgrade the rank of actors by evaluating their contributions. The reward function is almost automatic; for every meaningful message posted by a member he receives a message-point, that adds to his rank and thereby upgrade his member-rank. By responding to other's problems, by making problem solving for other consumers and the producer, the “problem solver” gets more formalized status. This subsequently allows him to enter otherwise closed discussion forums consisting of core knowledge holders on his subject. In these exclusive forums noisy communication created by inexperienced newcomers is avoided. It further gives the problem-solver more credibility and respect. As the member accumulate number of messages, which pass moderator control - his rank increases from “new member” to “junior member” to “member” and in the case of Seadogs to a final step “captain”. On the other hand when communication falls afar the forum purpose, no points are given and subsequently no increase in rank will take place. I call this “the moderator reward function”.

Only in cases where messages are deliberately useless or meant to insult a warning is given and in serious cases exclusions of the member is a probable consequence. Nevertheless, the moderators authority to directly penalize is most often carried out in a soft way<sup>18</sup>. Together the incentive structure and the moderator keep quality of knowledge exchanged up and noise down.

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<sup>18</sup> There exist examples where discussions have taken on impolite characters and therefore these discussions have been filtered out by moderators and the responsible member have received warning or have been excluded from participation. This has been the case at Seadogs Forum when members from different countries have gotten into nationalistic rivalry over historic events of the 16<sup>th</sup> century pirate life.

Thus, the moderator reward function seems crucial to control that the discussion and exchange stay within a suitable frame of the purpose of the on-line community. This function is generally accepted by the members of the Seadogs Forum as means of keeping discussion – that is the exchange of knowledge – efficient. There exist, of course many examples of on-line communities lacking some of these three features. Results are most frequently that discussions turn into anarchy, gets rude and subsequently the discussion - and is dies out.

As socialization processes takes place on the consumer-side the moderator is able to decrease his effort. As the competence and rank of particular members gradually increases they get more credibility. Over time high rank members begin to help other less experienced consumers. In this manner the moderator get released from some of his duties. For most moderators this is a well-known phenomena and it explains why even a growing members crowd in an on-line community can be managed with decreasing moderating effort.

*“we spend less time moderating members now than we did in the beginning...the point is allocate all the essential knowledge to key-members...so, they’ll do the job ”(The moderator at Seadogs Forum, March 2001).*

In this way moderators release time resources, which can be used more efficiently on concentrating on picking up the outcomes. Figure 6 illustrates how the moderator during, and just after, product release is extremely active. Later as the socialization process takes effect (members understand incentives, rules, and institutions are established) the moderator is able to decrease his activity - finally he to zero. The on-line community floats by itself. Nevertheless, as the product turns towards the end of its life cycle the activity also drops in the consumer organization.

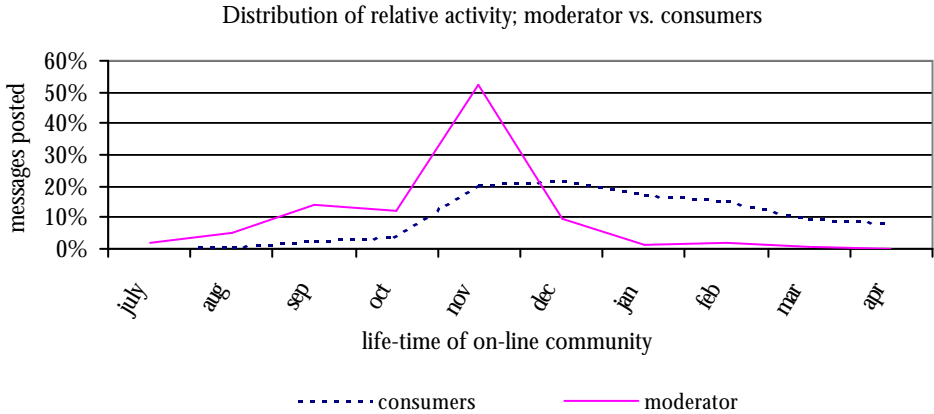


Fig. 6

According to moderators their effort-allocation should increase with the initial increase in consumer activity. In this fashion the firm is able to allocate crucial knowledge to consumers which guide consumers on track.

*“It allows us to step back and spend more time watching what’s going on” (moderator at Seadogs Forum, March 2001).*

The public relations management at Bethesda Softworks has lately begun considering “outsourcing” the moderating function to an individual consumer from Seadogs Forum. This possibility has become an option as management has become aware of potential individuals who in fact already act as “helpful authorities” in the on-line community. If “out-sourcing of functions to consumers” is a feasible strategy remains to be discovered – in another paper.

### **Concluding remarks**

The empirical findings show that by exploiting ICT opportunities and by setting up certain guiding elements Bethesda Softworks was able to establish a productive organization of consumers. Three to four months after its establishment the consumer organization had grown considerably. Despite the degree of consumer’s dispersion - in 49 countries over the globe - they interact intensely and continuously with each other and with producers. Out of the total organization of consumers a core group competent consumers could be traced. The group of competent consumers consisted of 185 individuals or 9,5 percent of the total consumer organization. The competent consumers were considered to be so on the basis of their activity, experience, and quality of outcome of their acts. Despite its small size the core group of competent consumers is responsible for more than half of the feedback emitted from the consumer organization. Quality of feedback affects firm’s possible outcome of interaction with consumers. Owing to the supply of consumer knowledge Bethesda Softworks had been able to make 45 improvements in product design. The quality of feedback coming from competent consumers is substantial higher than the feedback coming from non-competent consumers. On this basis (the high activity rate and high degree of quality in feedback by competent consumers) I find reason to believe that competent consumers must be held key accountable for the number of product improvements from which the firm has benefited.

One of the major advantage of this method of making consumer knowledge available, seems to be that consumes feedback is made available instantly as consumers engage the consumption and use of the product. In this case it allowed the firm to immediately spot many

problems related to their own product. By way of this process of allowing consumer to engage in product improvement the firm is able to improve product design much faster and in a fashion more targeted to markets than before.

Nonetheless, attention should be paid the fact that certain social aspects play a key role in establishing productive external organizations of consumers. A specific social innovation - complementary to the technical innovation of the Internet - is responsible for the efficient and meaningful use of this technological innovation itself. The social innovation is characterized the presence of incentives and authority - it is called "the moderator-reward-function". It plays an important role for the willingness of consumers to release their knowledge and for the quality of the knowledge made available.

On this background we find some answers explaining, "why some firms manage to take advantage of consumer knowledge". At the outset, because they are capable of taking advantage of opportunities represented by interfaces (in this case ICT). Further, for the reason that they manage to obtain a core of competent consumers who provide feedback valid for product improvement. Finally, they align (the right) incentives and provide "helpfully guidance" that get consumers on track. But, one must remember that only in the presence of both the technical device (ICT) and the social element ("the moderator-reward-function") beneficial outcomes will be from consumer knowledge.

In the case presented the firm decided to make a minor investments in managerial time to engage with consumers. Already in this initial experiment the firm benefited in the sense that it was able in a faster manner to improve on product design. On basis of this study I suspect that that diverting managerial time to explore the benefits from consumer contact is a feasible - and possibly superior - strategy that remains to be seen. By way of developments in ICT the availability of consumer knowledge will continue to increase. Altogether, I doubt that the major economic consequence of Information and Communication Technologies - as it is often claimed - stem from increased "networking" or from optimized business-to-business relations. I find reason to suspect that the significant economic effects of ICT will show themselves as the consequences of firm's uneven abilities to acquire, integrate and manage consumer knowledge.

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